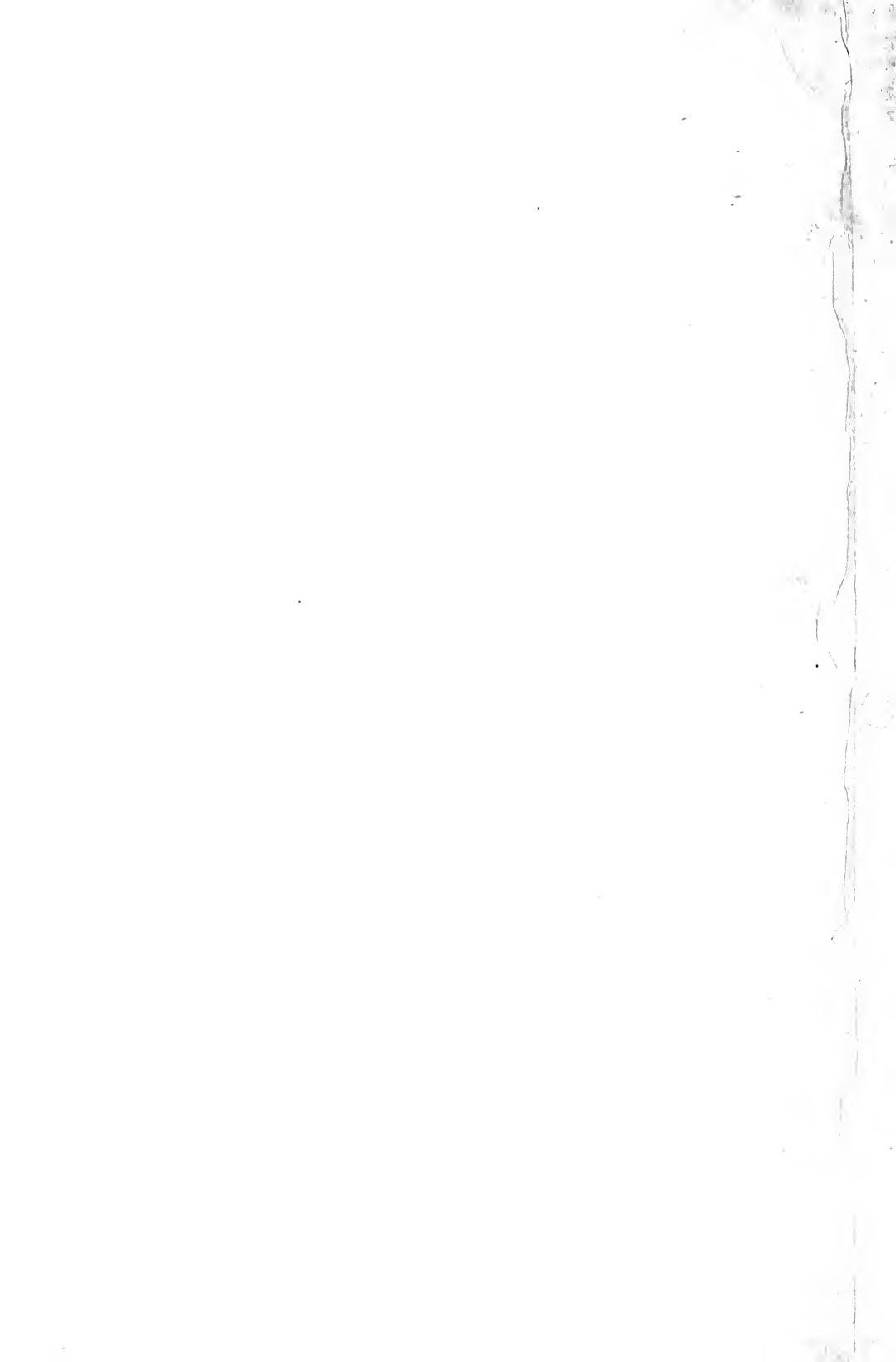


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FOUNDED IN 1874

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The Journal

OF

Nervous and Mental Disease

An American Journal of Neuropsychiatry, Founded in 1874

ORIGINAL ARTICLES

ON THE PATHOLOGY OF SENILE PSYCHOSIS THE DIFFERENTIAL DIAGNOSTIC SIGNIFICANCE OF REDLICH-FISCHER'S MILIARY PLAQUES *

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INTRODUCTION

The study of the psychoses occurring in the presenium and senium is one of the most obscure fields of clinical psychiatry. We find all sorts of complications accumulated in this period of life. Dementia praecox, manic-depressive, hysteric, psychopathic personality and other psychoses of earlier life may continue into this period, colored and obscured by the physiological senile reaction. On the other hand, the mental symptoms may be due to various involutinal and senile changes, such as menopause, arteriosclerosis, pure senile degeneration of the cerebral cortex, etc. Disturbances of the endocrine organs must also be taken into account because these are liable to undergo changes in advanced age. Alcoholism again manifests its symptoms more frequently in the decline of life. Cardiac and renal disturbances are met with in increasing frequency with the advance of age. Clinical differentiation is, accordingly, sometimes extremely difficult and even almost impossible.

Pure mental examination and psychoanalysis are almost helpless in understanding the true conditions of the patients. On the other hand, the pathological anatomy presents more definite data, which enable us to approach much more closely to the true situation, for

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clinico-pathological correlation is the only sure way to conclusively establish the diagnosis. It is for this reason that the present study has been made: 100 cases of senile psychoses (over fifty-five years of age) were subjected to thorough clinico-anatomical investigation. Effort was made, particularly, to determine the differential diagnostic significance of the Redlich-Fischer miliary plaques, which, it seems to the writer, is one of the most important problems related to the presenile and senile psychoses.

The presence of so-called miliary plaques in the cortex of the senile brain was first reported by Blocq and Marinesco in 1892. Redlich (1898) found the same structure in a few cases of senile brain and described the structure thoroughly. Alzheimer placed an important significance on the presence of the miliary plaques in a certain disease group described by him and designated as Alzheimer's disease by Kraepelin. In 1910 Fischer tried to establish the differential diagnostic significance of the plaques, studying 110 cases of aged psychoses both anatomically and clinically. Fifty-six from this material showed spherotrichia, of which forty-two cases presented a clinical picture of Wernicke's presbyophrenia. Fourteen cases showed paranoid, manic-melancholic and catatonic symptoms. He claimed that he found anatomic substrata of the presbyophrenia. However, a number of workers thereafter engaged in research on this subject observed such plaques in cases which do not correspond to the picture of Wernicke's presbyophrenia. In the second study on the same subject, Fischer modified his view and expressed the opinion that the plaque-positive cases represent a clinically and anatomically differentiable disease entity. This he called presbyophrenic dementia. Simple deterioration of senile psychoses which did not show plaques was called simple senile dementia. From his entire material, Fischer found 72 cases of presbyophrenic dementia, 42 cases of simple senile dementia and 44 cases of arteriosclerotic dementia. In addition to this, 35 normal senile brains were studied, 2 cases showing the presence of spherotrichia.

It must be understood, however, that the presbyophrenic dementia of Fischer's sense is altogether different from that of Wernicke's. It is called such because the majority of the spherotrichia cases showed clinical symptoms identical with those of Wernicke's and by this name the plaque-positive special group is differentiated from the simple type of senile deterioration which did not show plaques. Clinically Fischer attempted a further classification of this special group. "Wenn sich die Hallucinationen sehr haufen, kommt es

zum senilen Delirium. Das Ueberhandnehmen der Merkdefekte und der Konfabulationen fuhr zu Wernickeschen Presbyophrenie, die allein, ohne Delirium vorkommt, sich aber noch mit dem senilen Delirium kombinieren kann. Die Hallucinationen koennen auch noch paranoischen Charakter annehmen. Dann entsteht des Krankheitsbild der senilen Paranoia. Weiter koennen auch noch Stimmungsstoerungen, sowohl maniakalischen als auch melancholischen Charakters hinzutreten und schliesslich auch katatone Symptome, wodurch die Faelle jeweils eine besondere Faerbung bekommen."

These symptoms described by Fischer do not appear to be anything else except those of so-called senile dementia of the earlier textbooks. The classification of mental diseases in the State of Massachusetts is, as in most of the other states of America, based on the statistical manual proposed by the American Psychiatric Association (1917). The definition of senile psychosis (senile dementia) in this manual is as follows:

"A well defined type of psychosis which as a rule develops gradually and is characterized by the following symptoms: Impairment of retention (forgetfulness) and general failure of memory more marked for recent experiences; defects in orientation and a general reduction of mental capacity; the attention, concentration and thinking process are interfered with; there is self-centering of interests; often irritability and stubborn opposition; tendency to reminiscences and fabrications. Accompanying this deterioration there may occur paranoid trends, depressions, confused states, etc. Certain clinical forms should, therefore, be specified, but these often overlap."

The symptoms thus described are practically the same as those of Fischer's presbyophrenic dementia. Fischer, as the writer understands, wanted to differentiate the special group of presbyophrenic dementia from the simple type of senile dementia.

Differing from Fischer's results, Spielmeyer found the characteristic cerebral changes, especially an abundance of miliary plaques in cases which showed the usual symptoms of simple senile dementia.

Although Fischer's anatomical-clinical classification has not been generally accepted, his idea that the characteristic histological change which we are dealing with, must belong to a certain disease form, was approved by a number of authors. Spielmeyer even advises that the clinical differentiation of senile psychoses must be established on the basis of this peculiar histological finding.

Various workers, in fact, have devoted their studies to this subject, differing more or less in their results:

Sigg studied 26 brains of senile psychoses over sixty-three years of age. Thirteen cases showed plaques and 13 cases lacked them. Plaque-positive cases showed either symptoms of agitation or those of characteristic senile dementia. Almost all cases were committed in the institution on account of delirium occurring at night. Most of those cases showed also delusions and fabrication. Anatomically those cases presented, in addition to plaques, atheromatosis of the basal arteries, oftentimes with secondary softening. The plaque-negative cases were: three arteriosclerotic psychoses, three simple forms of senile dementia and seven other diseases in their terminal stage. As the result of his studies Sigg came to the following conclusions:

All cases of agitated senile psychoses invariably show plaques and arteriosclerosis. However, arteriosclerotic brains up to sixty-three years of age do not show plaques.

It would seem from Sigg's study that the psychoses with relatively pure amnesic picture do not show plaques, while cases manifesting specific senile agitation display an abundance of plaques.

Schonfeld, who studied 115 cases of mental diseases, observed that of 62 cases over fifty years of age, 22 (35 per cent) showed plaques. Patients under fifty years of age never presented plaques. Plaque-positive cases were 8 presbyophrenic, 5 presbyophrenic trends, 2 senile chorea with mental symptoms, and 3 undetermined cases (too short an observation). Plaque negative cases were 13 simple senile dementia, 3 post-apoplectic dementia, 2 arteriosclerotic psychosis, and 3 presenile dementia. Schofeld remarks that the spherotrichia is never absent in agitated forms of presbyophrenia; it is found also in the simple type of senile dementia and senile chorea.

Sinchowicz appears to place great differential diagnostic importance on the presence of the miliary plaques. However, senile plaques being found in normal senile persons and in some of the psychoses other than senile dementia, he interpreted the significance of this peculiar structure in a somewhat different way:

The mere presence of senile plaques does not necessarily indicate senile dementia. The number, arrangement, and size of plaques should be taken into consideration. The most important is the number. Four or five plaques (Leitz, obj. 3, Oe 3, magnification 80) in one optic field can be found in various psychoses and in normal senium. However, while the normal old person of ninety-four years of age presents 6 plaques in the frontal region, the senile

dementia of seventy-two years of age shows 52 in the same region. In cases where a limited number of plaques is shown, the age of the patient must first be considered. Four to five plaques can be found in one optic field of the frontal lobe of a normal ninety-year-old senium or of the seventy-year-old dementia praecox, or of a patient suffering from Korsakoff's psychosis. More than ten plaques in one optic field have never been observed in cases of senile dementia. A person 104 years old showing ten plaques can be considered as senile dementia, in a sense, the dementia being physiological. The combination of senile dementia with other psychoses may occur, for instance, with dementia praecox, and more often with arteriosclerosis. In normal senium the number of plaques increases with the age. A person 70 years of age has no plaques; 80 years, 1; 91 years, 4; 104 years, 10. This condition is entirely different in senile dementia. The severe cases here show abundant plaques. There is no particular relation between plaques and presbyophrenic dementia, as was proposed by Fischer. Not only the number but the arrangement of the plaques is of importance. In the normal senile and in psychoses other than senile dementia, the plaques are more or less scattered, while in senile dementia they tend to show grouping. In addition to this, the size of the plaques can be of differential diagnostic value. In senile subjects without psychosis, small sized plaques are encountered, while in senile dementia one observes a giant form among the smaller and medium sized ones. The giant form is never observed in any psychosis except senile dementia. The presence of miliary plaques in large numbers is found only in senile dementia, and cases failing to show any plaques at all belong to other diseases than senile dementia. Very few plaques can be found in normal advanced senium, psychoses, and somatic diseases of elderly persons.

According to Sinchowicz, therefore, the presence of the plaques may mean senile dementia or some other disease; the absence can rule out senile dementia.

The result of Fuller's investigation is somewhat different. The important conclusions of his paper are abstracted as follows: A large percentage, 62 per cent, of plaque brains exhibited gross lesions resulting from arteriosclerosis, and all showed more or less advanced cerebral arteriosclerosis. But cerebral arteriosclerosis was even more pronounced in nonplaque brains. Arteriosclerosis *per se*, therefore, appears to have little, if any, direct causative relationship to the formation of plaques. Since plaques have been found in the brains of elderly persons without psychosis, these peculiar structures

cannot be considered as characteristic of any special form of mental disease, although occurring with greater frequency in senile dementia than in any other form of insanity. The general histological evidence of these cases tends to show a similarity between the lesions of senile dementia and normal senile involution of the brain. The non-plaque cases in the series more nearly approximated the histological lesions of arteriosclerotic dementia. On the other hand, certain non-plaque cases which clinically progressed like senile dementia histologically did not show lesions essentially different from plaque cases except by the absence of plaques. Uncomplicated senile dementia, on histological grounds, appears, therefore, to be only an intensification of alterations found in normal senium.

As is seen in his conclusion, Fuller failed to classify plaque cases under a special group, although he says that plaques are found in senile dementia with greater frequency than in any other forms of insanity.

Huebner studied thirty-two cases of elderly persons both normal and variously diseased, and sought to establish a differential diagnostic value for the plaques. He found plaques in a case of manic-depressive, seventy-nine years of age, who had shown no marked dementia during life. Plaques were also found in a case of alcoholic dementia, sixty-six years of age. Huebner came to the conclusion that the presence of miliary plaques in the brain is not characteristic of any special psychosis and that the subject had at least reached the fifth decade is the most that could be advocated.

If senile dementia is only an intensification of normal senium (Sinchowicz, Fuller), and senile plaques are found regularly in advanced normal senile persons and indicate an involutinal process, the presence of plaques in senile dementia is not mere coincidence. However, to what extent this peculiar structure is of diagnostic significance can be determined only by the study of a large amount of material, carefully worked out both clinically and anatomically.

THE NATURE AND ORIGIN OF MILIARY PLAQUES

Few things are so obscure as the nature and origin of miliary plaques in the histopathology of the central nervous system. It will be useful, in connection with this study, to give the important opinions of former observers.

Redlich (1898), who was the first to describe these structures thoroughly, considered them secondary alterations of the neuroglia element, following primary degeneration and disintegration of gan-

gion cells. The plaques were found by this author more abundantly in the small and medium sized ganglion cell layers than in other cortical layers, and the degeneration of ganglion cells was most marked in those first two layers.

Cramer expressed the same opinion in the discussion of pathological anatomy of psychoses (1904).

Miyake (1906), in his report of two cases of senile dementia, considered the plaques of glial nature and designated them as Glia Rosette.

Alzheimer (1906) thinks that the plaques resulted from deposition of an unknown chemical substance produced by pathological metabolism. But the peculiar structures observed under the microscope are artefacts, being the result of chemical reaction between the metabolic substance and various fixatives and stains used. He did not express himself definitely about the perinuclear fibrillary substance, although he seems to favor the glial nature.

Leri (1906) believes in the glial nature of these structures, since he designated them as "sclerose neuroglie miliare."

Wada (1906) thinks that the plaques are only the result of necrobiotic process.

Herxheimer and Gierlich (1907) look upon these formations as resulting from greatly altered cells; *i.e.*, swollen cells with subsequent disintegration.

Bielschowsky advanced the opinion (1911) that the plaques are made by the primary thickening of neuroglia reticulum and secondary formation of the fibrillary substance in the center.

Ziehen agrees with the neuroglial conception.

Bonfiglio (1908) says that plaques are not the result of focal alterations of axis cylinders, as was claimed by Fischer in his former report, nor are they formed from the deposition in the brain tissue of the product of pathological metabolism. However, the changes begin with degenerative alterations of the ganglion cells and immediately surrounding terminal fibrillations of axis cylinders. Bonfiglio sees in the central nuclear mass the remains of degenerated ganglion cells.

Oppenheim (1909) described club-like swellings around the plaques, which were previously observed by Fischer and regarded as swellings of neurofibrils. By the neuroglia method of Weigert, Oppenheim was, however, able to demonstrate their glial nature.

Perusini (1909) described plaques as consisting of a central amorphous nucleus and two external concentric rings. In the inner

ring the variable substances of pathological metabolism are deposited, while the outer ring is glial in nature. Perusini interpreted this whole process as resulting from degeneration of the nervous element with subsequent thickening of neuroglia reticulum, in which the products of pathological metabolism precipitate. The surrounding glia element, reacting to this, produce fibers and encapsulate them as foreign bodies.

Bickel is of the opinion proposed first by Redlich.

Sinchowicz (1911), in his study on senile dementia, expressed his opinions as follows: Following destruction of the finest structures of the nervous element there is probably a primary thickening in the neuroglia reticulum. In this thickening there occurs a precipitation of products of pathological metabolism, among which glial scavenger elements make their appearance. In the periphery of the plaques axis cylinders show degenerative and regenerative alterations; the latter, oftentimes, being followed by further degeneration. The surrounding neuroglia tissue, reacting to this foreign body, produces large neuroglia cells trying to encapsulate the field by their fibers.

Fuller (1911) described plaques as consisting of homogeneous nuclear-like central mass and surrounding court. In the latter portion glia, nervous elements and other not definitely determined structures, fibrils, granules, and globules are found. The glia constituents and elements of nervous origin in the plaques exhibit not only progressive but regressive changes as well. Occasionally neuroglia cells are found in the place usually occupied by central nuclei. Such a picture was interpreted as encapsulating glia cells about a nuclear mass not in the plane of the section. Plaques without a homogeneous nuclear mass are not rare because these are not cut in the nuclear plane. (Alzheimer holds the same view.) The ganglion cell origin of plaques is discarded by this author because of the frequent appearance of plaques in the molecular layer and in the white substance of cerebrum where there is no evidence of heterotopia. As to the origin of the central nuclear-like mass the author has no definite conception. But the whole process may be regarded as due to products of pathological metabolism resulting from degenerating nervous elements (fibrils).

Fischer (1907, 1908, 1910, 1913) is the first to describe club-like proliferation of axis cylinders surrounding the plaques. This was interpreted as the result of necrotic process as acting as an irritant upon the nervous element. In later contributions Fischer demonstrated the fibrillary structure of plaques even by the simple staining

method, using hematoxylin and other basic dyes, although the fibrillary structure is not always demonstrated as the radiating mass of the nuclear. He gives sufficient reason, against the Alzheimer opposition, that the characteristic plaque figures are not artefact, *i.e.*, the result of chemical reaction between the products of pathological metabolism and the fixatives and stains used. Fischer, who studied the nuclear-like mass using various fixatives and chemicals, concluded that the mass is an albumen-like substance. As to the origin of this substance he expressed no definite opinion, although he thinks that it originated in the brain tissue.

Ziveri (1913) claimed that the central nucleus consists of calciumamynoid compounds. Marinesco and Minea think it to be Monaminophosphatide.

Cowe (1915), in his study on the rôle of neuroglia in the formation of plaques, came to the following conclusions: In the formation of senile plaques the neuroglia element does not participate. The ring of neuroglia fibers around the plaques can either be a real neuroglia proliferation or neuroglia fibers which had existed and been compressed chemically by new formed plaques.

The above is only a brief description of the representative opinions. Reviewing these, however, nothing very definite is obtained, except that the peculiar structure under consideration is indicative of a degenerative process of the central nervous system.

PERSONAL OBSERVATION: A MORPHOLOGY OF PLAQUES

A careful study of miliary plaques shows that the structures are not uniform in appearance. Most of the former observers paid special attention to one or two forms of plaques and tried to draw conclusions as to the nature and origin of the whole process which leads to the manifold appearance of miliary structures. This is the principal reason why the opinions of authors are so divergent.

The general morphology of plaques is best seen in sections impregnated with silver by means of the Hauptmann modification of the Levaditi method. Unless mentioned otherwise, the following description is based upon this particular staining:

(1) Spheric form with nuclear-like central mass (fig. 1): This is the main form of plaques described and discussed by most of the authors. It consists of a nuclear-like central mass and two concentric surrounding rings. The central mass is irregular in shape, and by high magnification reveals a jagged outline with radiating processes

simulating a conventional badge of the rising sun. The nuclear-like mass, usually homogenous or slightly granulated, presents occasionally coarse granules similar to those found in degenerating ganglion cells. On several occasions an apical dendrite was observed traversing the outer rings into the normal brain tissue. Such a picture was noted by various former observers, but was interpreted as of calotte section, the nuclear-like mass being the upper or lower of the

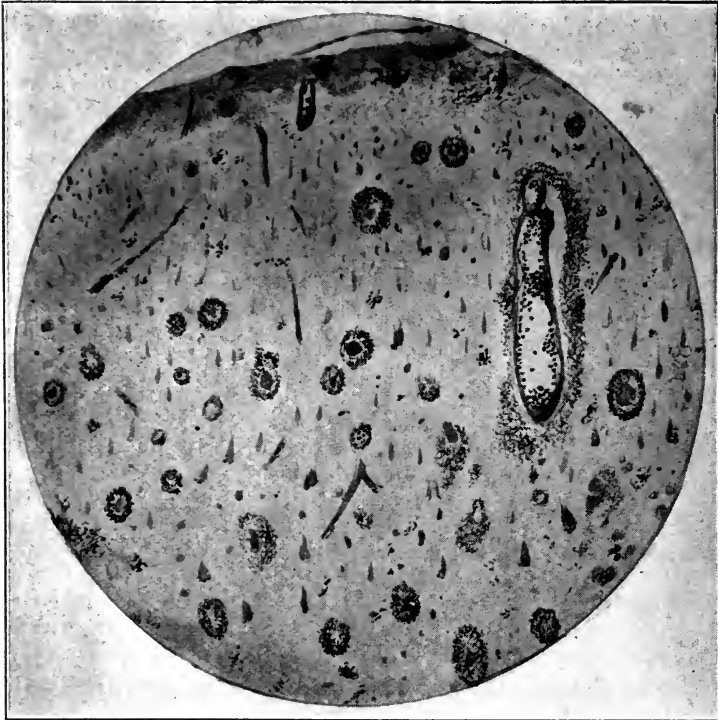


Fig. 1: Spheric form with nuclear-like central mass and perivascular form of senile plaques.

plane of section (Alzheimer, Fuller *et al.*). In order to know whether or not this exploitation is justifiable, 18 to 25 serial sections (each section six micron thick) were made and the relation was closely investigated. In the study of such preparations, the writer failed to detect any nuclear-like masses in these plaques; instead, the ganglion cells occupied the center of the plaques where the nuclear masses are usually found. These ganglion cells showed staining reactions in much the same manner as other typical nuclear-like masses.

This is evidently a direct support of ganglion cell origin of the plaques first claimed by Redlich. However, there is no reason to think that all nuclear-like masses are remnants of degenerated ganglion cells. It is true that plaque brains exhibit generally very advanced cellular degeneration,—disappearance of ganglion cells, marked fatty pigmentous degeneration, destruction of neurofibrillar structure, etc. But in several cases plaques were more abundant in brains in which the cellular element showed a fair preservation. Moreover, plaques with nuclear-like masses were shown in a few cases in ganglion cell-free-border of cortex and in the marrow stalk of cerebrium where there was no evidence of heterotopia. These facts cannot be explained by the ganglion cell origin of plaques. Some authors advocated a close relationship between nuclear-like masses and amyloid bodies. It is shown, however, that the nuclear-like masses and amyloid bodies reacted in a different manner toward various stains. They are also different in their morphology. Plaque brains exhibiting numerous amyloid corpuscles were not necessarily associated with the presence of abundant plaques. In no instance did the tissue surrounding typical amyloid corpuscles present a similar reaction to that shown by the external ring of the plaques.

At the present stand of our histochemistry it is almost impossible to define an exact chemical composition of this substance, although it does not seem, by any means, to be a lipoid matter so far as the staining and fixating agents are concerned. The fact that the plaques are found mostly in gray matter or at least in the neighborhood of it, and that plaque brains are greatly atrophic, presenting marked cellular degeneration, would favor the conception that these nuclear-like masses are products of pathological metabolism of gray matter, possibly of ganglion cells.

The inner ring of the plaques is a vacant space between the nuclear-like mass and the outer ring. On a few occasions a lipoid mass stained with osmic acid was demonstrated.

The outer ring consists of fine and coarse fibrillary substance, generally circular in shape, sometimes elongated and oval. The size of this ring is variable, ranging from a delicate narrow circle to a considerably wide band. The fibrillary substance was stained darkly by the silver impregnating method. The character of these fine fibrils could not be identified. They were not demonstrated by neuroglia stain of various methods. In all probability they represent the destroyed substance of the ground tissue. The coarse fibers, tortuous, curled, and club-shaped, are most likely neurofibrils, regen-

erating first and then undergoing degeneration. In some cases the coarse fibers showed characteristics of neuroglia fibers as demonstrated by Alzheimer. But these fibers were by far the fewer in number and do not seem to play an important rôle in the formation of the outer ring.

Occasionally neuroglia cells, healthy in appearance or sometimes considerably destroyed, were encountered in the outer ring. These cells were considered either as preëxisted or as phagocytic cells attempting scavenger duties. In rare instances pieces of degenerating myelin sheaths were found among the fine and coarse fibrils as described by Fuller and others.

In the direct neighborhood of plaques, on many occasions, neuroglia cells were encountered in the form of spider cells, protoplasmic body as well as dendritic processes exhibiting enormous hypertrophy. These were apparently trying to encapsulate the field involved, the attempt being, however, unsuccessful on account of the immediately following degeneration. In fact, the protoplasmic body of these spider cells showed evidence of degeneration, being often laden with an excess of fatty pigmentous substance. Prolongations of these cells were often irregular in outline, sometimes even granular in appearance.

(2) Diffuse form without nuclear-like central mass (fig. 2): A great many plaques do not show any nuclear-like central masses, and stand out by their intensive dark staining from the surrounding tissue. The size of these plaques varied from that of a small spheric form with nuclear mass to one occupying two or three cortical laminæ. These plaques consisted of ill-defined fibrillar masses grouped closely together, almost the same as described in the outer ring of the preceding form. Frequently these areas contained ganglion cells and nuclei of neuroglia cells. This form of plaques is found abundantly in severe cases where often forms are also numerous, and drew the attention of most of the former observers. However, the interpretation of such a structure varied a great deal.

Naturally it was thought by many that these were only calotte sections of typical plaques, the nuclear-like masses being upper or lower of the plane of section. Sinchowicz opposed this explanation because these areas often show grouping and, though rarely, a considerably large area of the cortex seems to be involved in the pathological process, also because the number of small and large areas is often enormous. This reasoning appears to be justifiable, although it is not by any means proved. In order to get a sufficient

insight, the writer again studied this condition in twenty-five serial sections. As was expected, these areas did not show any nuclear-like deposits and presented themselves merely as a diffuse alteration of the ground tissue. Sinchowicz regarded these areas as primary thickening of the neuroglia reticulum,—primary stage of the typical miliary plaques, preceding the secondary formation of nuclear-like central masses.

If this exploitation of Sinchowicz (although he does not give

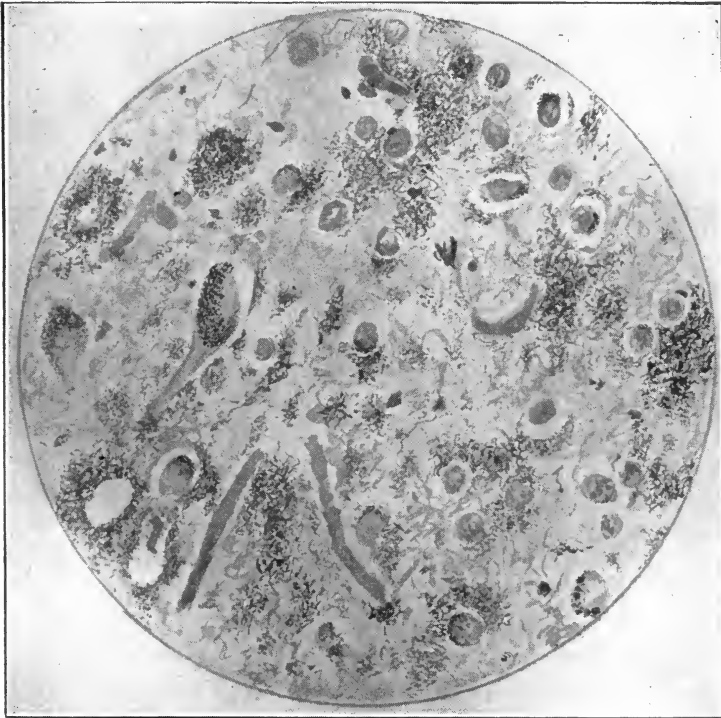


Fig. 2: Diffuse form of senile plaques.

definite ideas as to the precise *modus operandi*) was granted, the manifold appearances of miliary plaques can partly be understood. The writer agrees with the idea that the diffuse form without central nuclear-like mass is a result of primary thickening of neuroglia reticulum, because of the frequent findings of the circumscript thickened areas beside the well impregnated typical plaques. Following a destruction of fine nervous element there probably occurs hypertrophy and thickening of the reticulum, which, however, is subsequently followed by degenerative process, this being shown by a

highly argentophilic character of the field. As for the secondary appearance of the nuclear deposits, nothing definite seems to support the conception. In the earlier stages of plaque brains the spheric form with narrow outer ring appears free in the tissue when no marked thickening of reticulum is observed. Brains exhibiting rather scarce number of plaques often fail to show thickening of the reticu-

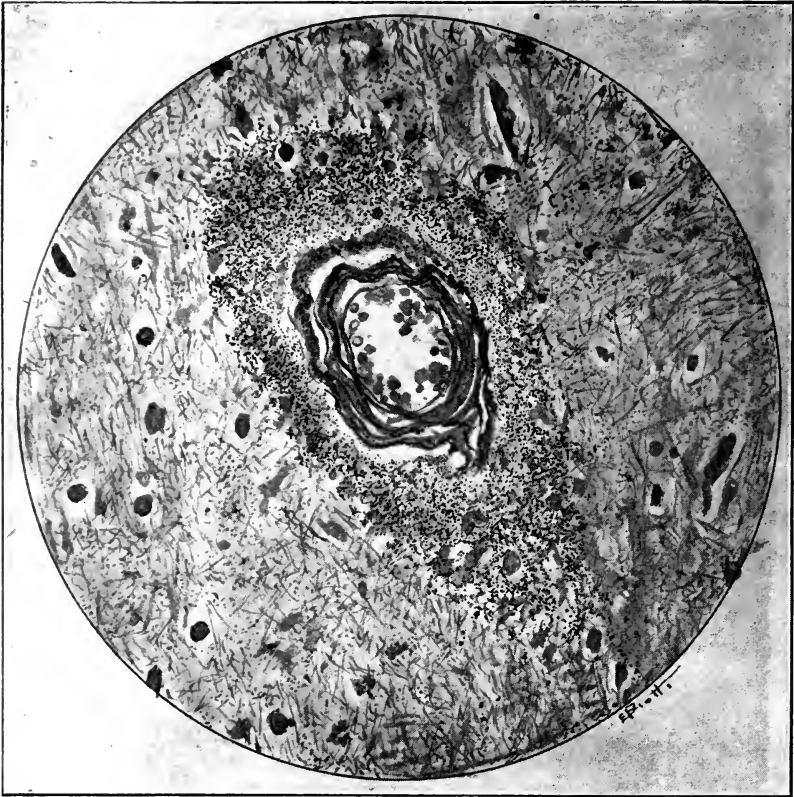


Fig. 3: Perivascular form of senile plaques.

lum and diffuse form of plaques, while, on the contrary, severe cases are apt to show numerous areas of diffuse form, bare of nuclear-like contents. These facts and some others which will be brought out later apparently oppose the idea that the nuclear-like masses are secondary products following the primary thickening of the reticulum.

(3) Perivascular form (fig. 3, fig. 4): The close relationship between blood vessels and plaques has not received hitherto due attention. Blood vessels in plaques were noted by various observers,

but here, again, those were considered as accidental or as lying in the periphery of the plaque not cut in the plane of section. A large number of cortical vessels mostly of upper layers were surrounded by dark stained fibrils of indefinite character identical with those found in previously described forms. That these vessels really form the central part of the plaques was directly demonstrated by the serial sections. Some of these vessels were markedly altered, show-

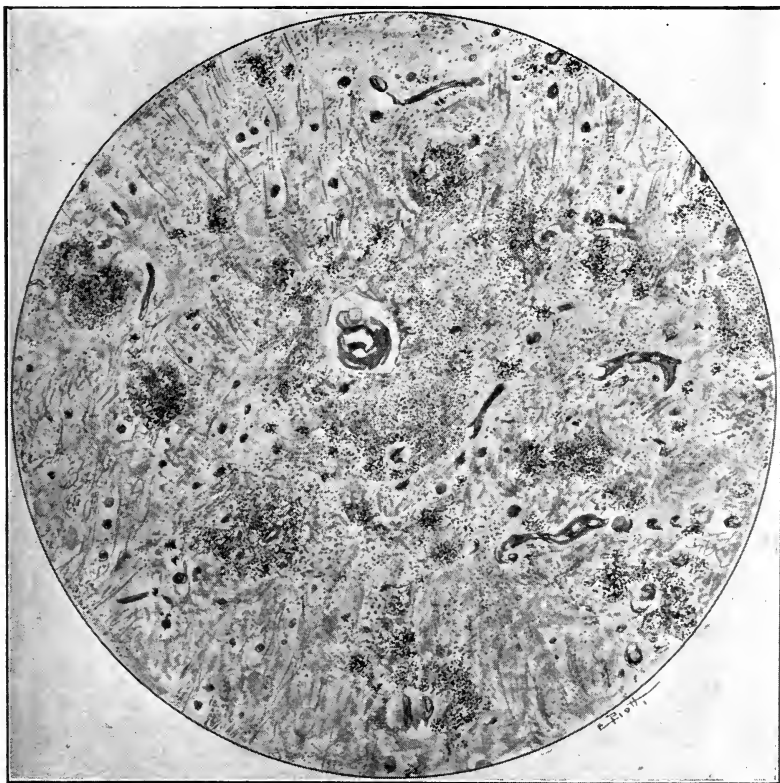


Fig. 4: Diffuse and perivascular form of senile plaques.

ing thickening of adventitia, hyaline degeneration, obstruction of lumina, etc., while others were shown with red blood corpuscles suggesting an apparent functioning. Occasionally globular substances showing fat reactions were found in the meshes of dark fibrils. The question may arise as to whether or not the perivascular form is a reticulum reaction to these foreign bodies and not to vessels. To this the general appearance of the structure may give a sufficient answer, because the characteristic alterations surrounded concentrically the

vessels and not the foreign bodies. It is most reasonable to think that this condition is an abnormal reticulum reaction to the degenerating blood vessels, first hypertrophied and then degenerated. Sometimes, mostly in the pyramidal cell layer (Brodman) one finds agglomeration of small and medium sized plaques without any nuclear contents. Such an alteration is encountered in advanced cases together with other forms of plaques. In a few instances, the writer discovered a

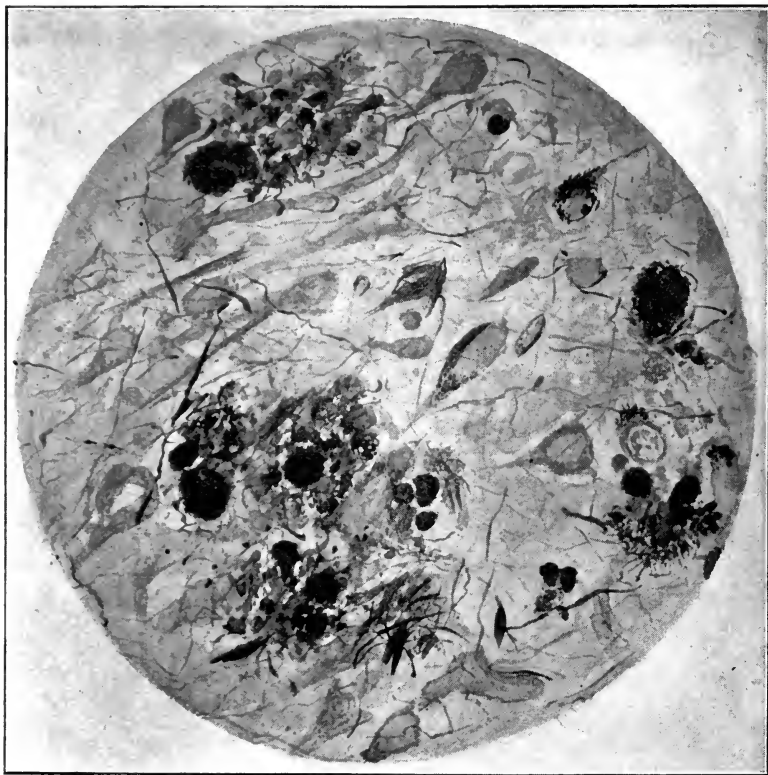


Fig. 5: Diffuse spheric form of senile plaques with globule-like contents.

blood vessel lying in the center of the agglomeration and the small plaques were found surrounding capillaries branching off from the central vessel. It appears to be quite possible that most of the agglomerations, if not all, originated in this manner.

At any rate, there is no doubt that the perivascular form is one of the main varieties of plaque and equal attention should be paid to this form. The idea that the central nuclear-like mass is a secondary

formation is no longer sustainable when the perivascular form is taken into consideration.

(4) Diffuse spheric form with globule-like contents (fig. 5): This form is encountered in the large pyramidal cell layers of Ammon's horn. Here, in the characteristic alteration of ground tissue one finds globules and droplets of various sizes, not forming a nuclear-like central portion, but scattered irregularly in the structure. Some of the globules were stained by sudan 3, scharlach R, fuchsin or cosmic acid. Others did not show any reactions to these stains but stained deeply by silver impregnation (argentophilic globules). These are, therefore, mostly products of pathological metabolism, various stages of lipoid matter. Occasionally, in this form, coarse fibrillary masses simulating Alzheimer's neurofibrillar degeneration were encountered. Pieces of degenerating myelin sheaths were not also rare findings.

(1) TOPOGRAPHICAL AND STRATOGRAPHICAL DIFFERENCES OF PLAQUES

As to the topographical distribution of plaques, nothing is to be added to that already described by authors. Generally frontal lobes and hippocampal gyri show most abundant plaques. These parts showed most marked cellular degeneration and atrophy of cortex. In a few cases of this study, cerebellum and basal ganglia presented fairly abundant plaques (fig. 6). In no instance were plaques shown in the spinal cord, but it is possible for this part to present plaques as reported by former observers. By no means, however, is it a frequent finding.

Not only did the number, but also the appearance of plaques, differ greatly by the stratographical locations. When very few in number plaques are mostly found in pyramidal cell layers, but when abundant they are encountered throughout the cortical laminae. In the white matter plaques are found mostly in the immediate neighborhood of the gray matter, although in rare instances they are found in the very center of the marrow stalk. In the cerebellum plaques were found mostly in the molecular layer, occasionally in the neighborhood of the Purkinje cell layer. Cerebella showing abundant plaques presented marked degeneration of the Purkinje cells, with their dendritic and axonal prolongations and tangential fibers and basket cells. No direct relationship is found between Purkinje cell degeneration and plaques.

Plaques, when present in the molecular layer of the cerebral cortex,

are generally irregular in form, varying a great deal in size. They lack nuclear-like contents. Side by side with well impregnated plaques, areas of reticulum thickening are frequently observed. Cell body as well as dendrites of the neuroglia cells in this region showed extremely advanced regressive changes. The diffuse form was also encountered abundantly throughout the other cortical layers. The spheric form with central nuclear-like mass was found in all cortical layers except in the uppermost molecular layer. Plaques in the white matter are spheric or oval and circumscript; the nuclear-like mass being often negative. The perivascular form was found mostly in



Fig. 6: Senile plaques in cerebellum. Bielschowsky's silver impregnation method.

upper cortical layers and in the terminal laminae of Ammon's horn. Form 4 is found throughout the cortex, but most abundantly in the large pyramidal cell layer of Ammon's horn.

SUMMARY: Plaques encountered in senile brains are not uniform in structure but consist of various components, differing by types and locations. *The structure common to all is the court (Hof) which consists of dark stained fibrils of indefinite character. This part represents in all probability, a destructive process of the ground tissue following the primary thickening of the neuroglia reticulum. The primary thickening of the reticulum is considered to be a reaction to the various degenerative processes of the ectodermal and*

mesodermal element, such as ganglion cells, neurofibrils, glia cells, glial fibers, blood vessels, products of pathological metabolism, etc. So far as the nature of the pathological metabolism is concerned the writer has no definite conceptions, although the ganglion cell origin is suspected.

The abnormal reaction of the reticulum, which seems to be the basis of the entire process, is the characteristic feature of the senile brains. It may be primary exhaustion of nutritive energy, or a secondary characteristic caused by specific exogenous agencies. Although a great many plaques are found around the vessels, the reticulum reaction is not considered to be dependent directly upon malnutrition of the parts supplied by altered vessels.

Although many points remain unexplained, it seems to be certain, from what has been studied by authors and by the writer, that the plaques under discussion represent a specific degeneration of senile brains and their equivalent.

SCOPE OF PRESENT STUDY

The material was derived from brains and cords of the laboratory series of Boston and Danvers State Hospitals, Massachusetts. Over 4000 brains and cords as well as blocks of internal organs have been carefully preserved in these laboratories. In order to obtain satisfactory results the writer employed as recent cases as possible, because those of later years have been more precisely worked out clinically. From the series of 1918, 1919 and 1920, consecutive autopsy cases (30 from Danvers, 70 from Boston State Hospital) diagnosed as Senile Psychosis, Psychosis with Arteriosclerosis and Involution Melancholia, were selected. The age of the patients varied from fifty-five to ninety-four. The number of patients according to decades is as follows:

Decades	Number of Patients
6th.....	10
7th.....	28
8th.....	34
9th.....	26
10th.....	2
	<hr/>
Total.....	100

These cases were systematically studied, not only for the presence of plaques, but for pathological alterations of any kind that might

possibly appear. For the demonstration of miliary plaques Alzheimer-Mann's method, Bielschowsky method and Hauptmann modification of Levaditi method were employed. For the study of the central nervous system in general, thionin staining, Weigert-Pal's staining for myelin sheaths, Weigert and Cajal's staining for neuroglia, Bielchowsky method for neurofibrils, Scharlach R, Sudan III, and osmic acid for lipid substances have been the routine of the laboratory. In addition to these, Van Gieson's method, Verhoff's method, light green fuchsin staining and several others were used. As the result of systematic anatomical studies, these cases were divided into the following six groups:

- (1) Cases in which miliary plaques are the prominent feature.
- (2) Cases in which miliary plaques are found together with arteriosclerotic changes.
- (3) Cases in which arteriosclerotic changes are the main feature.
- (4) Cases of marked parenchymatous degeneration without miliary plaques or arteriosclerotic changes.
- (5) Cases of minor parenchymatous degeneration.
- (6) Cases of organic lesions of other nature.

These anatomical groups were subjected to further consideration with regard to the clinical symptoms. Whether or not these groups of anatomical division correspond to certain clinical disease groups is the most important question, and this forms the frame of the present study.

GROUP 1. CASES IN WHICH PLAQUES ARE THE PROMINENT FEATURE

Cases under this group showed similar pathological findings, although individual cases differed more or less in detail.

Dura mater was thickened. The majority of cases did not show adhesions of the dura to the calvarium. Pachymeningitis hemorrhagica interna was a frequent finding in this group. Pia mater was thickened and showed milkiness along the large vessels and over the vertex surface of the hemispheres. Convolutions presented general atrophy, sulci being markedly gapped. In a large percentage of cases, however, the atrophy was confined mostly in the frontal lobes. The weight of the brain varied from 900 grams to 1375 grams; male average 1220 grams (normal male average 1358 grams), female average 1125 grams (normal female average 1235 grams). The average weight was, therefore, about 100 grams below normal. In most of the cases a marked increase of subpial cerebral fluid was

noted. Ventricles were much dilated and ependymal walls were thickened, occasionally being granular in appearance. In a few cases choroidal plexus showed various grades of cystic degeneration. Basal blood vessels were more or less thickened with some atheromatous plaques but when compared with those of the following two groups the sclerotic changes were rather moderate.

Microscopically, nerve cells presented sclerotic cell changes (Nissl) and granular degeneration (Sinchowicz) in addition to marked fatty pigmentous degeneration. In almost all cases of this group marked alterations of neurofibrils were shown. Neurofibrils were thickened or distintegrated or showed changes known as Alzheimer type of degeneration. In this type of degeneration the thickened neurofibrils are welded together to form a thicker and more darkly stained bundle. Following a complete degeneration of the interneurofibrillary substance, they form a peculiar tangled mass of whorl and snarl of neurofibrils. Alzheimer type of degeneration has been described hitherto mostly in plaque brains. In this series almost all cases of this group presented Alzheimer degenerations. The writer did not go into detail in describing the relationship between the plaque formation and the peculiar neurofibrillary change because of the negative evidence. Alzheimer type of change is to be regarded as resulting from an extremely advanced degeneration of ganglion cells.

The majority of cases showed a great reduction in number of cells, but this occurred diffusely and not circumscribed as was found in the immediately following two groups. Neuroglia cells were generally increased, occasionally forming distinct clumps (rasen). The cell free border of the cortex showed marked thickening of the neuroglia network. A great many neuroglia cells showed extensive degeneration,—marked pigmentation, atrophy of the nucleus, vacuole formations, etc. Fat corpuscle cells and granule cells were frequently found in perivascular spaces and around the plaques. Blood vessels of the cortex showed marked regressive changes such as hyaline degeneration, marked pigmentation of endothelial and adventitial cells.

All cases of this group showed miliary plaques. The approximate number of plaques (Bausch & Lomb obj. 16 mm. Oc. 10) is given in the description of each case. Cases showing focal degenerations were excluded from this group.

Case 1. Clinical Number 20718, Necropsy Number 2114, Danvers State Hospital. *Senile Dementia.* Female, age seventy-

seven. Whole duration of mental disease, four years. Marked memory defect. Although in her own home she stated that she wanted to go there, wanted to see her mother and father who had died many years ago. Accused people of stealing her things. Would go out and was unable to find her way home. Showed marked defect of retention. Fabricated freely. Had indefinite ideas of persecution. Died of bronchopneumonia.

Macroscopical examination of the brain: Weight 1090. Marked general and focal atrophy of convolutions. Chronic hemorrhagic pachymeningitis. Sclerosis of cerebral arteries. Microscopical examination: Convolutions atrophic. Great many Alzheimer degenerations. General fatty and sclerotic change of ganglion cells. Plaques were very abundant; 200 or more in one field. They were observed in cerebrum, stem ganglion, cerebellum, but not in the spinal cord.

Case 2. Clinical Number 21458, Necropsy Number 2169, Danvers State Hospital. *Senile Dementia.* Male, age seventy-nine. For fifteen years had an idea that people were persecuting him and trying to ruin his business. Had hallucinations of hearing. Five years ago, he signed over to one daughter all his possessions and then declared he did it when he did not know what he was doing and started to go to a lawyer to have things changed. He went out to see the lawyer and could not find his way back. Could not find his way from one room to another. Restless at night. He was completely disoriented. Had marked memory defect. Showed no hallucinations or delusions during the hospital residence.

Macroscopical examination of brain: Weight 1060. Markedly atrophic. Pachy- and leptomeningitis. Microscopical examination: Marked cell degeneration; diminution in number; fatty and sclerotic changes. Marked neuroglia proliferation. Alzheimer type of cell degeneration very abundant. Three hundred plaques in one field and the cortex is entirely replaced by these. Mostly large and diffuse form. A few plaques in marrow stalk.

Case 3. Clinical Number 20283, Necropsy Number 2177, Danvers State Hospital. *Arteriosclerosis.* Male, age eighty-three. He was found sleeping out in the bushes. Talked in an incoherent manner and was markedly confused. Had no idea of location. Apparently he had wandered away from home and could not find his way back. During the hospital residence of three years he showed marked deterioration; memory and retention defect. Rather euphoric all the time. No hallucinations or delusions. Died of general arteriosclerosis.

Macroscopical examination of the brain: Brain weight 1330. General atrophy of convolutions. Chronic leptomeningitis. Microscopical examination: Very abundant Alzheimer's degeneration. Ten plaques in one field. Cells showed general fatty degeneration associated with sclerotic changes.

Case 4. Clinical Number 19004, Necropsy Number 2179, Danvers State Hospital. *Senile Dementia with Arteriosclerosis.* Female, age seventy-three. Used alcohol excessively before admission. Became untidy. Frequently talked of those who had been dead many years. Memory almost completely deserted her. Poorly oriented for all spheres. There was marked retention defect. She fabricated freely. Apparently hallucinated. Died of general arteriosclerosis. Whole duration three years.

Macroscopical examination of the brain: Brain weight 1100. Marked general atrophy of the convolutions. Microscopical examination: Marked cell degeneration: fatty sclerotic cell changes, marked degeneration of extra- and intracellular neurofibrils. Very abundant Alzheimer. Twenty plaques in one field.

Case 5. Clinical Number 22262, Necropsy Number 2184, Danvers State Hospital. *Senile Dementia.* Female, age eighty-one. Whole duration about five years. First her forgetfulness was noticed. Would secrete things and then could not remember where she put them, continually hiding and hunting all day long. She was growing steadily worse. Memory has entirely gone. She does not recognize her own sister, does not remember her name. Her conversation was irrelevant and rambling. Is very repititious. Completely disoriented. Restless at night. Extremely untidy. She died of bronchopneumonia.

Macroscopical examination of the brain: Slight general atrophy of convolutions. Brain weight 1250 grams. Abnormal formation of Circle of Willis. Microscopical examination: Cortex show marked disturbance of the cytoarchitecture, great many cells having disappeared. Very marked general fatty degeneration and cell sclerosis. Alzheimer degeneration fairly abundant. Plaques were found ca. 100 in one field. They were mostly large diffuse form.

Case 6. Clinical Number 20645, Necropsy Number 2188, Danvers State Hospital. *Senile Dementia.* Female, age seventy-nine. Had been admitted about twenty-five years ago. She has probably been peculiar all the time. She was profane, told of old love affairs with men, with whom she had been criminally intimate. Throughout her stay in hospital was disagreeable, fault finding, mischievous in petty ways. She escaped once and then discharged. Has been always troublesome to community. On second admission was fully oriented, showed practically no memory defect. Inclined to be talkative, vehement in her replies, caustic and sharp. Has had ideas of persecution. During the hospital residence of two years (second admission) she was sharp and sarcastic, fully oriented, often irritable and excited. In the last year she appeared slightly demented and became untidy.

Macroscopical examination of the brain: Weight, 1020. General atrophy of convolutions. Slight chronic leptomeningitis. Microscopical examination: Arteries are sclerotic. Marked marginal

fibrillar gliosis. Cells show focally slight fatty degeneration, otherwise cell figure fairly good. No Alzheimer degenerations. Plaques were found only one or two in one field. Small spheric form (d. p. or some other disease).

Case 7. Clinical Number 22473, Necropsy Number 2197, Danvers State Hospital. *Senile Dementia.* Female, age sixty-three? Appeared to be seventy-five years of age. Has been an inmate of a city home. Became untidy and forgetful. Restless at night. On admission speech was incoherent and rambling. She was disoriented. Complete loss of memory. Marked defect of retention. No hallucinations. At times quite restless and noisy. After two months' stay in hospital died of mitral regurgitation and general arteriosclerosis.

Macroscopical examination of the brain: Brain weight, 1280. Slight atrophy of convolutions. Sclerosis of basal arteries. Microscopical examination: Arteries somewhat sclerotic. Diffuse cellular degeneration; fatty degeneration and cell sclerosis. Few Alzheimers. About 100 plaques in one field.

Case 8. Clinical Number 21581, Necropsy Number 2201, Danvers State Hospital. *Senile Dementia.* Female, age seventy-five. History not known. Brought to hospital by police. On admission she was disoriented and demented. Memory was completely gone. At times noisy and profane. Had no insight. Was extremely forgetful. Marked fabrication. After two weeks' hospital residence died of general arteriosclerosis and bronchopneumonia.

Macroscopical examination of the brain: Chronic pachy- and leptomeningitis; slight general atrophy of convolutions; external hydrocephalus. Brain weight, 1150. Microscopical examination: Marked general cellular degeneration. Increased capillaries and neuroglia element. Occasional Alzheimer. Immense number of senile plaques, more than 400 in one field.

Case 9. Clinical Number 22577, Necropsy Number 2211, Danvers State Hospital. *Senile Dementia.* Female, age seventy-seven. Whole duration of the disease one year. She began to think that people were slighting her and complained that they would not talk to her. Was very restless at night. Conversation was rambling and disconnected. Was depressed and asked for a knife to kill herself. Accused people of stealing things which she could not find. Consciousness is clear and well oriented. Has auditory and visual hallucinations. Memory defect for recent events. Believes that she is in Cambridge jail and that she is going to be electrocuted for her crimes. She was restless all the time.

Macroscopical examination of the brain: Chronic pachy- and leptomeningitis; universal atrophy of the convolutions. External hydrocephalus. Brain weight, 1200. Microscopical examination: General cellular degeneration. About twenty large senile plaques in one field. Many in cortical margin. Few Alzheimers.

Case 10. Clinical Number 21121, Necropsy Number 2216, Danvers State Hospital. *Senile Dementia.* Male, age seventy-eight. Duration three years. Disoriented for time and place. Thought he was sent here for punishment. Showed marked loss of recent memory. Defect of retention. Was restless at night. Occasionally irritable. After one year's hospital residence died of general arteriosclerosis and bronchopneumonia.

Macroscopical examination of the brain: Sclerosis of basal arteries; general atrophy of convolutions; external hydrocephalus. Brain weight, 1170 grams. Microscopical examination: Cytoarchitecture fairly good. Moderate fatty degeneration of ganglion cells. Alzheimer degeneration occasionally encountered. Marked marginal gliosis. About fifty plaques of large and aggravated form. A few in marrow stalk. Interesting is the relation between cell degeneration and plaques. Here the plaques are large and fairly abundant in spite of the relatively healthy ganglion cells.

Case 11. Clinical Number 22359, Necropsy Number 2222, Danvers State Hospital. *Senile Dementia.* Female, age ninety. Husband died about three years ago. Three years before her husband's death patient left him to live with another old man. She lived with this man about a year until he died and then she went to live with some other old man who died three years later. On admission she was fairly well oriented. Had some insight. Seemed to have slight speech defect. Very marked memory defect. Unable to retain any new perceptions. Was very untidy. Quiet and agreeable. Blood pressure 220-120. Died of general arteriosclerosis.

Macroscopical examination of the brain: Chronic pachymeningitis. External hydrocephalus. Marked basal arteriosclerosis. Brain weight 1130. Showed general atrophy. Microscopical examination: Cytoarchitecture disturbed on account of the marked cellular degeneration. Marked general fatty degeneration and cell sclerosis. Arteries sclerotic. Marked increase of neuroglia tissue. A few Alzheimers. About fifty plaques, large isolated form.

Case 12. Clinical Number 19514, Necropsy Number 2226, Danvers State Hospital. *Arteriosclerosis.* Male, age sixty-seven. Showed marked forgetfulness. Lost his way home. Was dull and stupid. Hallucinated in visual and auditory spheres. Was agitative and restless, especially at night. He was disoriented completely. Died of strangulation of sigmoid colon.

Macroscopical examination: General atrophy of convolutions. Brain weight 1150. Chronic pachy- and leptomeningitis. Microscopical examination: General cellular degeneration. Fatty change and cell sclerosis. Degeneration of neurofibrils. A few Alzheimers. About fifty large plaques in one field.

ON THE STRUCTURAL BASIS OF THE NEUROSES AND PSYCHOSES *

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There is a manifest tendency on the part of psychiatrists generally to assume that there is a physical basis for the psychoses and neuroses, although those are not wanting who minimize or even, by implication at least, deny the importance of this factor in both. Since Freud's doctrines began to be popular, the attention of workers has come more and more to be centered in that compensatory or defensive mechanism, superstructure if you will, which he explored so successfully; but whatever the attitude of his followers, Freud himself accepts a constitutional factor in the shape of a distortion of the sexual impulse.

It must be admitted that if such constitutional or physical factor be present, the possibility of its sometimes coming to have the power to determine the nature, severity and duration of the process is too important to justify the neglect which has been its share. It may be that in some or all situations the important factor is not the compensatory mechanism after all but the constitutional factor which may be said to give life and form to it; that the former is the invariable, nonspecific, and the latter the characterizing factor. We would think of this being the case when the inherent defect is relatively severe. The resemblance of this view to the organ-inferiority hypothesis of Adler is obvious as is also its difference from that view.

During some recent studies there occurred to the writer a method of estimating the physical basis of the psychoses and neuroses, if physical basis they have, that should be of the greatest service in elucidation, classification and prognostication. This method is that of analogy, of interpreting the unknown in terms of the known after man's universal fashion. For purposes of comparison conditions are selected which by nature and course seem most nearly to correspond to those which are under investigation, and feature by

* This is a preliminary communication; a more detailed analysis will follow.

feature the two groups are compared and studied for common factors that will aid in the elucidation.

In those studies effort was centered on the nature of the possible structural basis of dementia praecox. Using as a criterion for the selection of conditions for comparison the triad, obscure etiology, chronicity and progression, the following conditions were chosen: myopathy, progressive spinal atrophy, amyotrophic lateral sclerosis, Friedreich's ataxia, paralysis agitans, Wilson's disease, Huntington's chorea, torticollis, (trifacial neuralgia), pruritus vulvae and tinnitus aurium. A consideration of these conditions together with dementia praecox seemed to bring out the following facts: (1) that the conditions affecting lower levels have a definite structural pathology, while those involving higher have not; (2) that after the initial advance progression tends to become slower and finally to cease altogether; and (3) that involvement is not indiscriminate and lawless, but conditioned and limited by physiological function. From these facts, by deduction, it was concluded that in each case the pathological process involves only certain functional units and ceases when their destruction is completed; and that in all cases the basis is structural change but at higher levels this is not evident because of the size or of the scattering of the structures subserving the affected functions.

The way in which these conditions conform to rule becomes evident when two others, multiple sclerosis and syringomyelia, which fulfil the requirements of the initial criterion but do not lend themselves to further comparison are contrasted with them. The advance of these two conditions is indiscriminate, affecting different functions without choice and shows no constant tendency to become less rapid.

It was the assumption that dementia praecox belongs among those conditions of this group that affect higher physiological levels. Thus it would be a primary degenerative condition in which the degeneration involves a certain function or set of related functions; and the mental symptoms would be thought of as wholly secondary and therefore liable to great variations, or in certain instances to be lacking altogether.

The set of conditions used in this comparison belongs to the progressive type; it would be interesting to inquire whether there may be prototypes which are not progressive but stationary and congenital.

Following the foregoing conclusions, one is led to look for congenital defects conditioned by physiological function. Examples are not far to seek though in most cases the proof of structural basis is lacking. Among these may be mentioned color blindness, Little's disease (pyramidal aplasia), word blindness, absence of musical or mathematical ability, and possibly stammering and left handedness. These examples illustrate the radius covered by this type of condition and it is evident that somewhat in contrast to the progressive conditions they tend to be placed at higher levels. Congenital anomalies were excluded as being too much in the nature of accidents.

Corresponding to these deficiencies we may select among the psychic deviations those which appear to be stationary and congenital such as mental deficiency, psychopathic personality and tentatively the psychoneuroses.

Thus as a result of this analysis we have two separate and distinct processes, viz.: (1) the progressive or acquired, and (2) the stationary and congenital¹ each of which is conditioned by physiological function and has a basis in structural changes. Into one or the other of these categories the various psychic deviations may be made to fit.

It has already been implied that the functional units represented in these degenerations and deficiencies are unit characters in the genetic sense, which fact may be taken as further evidence for their structural basis.

On the basis of the foregoing deductions a grouping of the various mental deviations may be made:

- Progressive: Progressive spinal atrophy, paralysis agitans, etc.
 Dementia praecox
 Senile dementia
 Epilepsy
- Stationary: Little's disease, color blindness, etc.
 Mental deficiency (primary)
 Psychopathic personality
 Psychoneuroses

¹ Professor C. H. Danforth of the Anatomical Department has suggested that with the congenital conditions degeneration may have taken place before birth, and that therefore no essential difference exists between the two groups.

Doubtful: Manic depressive psychosis
 " Fear psychosis " (psychasthenia)
 Paranoia
 Compulsion neurosis
 Migraine

In each of these conditions, it may be, there is a different functional unit affected, which fact may be taken to explain the essential difference in their manifestations. As the mental symptoms are looked upon as being to a greater or less degree secondary, the variations in them are regarded as less characteristic—but with certain exceptions, for instance, in the case of the psychoneuroses, which will be discussed in a subsequent paragraph.

The nature of the functional unit as well as the shape and location of the anatomical structure is difficult to discover. One wonders whether emotion (in relation to manic-depressive psychosis) is a functional unit, whether "energy" is the defective unit in neurasthenia and so on; but it seems doubtful whether the affected units can be identified at these levels.

From the presence of a "doubtful" group, it is evident that it is not always easy to decide whether a condition is progressive or not. It may be that many conditions will have to be recast in new groups. Take "fear psychosis" for example; in some cases it seems definitely to have arisen late in life but in others to have existed from childhood, as in the case of a man of seventy years who remarked "I have always been afraid of everything." Again in the case of manic-depressive psychosis it is impossible to establish whether the defect is present from birth or arises later in life. Cases of these conditions must be further studied from the viewpoint adopted here, and also perhaps in their different aspects occurring in various members of the family.

The psychoneuroses, too, offer some difficulties. It is impossible to conceive of their depending on one common defect; the difference between some of the pictures seems too great and fundamental for that. More likely a great number of lesser defects may give rise to them. Let us take a hypothetical case, say of a musician depending on his music for a living and having a defect in the tone-trait of his musical sense. He may get along until some circumstance makes it imperative that he retain his position; the added strain in the presence of the handicap might result in a psychoneurosis. Such defects must usually be present in the neuroses of civil life;

indeed their occurrence is indicated by the tendency to hyperpyrexia spasms and states of terror found in some children.

In the psychoneuroses of war-time a different situation may exist. The fact that almost anybody may become subject to a neurosis militates against the postulating of a defect. It seems that unusual mental strain, fatigue or intoxication may either accentuate minor deficiencies or else depress functions to the point where they act like defects.

In any case, very evidently the estimation of the defect in the psychoneuroses is very difficult. The severity and type of the compensating mechanism cannot be regarded as any index in many cases. Still the effort to determine the nature of the defect should not be given up for it will often be found possible to separate the severe types, like, for instance, the compulsion neuroses, from the mild.

There remains the question of proof for the existence of these structural factors in the psychoses and neuroses. The field is at best a speculative one for in most cases direct evidence cannot be offered. The structural changes found in dementia praecox by Gurd, Southard and others is favorable evidence in that instance. So also are the mere facts that these obscure conditions are found in a domain where obscure conditions having a structural basis are numerous and also that they lend themselves to the comparisons already indicated. That there is no correlation as to incidence is neither evidence for nor against. The deciding evidence, however, is whether or not this assumption explains all the facts better than another.

This hypothesis is in no sense to be taken as a contraindication to treatment. The value to the individual and to the community of relieving disturbing symptoms arising out of efforts at compensation must remain as obvious as ever. On the contrary, there is an advantage in knowing from the first to what extent relief is to be anticipated from treatment.

SUMMARY

This presentation is an attempt to explain the nature of the structural changes which have been assumed to be the basis of mental deviations. The method is that of comparative study. Taking for comparison such obscure nervous affections as progressive muscular atrophy, paralysis agitans, Little's disease and color blindness, it is shown that they fall into two groups, viz., (1) the progressive and acquired, and (2) the stationary and congenital conditions. Evidence

is offered to prove that they all have a structural basis and that in each case the degeneration or deficiency affects structures subserving one or a few closely related functional units. Through further comparisons, mental deviations are shown to fall into one or the other of these groups. If this hypothesis proves to be true and structural changes are found to be the basis of mental deviations, its value in relation to prognosis and treatment is obvious.

SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

THE THREE HUNDRED AND NINETY-EIGHTH REGULAR MEETING WAS HELD AT THE NEW YORK ACADEMY OF MEDICINE, TUESDAY, OCTOBER 3RD, 1922, THE PRESIDENT, DR. FOSTER KENNEDY, IN THE CHAIR.

The following program was carried out:

I. CLINICAL CASES

Dr. T. K. Davis presented a patient in whom there was double papilledema, caused by blocking of the cord at the fourth cervical; this was greatly relieved by operation. The case history is as follows:

The patient, male, twenty-four, was admitted to Bellevue Hospital last spring. The family history was negative; the personal history showed previously healthy life, and venereal disease (both congenital and acquired) could be excluded. He was ill two years before admission with headache, dizziness and vomiting; no diplopia or fever. He improved and returned to work (clerical), and was well for a year when the headaches returned, and the legs and arms felt weak. On admission to hospital early in February, 1922, examination showed slight papilledema, diminution of deep reflexes in the arms, presence of reflexes in the legs with a positive Babinski on the left; abdominal reflexes normal; no sensory changes in the upper extremities. The X-ray of the spinal column showed no bony involvement, no spondylitis, and the X-ray of the skull was negative. The spinal fluid was negative for cells and for colloidal gold curve. Both spinal fluid and blood Wassermanns were negative. Heart and lungs were negative. Blood pressure was 130/80; nonprotein nitrogen 30 mg. There was no cervical rib. The youth showed some congenital abnormalities, *viz*, hypospadias and an undescended testicle on one side, also a doubling up and over of the fifth toe on each foot.

The headaches were greatly improved by lumbar puncture, and the patient went home, but was kept under observation. Two months later he returned with increased symptoms,—weakness of arms and hands (very marked atrophy of arms, hands and shoulder girdles), and increased headaches and papilledema. The triceps reflexes were now absent, the biceps reflexes present though weak. There was hypesthesia over C. 3 to 8, inclusive, and over D. Over D. there was also a disproportionate disturbance of temperature sense in addition. On one occasion he had a general convulsion without loss of consciousness, lasting only two minutes. In this there were clonic spasms of all extremities as well as lateral rotation of head

and eyes from side to side. In view of this convulsion, the severity of the headaches and the increasing papilledema, a laminectomy was deemed advisable, and the third, fourth, and fifth laminae were removed in June, 1922. A very tense dura was found, with the cord completely filling the dural cavity and an apparent lack of fluid below an enlargement at the fourth cervical segment. Exploration was made for a dural tumor but none was found.

The swelling about the fourth cervical was incised in the posterior midline, and a cavity was disclosed, which on probing was found to be about 1.5 inches long. One feature worth mentioning is that the operator, for some reason, not fully explained, was unable to pass a probe upward through the foramen magnum. The patient made an excellent recovery with disappearance of the papilledema. Post-operative treatment has consisted of massage, and the course has been very favorable. He has gotten back considerable strength. The greatest disability remaining is in the left deltoid and left pectoral muscles, but even these muscles respond to both faradism and galvanism, and with normal polarity.

The case has been considered an interesting one inasmuch as it is one in which a moderately high cervical lesion caused bilateral papilledema and one which has shown a rather surprisingly good post-operative course following incision of a syringomyelic cavity.

DISCUSSION

Dr. Frederick Tilney asked if the papilledema disappeared after operation.

Dr. T. K. Davis replied that the optic cups are still somewhat obscured; the edges of the discs are a little irregular in outline. These, he said, are the only changes, and he thought they indicated a certain degree of post-neuritic atrophy.

Dr. Tilney continued: The case appears interesting because the change, as far as one knows, was so remote from the particular lesion. Certain things in the symptomatology, such as the convulsive seizure described, would lead one to believe that the lesion in the cervical cord was not the only pathological change involving the central nervous system, so that the papilledema might be explained by something else than the blocking of the subarachnoid spaces. Where stigmata are so numerous, there may be other lesions, such as embryonic rests or cyst formation in other parts. I should want to make a mental reservation in the diagnosis of such a case to the effect that this might not be the only lesion existing.

Dr. Foster Kennedy said: We were very much interested at Bellevue in this boy. He seemed to fulfill all the conditions required by our theoretical conceptions. The cervical gliosis was definite, with motor segment atrophies. The segmental sensory disassociation proceeded rapidly, coinciding with intense headache and severe papilledema; this seemed to demonstrate the fact that the papilledema was due to acquired hydrocephalus and operation corroborated this explanation. The cord filled the canal; there was no pulsation below

the level of the bulge. On incision of the dorsal column a large cavity was found. This upheld our diagnosis in every respect, because the incision of the syringomyelic cavity and cord decompression produced amelioration of the papilledema. Dr. Tilney's remark that there may be other embryonic defects of the brain which produced the convulsion and papilledema can neither be proved nor disproved, but the facts as we know them are opposed to that conclusion. The convulsion was synchronous with a period of tremendous intracranial pressure, and relief of the spinal pressure produced relief of the intracranial symptoms. Therefore, as far as one can judge, Dr. Tilney's mental reservation is not necessary to explain the symptoms. These cases of high cervical lesions producing intracranial effects have been in the literature since 1902, but this is the first case I have seen personally.

II. PAPER

STUDIES ON THE EVOLUTION OF CEREBELLAR FUNCTION

A CONSIDERATION OF SOME COMPARATIVE EMBRYOLOGICAL AND EXPERIMENTAL EVIDENCE

DR. FREDERICK TILNEY

[Stenographer's Abstract]

Dr. Tilney said: I have devoted attention for many years to the study of the functions of the cerebellum. It may be stated that conclusions hitherto drawn from experimental work on mammals are not satisfactory, because one cannot say definitely what has been done to the animals. Pathological observations on many are also unsatisfactory. We must therefore seek for a better understanding of the morphology of this organ by going back earlier in the scale and picking up threads *de novo*. In the evolution of the cerebellum four postulates may be stated: (1) The organ first made its appearance in the transition from the invertebrate to the vertebrate, in response to the demand for a new function; (2) This new function was dependent upon the alteration of the neuroenteric tract; (3) A mechanism was required which should control the maintenance of the animal in the optimal physiological posture; (4) When the center for the management of posture had become determined, the new organ, the cerebellum, began to assume the function of all posture maintaining activities in the motor sphere.

Dr. Tilney showed models and slides tracing the development of the cerebellum through the various stages:

1. The *Archiparencephalon*, a ridge of cells in the dorsal part of the medulla, as seen in the lampreys,—parasitic fishes, with little motor activity. This is a bulbar, not true cerebellum (*Cerebellum bulbare*).

2. The *Paleoparencephalon* or medial cerebellum, as in sharks and rays,—fishes with considerable motor activities. There is a stratified cell layer, connected with the semicircular canals. The demands of the organism have called for a differentiated organ (*Cerebellum mediale*). Higher in the scale, the birds show marked change in the type of tissue, with indications of lateral lobe development, probably corresponding to the necessity of controlling automatic, associated movements of the extremities and body segments.

3. The *Neoparencephalon* or lateral cerebellum (*Cerebellum laterale*), occurring in mammals, and associated with the development of independent movements of the fore and hind legs (the neokinesis of Hunt). Platypus, the most primitive type of mammal, shows the earliest indication of lateral lobes. Passing from the lower and higher mammals to the quadrumana, the development of the dentate nucleus goes progressively forward. In the gibbon, orang, chimpanzee, gorilla, and lastly man, the progress of the lateral lobe ascends in relation to the amount of postural control of the independent movements of the limbs.

DISCUSSION

Drs. Elsberg and Timme thanked Dr. Tilney for his splendid presentation and expressed their appreciation.

Dr. Foster Kennedy said: I would like to ask Dr. Tilney to devote a few moments to the consideration of the postural mechanism in the invertebrates. They have no cerebellum as we know it, but the postural coordination of insects is perfect. Dr. Tilney's definition of motion as a "fluid stream of postures" is a sound one. Clinicians would agree to that interpretation. Cerebellar lesions produce a decomposition of rhythm, the stream being broken into its component parts. I would like to ask about the idea of the development of lateral portions in birds. I think in some birds (such as the fighting ostrich and the hawk), there are seen distinct neokinetic powers in the independent action of one limb. Here are highly coordinated movements with almost no development of the lateral lobes of the cerebellum in these creatures.

Dr. I. Strauss said: There is no doubt about the facts as set forth by the speaker in this beautiful and painstaking work. Everyone must appreciate the labor spent on these slides and reconstructions. Dr. Tilney's thesis involves the discussion of a philosophical question. Does function change morphology, or is morphology altered by something else? The old Darwinian theory of the survival of the fittest has had to be modified. There are myriads of mutations of species. The Darwinian law determines which of the variables should survive, but is it not more correct to say that there have been variables and certain of these which have been found of use to the organism have been allowed to remain. That would explain the development of the lateral lobes. In regard to the birds, it struck me

that many movements are independent. They are not all associated or automatic. The scratching of hens and the wing movements of some birds in fighting are independent. In the jump from birds to mammals there is considerable lateral lobe development, and there seems to be a gap in the line of reasoning which has to be bridged over. Possibly there may be some other factor or force which has to do with development of this part of the brain.

Dr. Abrahamson said: Decerebrate rigidity must be regarded as posture; removal of the cerebellum does not change it; removal of a portion of the brain stem especially in the neighborhood of the Deiter's nucleus, produces a loss of the hypertonicity, a change from extensor to flexor posture. This region of the brain stem is represented in part by the *cerebellum bulbare* (Tilney) which controls the truncal muscles, but not the extremities; yet removal of this part causes a marked change in the posture of the extremities. It is my opinion that the function of the cerebellum is to regulate and synergize the movements in the passage from one posture to another; that it exerts little or no influence on the posture itself.

Dr. F. H. Pike (by invitation) said: With regard to decerebrate rigidity, Sherrington investigated that question long before the work of Magnus. Decerebrate rigidity appears after the transection of the brain stem in front of the corpora quadrigemina, but the whole midbrain region must be left intact. The rigidity disappears when the dorsal roots of the spinal nerves are divided, or when the dorsal and ventral spinocerebellar tracts are sectioned, with the dorsal roots intact. Transection of the brain stem at the lower border of the midbrain also abolishes decerebrate rigidity. Ninian Bruce traced fibers originating in cells in the nucleus dorsalis (Clarke) up to the anterior and posterior corpora quadrigemina. Thiele had shown, some years before, that careful ablation of the cerebellum did not abolish decerebrate rigidity.

Dr. Frederick Tilney (closing) said: I think there is a definite degree of neokinesis in the bird, which is associated with the incipient lateral lobe formation. There is, however, considerable work to be done before confirming this view. I think posture is an essential of motion. With reference to the philosophic criticism of Dr. Strauss,—I think it would take us a long time to come to a definite conclusion, and the discussion would degenerate into purely an academic one. With reference to the priority of function or form,—we must interpret facts as a form-function relation. I believe, personally, that form precedes function, because in passing from one form to another the alteration of an essential part alters the relations of all parts of the body. I cannot answer the question about invertebrates, as I have not made a personal study of this side of the work. I think we are beginning too high up in our neurological studies and we shall have to look for the answer to some of our problems in the invertebrates. I am told by those who have studied the subject that there are parts in the arthropods and arachnoids which show cell groupings

in communication with the peripheral organs and the semicircular canals, the proprioceptive system and corresponding organs. As far as decerebrate rigidity is concerned, I do not know what it is; no one does. It has not been analyzed.

Dr. F. H. Pike (by invitation) gave a demonstration of animals in which the results of recent lesions of the cerebellar cortex of one side were contrasted with those resulting from extirpation of the otic labyrinth of the same side. In the cat the postural disturbance was very marked in the latter case. The head was turned about the long axis of the body, from 45° to 90° to the side of the lesion. If the animal lay on one side,—the right or sound side,—the tip of the nose was turned up to an angle of nearly 90° with the table. If the animal attempted to walk, it rolled over repeatedly to the side of the lesion. There was no actual disturbance of the movements of the limbs, but the animal was unable to control its posture or position. It has been shown in other experiments that the head straightens up after division of the dorsal roots of the cervical nerves on the opposite side, to that of the vestibular lesions. There are also rhythmical movements of the eyes, with a slow deviation to the side of the vestibular lesion, and a quick movement in the opposite direction.

It was formerly stated in the textbooks that the effects of cerebellar lesions were essentially similar to the effects of vestibular lesions. This was something that everyone knew, and the question was not open to argument. But in the cats exhibited, those with cerebellar lesions did not show any true ocular nystagmus. Sight oscillations or tremors of the eyes could be made out when the animal looked at a near object intently. There was no torsion of the head, and the animal did not roll over when it attempted to walk. It turned to the side opposite to the lesion in walking, or went straight ahead. It could turn to one side of the lesion in walking. The fore foot on the side of the lesion was raised higher in stepping than the other fore foot. The symptoms observable were concerned with movement rather than posture. Our observations on ocular movements of cerebellar origin, or, more correctly, in cerebellar lesions, are in general agreement with those of Eckhard. He removed the cerebellum of a frog with extreme care, and, in those experiments in which he was sure that he did not injure the medulla oblongata, he did not get ocular nystagmus.

The posture of the pigeon with a severe cerebellar lesion is more affected than is that of the cat with a cortical lesion. There was some rigidity of the legs and toes in the animal exhibited, but this was not indicative of a cerebral lesion, and could not be called decerebrate rigidity. True decerebrate rigidity has not been described in the pigeon. It will be remembered, also, that, in Hughlings Jackson's original figure of a child with cerebellar lesion, there was opisthotonus and extension of the limbs.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY—METABOLIC INTEGRATION.

1. VEGETATIVE NERVOUS SYSTEM.

Crile, G. W. STUDIES IN EXHAUSTION. [Archives of Surgery, Chicago, March, 1921.]

The results of this study may be summarized as follows: Prolonged insomnia produces histologic lesions in the liver, the suprarenals and central nervous system. Prolonged insomnia produces no appreciable alteration in the H-ion concentration of the blood. Prolonged insomnia decreases the electric conductivity of the cerebrum, cerebellum and spinal cord. Sleep repairs the histologic lesions in the central nervous system and in the liver except in such cells in which the nucleus has become disintegrated. Sleep and rest, if sufficiently prolonged increase the electric conductivity of the central nervous system to, or above, the normal. Nitrous oxid-oxygen to some extent appears to be an efficient substitute for sleep so far as restoration of brain exhaustion is concerned.

Luzzatto, R., and Levi, A. DISSEMINATED NERVE LESIONS DUE TO VINYLAMIN TOXEMIA. [Rif. Med., 1921, XXXVII, p. 1148.]

Vinylamin [C_2H_5N] is an unsaturated fatty base already experimented upon by various authors (Ehrlich, Levaditi, Gabriel, Markvald, Luzzatto). Luzzatto and Levi have now observed that doses of 0.005 to 0.008 gm. per kilo of pure neutral hydrochlorate of vinylamin, when injected either subcutaneously, intravenously or intraperitoneally into rabbits, are sufficient to cause disseminated lesions of the white substance of spinal cord. Such lesions are not rendered visible by Marchi's method or its modification, but can be shown by means of Donnaggio's method for positive staining of nerve-fibers in the initial phase of primary degeneration. If even smaller doses of the same substance (0.001-0.003 gm. per kilo) are injected intrarachideally the toxic effect also begins to manifest itself after a period of incubation and the animals may survive for about 4 days, at the end of which the same disseminated primary degeneration of the medullated fibers of spinal cord can be observed. But the lesions are in this case more widespread and intense in character, and very much remind one of the plaques of disseminated sclerosis, except for the absence of the proliferation of neuroglia, the animals not surviving long enough for a manifestation of this kind. [da Fano.]

Roessingh, M. J. METHODS TO DETERMINE ACTIVITY OF BONE MARROW. [Ned. Tijds. v. Genees., October 1, 1921, II, No. 14. J. A. M. A.]

Roessingh emphasizes that the fixation of oxygen by the erythrocytes, and the granulation demonstrated in them by one of the vital stains, may be regarded as valuable indications of the functional activity of the bone marrow at the moment. In 30 normal persons, with 100 per cent hemoglobin, the vital granulation did not surpass 0.4 to 1.8 per cent. His technic was the same as that used by Cunningham, described in the Archives of Internal Medicine 26:405 (Oct.) 1920. He tabulates further the findings in over 50 patients with various pathologic conditions, including 11 cases of pernicious anemia, giving the hemoglobin content; the maximal oxygen capacity of the erythrocytes; the oxygen content after four hours in the incubator; the oxygen fixation percentage; the fixation index, and the percentage of vital granulation cells. In pernicious anemia the figures were the highest, the conditions resembling the embryonal, and indicating intense stimulation of the blood forming organs. Stimulation was also evident after transfusion of blood, and in 2 cases of tumor metastasis in the bone marrow. The oxygen fixation index and the vital granulation did not always harmonize. The highest fixation index was in a case of pernicious anemia three days after transfusion of blood, having run up from 51 to 133, and dropping to 0 the seventh week. The corresponding vital granulation percentages were 7.2; 8.6 and 4.3. The highest granulation figure was in another case of pernicious anemia, 54 with, at the time, an oxygen fixation index of 20.8.

Blegvad, O., and Haxthausen, H. BLUE SCLEROTICS AND BRITTLE BONES. [Brit. Med. Journ., December 24, 1921, II, No. 3182.]

Zonular cataract which is thought to be an hereditary affection, is here combined with brittle bones. Further, there was a particular change in the skin which, in its development and appearance, corresponds to a description given for the first time by Thibiérge, who called it *athrophodermie érythémateuse en plaques à progression exentrique*. A similar case, the authors tell us, was reported later by Yadassohn, who proposed the name *anetodermia erythematodes*.

Blegvad, O., and Haxthausen, H. BLUE SCLEROTICS WITH FRAGILE BONES. [Hospitalstidende, September, 1921, LXIV, No. 39.]

The authors here present the results of an extensive statistical and clinical study concerning this comparatively rare combination of syndromes. Seventy-six of the 156 members of families had blue sclerotics, and 24 of the 52 had had fragile bones and frequent fractures. The hereditary appearance of these anomalies in the families examined shows the Mendelian dominant factor. Deafness is also common in these families. Another family of the kind, the first to be reported in Denmark, is given in detail. The blue sclerotics were noted in three generations in

10 of the 23 members, and all those affected, except the grandparent, had fragile bones. The patient reported upon was a young woman, and she presented in addition zonular cataract, and a peculiar skin affection consisting in patches of atrophy of the skin. She had had nine fractures from very slight injuries.

Ström, S. A CONTRIBUTION TO RÖNTGEN DIAGNOSTIC IN OSTEITIS FIBROSA AND AFFECTIONS OF THE BONE SYSTEM WITH SIMILAR RÖNTGEN APPEARANCE. [*Acta chirurgica scandinavica*, Vol. LIII, No. 2.]

The problem of differential diagnosis, by means of Röntgen examination, between osteitis fibrosa, solitary bone cyst and tumor is a problem of great importance. There are several works treating of the Röntgen pictures of these affections of the bone system, but these can vary considerably, and discussion on this subject cannot be considered as finally closed.

Some cases with Röntgen pictures are described in the paper; these are: (1) Case of osteitis fibrosa in the greater part of the humerus, with club-shaped expansion of the upper half of the bone; (2) Case of solitary bone-cyst in the metaphysis region of the femur; (3) Case of typhoid bone abscess; (4) Case of sarcoma in the patella with alveolar, cystlike structure; (5) Case of bone alterations in the upper part of the tibia, in which the microscopic, pathologic-anatomical diagnosis was osteitis fibrosa, but in which the Röntgen picture seems rather to point to gumma or septic bone abscess.

Osteitis fibrosa or deformans—it seems to be just, from many points of view, to group these conditions together—usually attacks the greater part of one or several long hollow bones. The bone becomes raised expansively and the bone structure altered. Cyst spaces are often found in the deformed part, but not in all the cases published. The bone assumes a clumsy, sometimes fantastic form through curvatures, especially such bones as are exposed to static weight. In contrast to myelogenous sarcoma, the bone generally retains its outer contour. A tumor, on the other hand, breaks through the bone, and grows out into the soft tissues. Though this is a rule respecting tumors, an exception may be formed by giant-cell sarcomata, which may be regarded as relatively benign tumors. They are often confined within the bone itself, sometimes forcing up its surfaces, without, however, destroying the bone contour to any considerable degree, and not seldom showing alveolar, cystlike structure. The solitary bone-cysts, which generally occur in the metaphysis region of the long hollow bones, sometimes also in the middle of the diaphysis, present most frequently the appearance of a sharply defined cyst-space in the bone, with one chamber or several. When large, they can produce a one-sided or fusiforme protuberance of the bone. Outside of the cyst itself the bone shows no alteration. The existence of such a cyst is

frequently discovered only through the occurrence of a spontaneous fracture. An appearance somewhat resembling that of these solitary cysts can also be given not only by central sarcoma, especially giant-cell sarcoma, but also by bone-abscesses—septic, typhoid or tubercular. In the two first-named kinds of abscess there is found around the bone in the surrounding parts a periosteal deposit; in tubercular abscesses there are other alterations of the bone, which characterize the bone-process.

Conclusions. (1) One ought to distinguish clearly between the ideas of osteitis fibrosa and solitary bone-cyst. The pathologic-anatomical appearance, and consequently the Röntgen picture present striking differences; (2) Tumors can exhibit cystlike structures, while in osteitis fibrosa cyst spaces may be but slightly developed or absent, though the contrary is most usually the case.

Wiemann, O. BY-EFFECTS OF PARAVERTEBRAL NERVE BLOCKING. [Arch f. klin. Chir., March 26, 1920. J. A. M. A.]

Wiemann induced regional anesthesia the day before the operation on the thyroid in a number of cases to determine the exact mechanism of the occasional by-effects with this form of anesthesia. The phenomena observed confirm that paravertebral condition anesthesia is liable to be followed by signs of paresis of the sympathetic and vagus nerves. Those of the sympathetic are not important, but the simultaneous arrest of both sympathetic and vagus functioning is liable to induce serious disturbance in persons with overexcitable autonomic nervous system. He found that these by-effects can be avoided by making the injection at the posterior portion of the transverse process. In some of the cases roentgenoscopy revealed paresis of the diaphragm on the same side but without subjective disturbance. The pulse was sometimes slowed and sometimes accelerated or not influenced. Some of the patients who presented by-effects at this preliminary anesthetization, did not have the actual operation next day, although at the operation the paravertebral technic was applied on both sides and with three or four times as much of the anesthetic. The ptosis or miosis noted in some cases was evidently due to paresis of the sympathetic, but it was briefly transient.

Quimper. VAGOTONIA AND SYMPATHETICOTONIA IN THE CLINIC. [Cron. Méd., Sept., 1920, XXXVII, No. 687.]

This article first discusses the general literature, and he shows that the original formulation outruns its practical applications. It is very rare to find complete ambivalences. The greater part of the symptoms from derangement of the autonomic nervous system proceed from the digestive apparatus and structures derived therefrom. The opinions are conflicting as to the share of vagotonia in gastric ulcer. Some patients reacted alike to atropin and epinephrin. Mora himself has encountered pronounced vagotonia in cases of habitual constipation. This has been confirmed by others, and atropin has been found useful in

treatment of habitual constipation on this basis. The conception of vagotonia has been fruitful in visceral neurology. The complete syndrome is rare, but monosymptomatic forms are often encountered, and the complete balance between the parasympathetic and sympathetic is often upset by some toxic or infectious or emotional process.

Liljestrand, G., u. Magnus, R. THE EFFECTS OF CARBONIC ACID BATHS ON NORMAL INDIVIDUALS, WITH OBSERVATIONS ON HIGH ALTITUDES. [Arch. f. d. ges. Physiol., 1922, CXCIII, 527.]

Experiments were made at Bad St. Moritz, which is situated at an altitude of 1,800 meters. At this altitude the post-absorptive basal metabolism, the minute output of blood from the heart, and also the (un-reduced) pulmonary ventilation were the same as at ordinary levels. The alveolar CO_2 pressure was slightly lowered, and there was also a lowering of venous CO_2 pressures amounting to between 4.0 and 5.7 mm. When the subject was immersed in a tepid carbonic acid bath (temperature 33°C .), there was conspicuous dilatation of the skin vessels, accompanied by a subjective sensation of warmth. The basal metabolism was not increased either during or after the bath, with the consequence that the body temperature was lowered by 1°C . or even more. These effects of carbon dioxide are stated to be due to a direct action of the substance on the skin vessels; as a compensation for the dilatation the output of the heart per minute was in some cases increased, though in all cases there was a fall in the pulse-rate owing to the cooling of the body. The respiratory ventilation is increased during immersion in the bath, even when pure air free from carbon dioxide was breathed; the carbon dioxide tension in the blood was correspondingly reduced. [Medical Science.]

McGuigan, H., and Atkinson, H. V. THE EFFECT OF HEMORRHAGE ON THE SYMPATHETIC NERVES. [Am. J. Physiol., 1921, LVII, 95.]

Nervous impulses that modify the amount of sugar in the blood pass by way of the vegetative system. Hemorrhage causes a hyperglycemia, it also stimulates or sensitizes the sympathetics as judged by the response to injections of adrenalin. By the use of drugs that are known to stimulate or depress the centers it is here stated that the greater influence of the hemorrhage on the vastomotor mechanism is peripheral.

Carlson, A. J., and Luckhardt, A. B. VISCERAL SENSORY NERVOUS SYSTEM. [Journal of Physiology, September 1, 1921, LVII, No. 2.]

Carlson and Luckhardt here state that the primary action of many drugs on visceral motor mechanisms depends on the predominant innervation (motor or inhibitory) of the organs. The observations seem to point to the idea that tonic inhibitory innervation through the vagus nerves play a rôle in the motor control of the esophagus and the cardia. But the conditions found in one animal group or species do not necessarily

apply to another group or species, as the degree of differentiation in the motor control from the primitive condition appears to vary greatly in different animal groups.

Espino. THE OCULOCARDIAC REFLEX. [Cron. Méd., November, 1921, XXXVIII, No. 70. J. A. M. A.]

Espino recalls that the extensive literature on this subject contains so much that is contradictory that it is difficult to estimate the significance of this reflex. He applied the test to thirty-five inmates of an institution for the insane, each tested three times. In these psychopaths the response to compression of the eyeball was a moderate slowing of the pulse and respiration. This reaction was never intense and in a few instances there was no reaction, or the pulse and respiration were speeded up instead of slowed. The response varied at different times in the same individual, even in the course of the same day. It seems evident, he says, that this and similar sensory stimuli are able to induce a general motor reflex in the vegetative system which enables us to penetrate farther into the No Man's Land of psychoses, neuroses, etc.

Mosler, E., and Werlich, G. TESTS OF THE VAGUS IN VAGOTONIA. [Zeitschrift für kl. Med., 1921, XCI, Nos. 3-6.]

The authors state that the oculocardiac reflex and similar physical tests of the excitability of the vegetative system must not be relied on too implicitly. This paper deals with the results obtained by the application of the Czarmak pressure test, respiratory arrhythmia, and Erben's test, to 50 patients with neurasthenia, exophthalmic goiter, peptic ulcer, spastic colitis, asthma or other usually thought to be manifestations of vagotonia. Positive responses were obtained in the majority, but not in all. Only in one case were all the tests positive; in some they were contradictory, and 14 responded negatively to all four tests, and 13 to all but one test.

Roger, H. THE ACTION OF RENAL EXTRACTS ON THE VAGUS. [Compt. Rend. Soc. de Biol., 1921, LXXXV, October, p. 710.]

By a special method Roger extracts from the normal kidney a substance that has the power of stimulating the cardiac nerve terminations of the vagus when injected intravenously in rabbits or dogs; there is a rapid fall of pressure, and the heart beats become slow and of large volume. Successive injections increase the intensity of this reaction. In the rabbit fatal syncope may be thus produced. Bilateral vagotomy does not modify the results; therefore this renal substance does not act on the bulbar centers. But, if a previous intravenous injection of neutral sulphate of atropine be given, the renal extract gives no fall of pressure, but a slight rise. Roger concludes that the renal parenchyma contains a substance which acts on the cardiac nerve terminations of the vagus: it thus does for the vagus what adrenalin does for the sympathetic. [Leonard J. Kidd, London, England.]

Thibierge and Boutelier. THE OCULOCARDIAC REFLEX IN SYPHILIS.

[Arch. des mal. du coeur, etc., May, 1921.]

Loss of the oculocardiac reflex is frequent in syphilis according to these observers. It may occur in the primary stage, but is more frequent in the secondary stage, and still more in the tertiary stage and in syphilis of the nervous system, in which it is observed in four-fifths of the cases. In patients who show nervous symptoms at an early stage the changes in the reflex are in no way related to the nervous manifestations, nor is there any parallelism between the meningeal symptoms and changes in the reflex. Investigation of the oculocardiac reflex is not therefore of any special diagnostic or prognostic value in nervous syphilis, but the frequency of the loss of the reflex deserves to be known, if only to avoid attributing it to some intercurrent affection.

Mouchet, A., and Pilatte, R. OSTEOARTICULAR DYSTROPHIES AND INDUSTRIAL ACCIDENTS. [Journ. de méd. et de chir. prat., May 10, 1920.]

A study of osteoarticular trophic changes occurring in adolescence and middle life in which the authors conclude that: (1) At adolescence, in the form of trophic disorders of growth, producing spontaneous fracture of the neck of the femur, in which traumatism may play little or no part; (2) during adult life, usually after forty years of age, in the form of a trophic arthropathy, frequently but not invariably due to syphilis. In such cases radiography is a valuable guide, but requires careful interpretation; it is most important that the healthy side should be radiographed at the same time as the affected side.

Dwyer, H. L. CHONDRODYSPLASIA: MULTIPLE CARTILAGINOUS EXOSTOSES. [Amer. Jour. of Diseases of Child., March, 1920.]

Dwyer reports a family in which three members were victims of cartilaginous exostoses. Their ages were seven and twenty-nine years, and twenty months, respectively, the oldest patient being the father of the other two. The bones involved were the tibia, scapula, humerus and femur.

Adrian and Roederer. ARTHROPATHIES IN SCLERODERMA. [Ann. de dermat. et de Syph., Nos. 6-9, 1920.]

Adrian and Roederer state that scleroderma in rare cases is complicated by changes in the joints. As a rule these joint changes precede the skin lesions, and only rarely accompany or succeed them. It is impossible to differentiate these arthropathies from other chronic affections of the joints when the skin lesion is absent. The age most susceptible to the arthropathies of scleroderma is that from thirty-one to forty; the smallest number of cases occurs below ten years of age. The largest number and the severest attacks are found in the female sex; damp, cold, and chill seem to predispose to the affection. The changes may affect one or more joints, disappear after a certain time, and then recur.

In some cases the joints may not undergo any appreciable or minimal pathological change. In the great majority of cases the onset of these arthropathies is insidious, but in some cases there is an acute onset, in which the joints are painful and tender and the skin covering them is tense and hot. The muscles, tendons, tendon sheaths, synovial membranes, and bones may be attacked; in rare cases the heart and thyroid may be implicated. The prognosis is good in the forms manifested by arthralgia only, but is more serious in the cases characterized by progressive affection of several joints and marked deformities, and treatment is usually ineffective.

Klinkert. PATHOGENESIS OF GOUT. [Ned. Tijd. v. Genees., December 4, 1920, II, No. 23.]

This author is a dynamic pathologist. He deals with the nervous regulators of metabolism, with the body as a whole, and is not lost in the detail of a part. The nervous factors are the main ones in gout, and he traces this idea through the history of gout, ascribing a minor rôle to uricacidemia. "It is impossible to explain the explosion of a gouty attack by any deposit of urates, but a discharge of accumulated nervous force might readily explain it, and explain further the symmetrical symptoms, and the shifting about of the symptoms." Klinkert interestingly reports a case of Garrod in which application of local measures to the joint involved in the gouty attack cured the joint trouble, but a violent attack of angina pectoris followed. (Similar displacements are the everyday observations of the neuropsychiater.) Others have published cases in which the cure of the gout in the joint was followed at once by a pain in the bladder, with hematuria, and as this subsided the heart action became extremely irregular and months elapsed before the heart beat was strong and rhythmic again as before. Treatment of gout, Klinkert reiterates, should not aim to cure the local situation alone. Flannel and patience are perhaps the best local measures, but every effort should be made to tranquilize and regulate the instability in nervous system, the real basis of the disturbances. "Moderation in everything, physical and mental, is the best preservative against gout."

Bolten, G. C. A SPECIAL FORM OF GALVANIC OVER-SENSITIVENESS IN FRAGILITAS OSSIIUM. [Nederlandsch Tijdschr. voor Geneeskunde, 1921, LXV, February, 952.]

Bolten describes four cases of fragilitas ossium in children and youths, and draws special attention to a peculiar form of galvanic hypersensitiveness which has apparently not been hitherto mentioned. In all four cases there were present (1) an abnormally brittle skeleton, (2) definite blueness of the sclerotics, (3) deficiency of calcium in the leg-bones as seen by Röntgen-photos, (4) a very great number of vasomotor-trophic disturbances, such as acrocyanosis, chilblained fingers and toes,

brittle white-spotted nails, defect of tooth-enamel, very thin hair of head, falling out of hair, urticaria, migraine, and angeioneurotic edema of mucous membranes, etc., and (5) the peculiar electrical phenomenon. Bolten thinks that this electrical peculiarity gives us an insight into the origin of the syndrome described here by him. The general galvanic over-sensitiveness in tetany—both in manifest and latent—is well known; this is manifested by a general reduction of the minimal values, thus for all forms of contraction, especially for the kathodal closure contraction. In Bolten's cases, on the contrary, the reduction was greatest in the kathodal opening contraction, viz., with 2·8—3·2 M. A. (6—7 M. A. being the average normal). He concludes that the abnormalities present in his four cases are to be regarded as a trophoneurosis, a group of metabolic disturbances, that depends on insufficiency of the thymus and the parathyroids, with which is connected a slight hypothyroidism, and, as the inevitable sequel of diminished function in these accelerating (sympathicotonic) glands, a slight vasomotor insufficiency. With the assumption of this causal mechanism depending on hereditary factors, damaged germ-plasm, etc., all these disturbances are to be regarded as equivalent. The disturbances of the thymus and the parathyroids give rise to the trophic bone affection; the osteoblasts are weaker and less numerous than normal, and the bone is deficient in calcium-salts and therefore brittle. The blue sclerotics are due to abnormal thinness of the sclerotics, so that the ureal pigment shows through them, and this thinness depends on a trophic disturbance. The galvanic over-sensitiveness is a sign of loss of parathyroid and thymus function, and the numerous vasomotor-trophic disturbances are dependent on a functional diminution of tonically acting blood-glands. [Leonard J. Kidd, London, England.]

Schreiber, Arias. PATHOGENESIS OF ARTHRITISM. [Crónica Med., Lima, October, 1920.]

The disturbances in metabolism which accompany and characterize arthritis, according to this observer, are intimately related to the modifications of the nerves which preside over catabolism and anabolism, that is, the vagus and sympathetic nervous systems. Treatment should be addressed to these to restore the physiological balance between the sympathetic and parasympathetic stimuli.

Roth and Volkmann. OSTEITIS FIBROSA. [Mittheil. a. d. Grenz. d. Med. u. Chir., 1920, XXXII, No. 3. J. A. M. A.]

Roth and Volkmann describe exhaustively a case of this rare disease (originally diagnosed by Recklinghausen), and give a bibliography of the disease. The etiology is unknown, but systematically the disease is classified with the sclerosis of the vascular glands, and a permanent injury to the myeloid system which prevents the retention of unripe cells—evident in the presence of myelocytes in the blood during exacerba-

tions. The case under treatment developed in a woman after the menopause had set in. Treatment with glandular extracts no longer could be attempted. A transplantation of parathyroid tissue was indicated by the findings of O. Meyer, who determined in one case a distinct parathyroid tumor (microscopically proved a simple hyperplasia). No specific treatment is known. Lime is retained and sometimes gives temporary improvement.

Bolton, H. THE ARTHRITIC DIATHESIS. [Ned. Tijds. f. Gen., 1921, II, No. 7, October 22.]

All syndromes belonging to this diathesis (gout, adiposity, diabetes, neurasthenia, asthma, epilepsy, urticaria, angioneurotic edema, hay-fever, colica mucosa, intermittent arthritical edema), depend upon a degenerative constitution-disorder. Here are different diseases with different disorders in metabolism, and still they are closely related, which is evident in the contemporary manifestation or the alternating by the same person or in his family. Save the characteristic symptoms we find always other signs of degeneration of the vegetative nervous-system. When they fail sometimes by the patient himself, we find them in his family. I mean the constipation and the great group of cardiovasomotor and trophic disorders (low blood pressure, instability of the heart action, reflexes of Aschner, Czermak and Erben, disturbance of the blood division, pale skin with instability of the filling with blood, local erythema, dermatographia, cold hands and feet, vasomotor arthroneuroses, trophic disorders in skin, nails and teeth). In other publications I gave my opinion that these vegetative symptoms depend upon a constitutional hypofunction of the sympathetic system. By all members of the arthritic diathesis we find disorders in the purine-metabolism. In urine the content of endogene acid, uric, is not only decreased in gout, but also in diabetes, adiposity, migraine and asthma, diseases alternating in the family of gout patients. The same in neurasthenia, exudative diathesis, angioneurotic edema, and the intermittent arthritical edema. Next the decreased acid uric-content in urine we find an increased content in blood. All members of the arthritism also have in common an insufficiency of the factors necessary for a normal purine-metabolism. Hereon relies the predisposition for the gout as well as those for the other arthritic diseases.

In the arthritic group we find also disorders in purine-metabolism combined with disturbances depending upon a hypofunction of the sympathetic system (cardiovascular and trophic disorders). In my opinion the link connecting the different members of the arthritism is to be sought in an innate insufficiency of the sympathetic, that is responsible as well for the delay in fermentative purine-metabolism as for the other vegetative stygmata.

Justschenko found after thyroidectomy the content of nuclease in

the liver decreased (nuclease divides the nucleine-acids in their components sugar, phosphor and purine-bodies). Hypothyroidism is a brake for the excretion of purine-bodies (Fleischmann, Salecker). The sympatheticotrope adrenaline accelerates the purine-metabolism (Falta, Salecker), just as the piqure of Cl. Bernard, that mobilizes the sugar via the sympathetic. Lancereaut found experimentally that the "colique arthritique" can be provoked by resection of the sympathetic. Pepsine, secreted under influence of the sympathetic (resection of the splanchnic gives a decreased content of pepsine in the stomach [Lichtenbelt]), is of greatest importance for exogene purine-metabolism. These data show clearly the preponderating importance of a normal sympathetic innervation for the purine-metabolism. The vagus only orders the secretion of the hydrochloric acid and the liquid (water and mucus) in the intestinal tract, but has nothing to do with the fermentation functions. Therefore the name "vagus neuroses" is inaccurate for the members of the arthritic diathesis.

There are a great many who do not consider gout as a neurosis; they set a too great value upon the disorder in metabolism, and neglect the importance of the vegetative system (in combination with the endocrine glands) for the metabolism. The disturbance in purine-metabolism is not the principal in gout; it is only an inferior part of the disease and in pathogenesis certainly not the most important factor. As we find it in all types of arthritism, it never can be the cause of one special disease. It is only an indicator of an innate constitution-disorder that manifests itself in different forms; one of these is gout. The purine-disorder is only a symptom that all members of the arthritism have in common. The same with the constitutional degeneration (as basis of all neuroses), and the degenerative vegetative stygmata.

One of my patients, a neurasthenic of sixty years, showed the following symptoms: cardiovascular disturbances, slight trophic disorders in skin and nails, constipation alternating with colica mucosa, intermittent arthritical edema and disorder in purine-metabolism. Remarkable is the contemporary or alternating manifestation of the different symptoms (colica mucosa, arthropathies, tachycardia, local asphyxiè of the fingers) during the stadia of depression. In my opinion these symptoms are equivalents; they are different manifestations of the gout-neurosis.

Such evident cases are relatively exceptional, and can't prove the neurosis theory. When, however, we keep more in mind that in gout the principal is not the disorder in metabolism, and when we pay more attention to the disturbances in the vegetative innervation, as well by the patient himself as in his family, we will find indications enough to class the gout as a neurosis.

Since by the other members of the arthritical diathesis the arthritical disorders are of inferior interest, and as the principal is to be seen in the disorder in metabolism (on nervous basis), it is better to speak of neurometabolism than neuroarthritism. [H. Bolton, Hague, Holland.]

2. ENDOCRINOPATHIES

Wagner and Parnas. CORRELATION OF GLANDS. [Med. Klin., January 29, 1922, Vol. XVIII, No. 5.]

The girl of ten seemed to have chronic interstitial hepatitis; the liver was very much enlarged, and in addition there was an odor of acetone about her when fasting, and there is glycosuria after ingestion of starch and sugar, but no sugar is found in the blood, fasting, although ketone bodies abound. After eating sugar and starch, the acetone disappeared, but intense glycosuria followed. This same sequence occurred day after day. Under thyroid treatment, lipemia, lipuria and steatorrhea developed. Wagner and Parnas theorize that the main disturbance in this case is the lack of the ability to form and store glycogen in the liver. In some respects the condition is like that of a mild diabetes, but it differs materially from the latter when sugar is not being supplied from without. There is no formation of sugar from the body reserves. But this takes place when thyroid treatment is given. This seems to suggest that the thyroid is in control of this function. They theorize further that the pancreas presides over the sugar metabolism: through the liver it checks the mobilization of glycogen; through the thyroid it influences the formation of sugar anew. The removal of the pancreas thus removes the brake on both these functions, and complete experimental diabetes is the result. [J. A. M. A.]

Tallquist. THE INFLUENCE OF UNDERFEEDING ON GRAVES' DISEASE AND DIABETES. [Finska Läkaresällskapets Handlingar, January and February, 1922.]

The author gives a statistical survey of the frequency of diabetes, Graves' disease, and achylia gastrica before, during, and after the war. He first discusses the tendency to edema from undernourishment, saying that it was observed during the Napoleon campaign in Russia, and the Boer War. It first appeared in Finland in 1918, and was quite prevalent in 1919 in the cities, especially in the prisons, but then it disappeared as food conditions improved. On the other hand, exophthalmic goiter and diabetes mellitus became very rare during the war undernourishment period. Both of these, he recalls, have a typical pathologic hormone basis. Undernourishment reduces production of hormones. The organ extract business in Germany had to be abandoned during the war, as the underfed animals could not supply any epinephrin or other active gland principle. The endocrine glands seem to be especially sensitive to underfeeding. The diseases which are traceable to excessive endocrine functioning became comparatively rare during the undernourishment period of the war. His charts show a remarkable parallelism between the declining incidence of exophthalmic goiter and diabetes in his own service and private practice, while gastric achylia ran up to a high peak during the undernourished years. There is no doubt that both constitutional and

occasional factors coöperate in these two diseases, but no one heretofore, he remarks, has appreciated the importance of relative overnourishment as a factor in exophthalmic goiter, although this has long been recognized in diabetes. The compulsory undernourishment of the war averted certain factors, and thus preserved the constitutionally predisposed from the development of the disease. His clinical material consists of over 13,000 cases of all complaints, and the chart showing the incidence of diabetes and Graves' disease in the period 1912-21 also shows the average weights of all his cases from year to year. During 1918 and 1919 the shortage of food in Finland induced an average decline of weight by about 18 per cent. As his chart shows, there was a remarkable conformity in the decline in weight and in the frequency of the above-mentioned diseases. By 1921 the curves for both diseases showed a marked rise, coinciding with the return to normal of food conditions. The author considers that what he calls the "decimating" influence of underfeeding on these two diseases does not contradict the view that constitutional predisposition plays an important etiological part; but it would seem that involuntary underfeeding does, to a certain extent, prevent the development of both diabetes and Graves' disease in persons predisposed thereto. The curve for gastric achylia was less instructive, but the author is inclined to think that not only Graves' disease and diabetes but also heart disease, abnormally high blood pressure, arteriosclerosis, arthritis, and possibly also nephritis, are conditions which depend largely on an unrationed dietary.

Wilson, L. B. MALIGNANT TUMORS OF THE THYROID. [Annals of Surgery, August, 1921, LXXIV, No. 2, J. A. M. A.]

Attention is here called by Wilson to the unappreciated relative frequency of malignant tumors of the thyroid, and he summarizes the principal observations in a pathologic study of the thirty-five cases which have been observed in the Mayo Clinic from January 1, 1901, to January 1, 1921. A bibliography covering the subject during the last fourteen years is appended.

Crile, Lower, Sloan, and Harrison. POSTOPERATIVE THYROID GLAND COMPLICATIONS. [Amer. Journ. of Surg., October, 1921.]

Certain postoperative complications of operations on the thyroid gland are here reported on. A rare occurrence, adherence of the scar to the trachea, is relieved by excision down to the normal tissue, the separated fascia and muscle being approximated. The frequently observed malformation of the neck after thyroidectomy may be relieved by transplanting fat. Traction on the nerves with its usual resultant hoarseness rarely remains permanent. Aphonia is usually psychogenic and persisted in only two instances. The speaking and singing voice are usually improved, and by avoidance of undue manipulation there is little risk of their being impaired. Intermittent respiratory block, occurring usually at

night, is alarming in view of the possibility of asphyxia, and if the condition continues the vocal cords may be clipped off in the center of their free margins to leave a free respiratory passage. Should infection arise in the wound the neck should be opened freely to allow of treatment to its entirety. Iodine should be given for at least a year after thyroidectomy to control any tendency to recurrence of growth in the portion of gland remaining. In about 1 to 500 cases thyroid deficiency follows operation, and is easily controlled by the intermittent administration of thyroid extract, and in time the symptoms permanently disappear.

Cameron, A. T., and Sedziak, F. A. EFFECT ON GROWTH OF FEEDING THYROID. [Am. Journ. of Physiology, November 1, 1921, LVIII, No. 1.]

In animals subjected to thyroid feeding the condition of the glandular tissue itself suggested to these observers that during average conditions the output of thyroxin is determined by something in the blood passing through the gland—perhaps the thyroxin content of the blood itself—and as long as this remains above a certain level the setting free of thyroxin, presumably by the breakdown of idiothyroglobulin, is halted. The hypothesis is in part supported they believe.

Boitel. THE ETIOLOGY OF GOITER. [Rev. méd. Suisse rom., November, 1920.]

This paper is based on the study of 1308 cases of goiter which had attended Roux's clinic at Lausanne from 1887 to 1917. His summary reads thus: 1. Throughout the Canton of Vaud goiter is unevenly distributed. 2. This distribution seems to correspond with the physical geography of the region, its minimum incidence occurs in the Jura chain of mountains, especially on the eastern slope, and its maximum incidence in the Broye and Mentue valleys. The plain of the Rhône is also more affected than the neighboring mountainous regions. 3. Hereditary influence was demonstrated in 47 per cent of the cases. 4. It could not be proved that the native population was more or less affected than newcomers. 5. Goiter had an entirely different distribution from that of typhoid fever. 6. Goiter appears to attack the rural population a little more than the dwellers in towns, but the difference is not very pronounced. 7. There is little evidence that the primary cause of goiter is absence of iodine in the soil.

Goodpasture, E. W. INFLUENCE OF THYROID PRODUCTS ON MYOCARDIAL NECROSIS. [Journ. of Experimental Medicine, October, 1921, XXXIV, No. 4.]

In severe hyperthyroid states death is frequently brought about through myocardial exhaustion. The specimens examined by the author showed acute necrosis of cardiac muscle, in one instance involving a large part of the left ventricle. The necrosis resembled that associated

with intoxication by acute infections such as diphtheria or scarlet fever. Infection of sufficient virulence to be alone responsible for the necrosis was not demonstrable. Hence, a study was undertaken to determine, first, what demonstrable effect feeding desiccated thyroid gland, or intravenous administration of crystalline thyroxin would produce in the myocardium; second, whether the effect of these substances would cause the heart to be more readily injured by toxic agents. Such animals showed characteristic symptoms with relatively slight myocardial lesions. Animals which had in addition, been subjected to chloroform anesthesia showed striking, widespread myocardial degenerative lesions. Chloroform is apt to be exceptionally detrimental to the myocardium, and should be avoided as an anesthetic in operations on toxic goiters.

Houssay and Sordelli. INFLUENCE OF THYROID ON ANTIBODY FORMATION. [Revista d. l. Asoc. Méd. Argentina, July, 1921, XXXIV, No. 201, J. A. M. A.]

Most of the research on rabbits, horses and dogs was inconclusive, but the difference in production and hemolysins and agglutinins between horses before and after thyroidectomy was all in favor of the thyroidectomized animals. The advantage was on the side of the normal controls in the test production of diphtheria antitoxin; the two thyroidectomized horses could not bear the diphtheria toxin.

Houssay and Sordelli. SUSCEPTIBILITY OF THYROIDECTOMIZED ANIMALS. [Revista d. l. Asoc. Méd. Argentina, July, 1921, XXXIV, No. 201.]

The findings were conflicting in the research on rabbits and guinea-pigs reported.

Swiecicki, H. EXOPHTHALMIC GOITER AND THE SUPRARENALS. [Presse Médicale, August, 1921, XXIX, No. 67.]

This paper presents extensive material to advance the hypothesis of an interrelational character tending to prove that the primary factor in the production of exophthalmic goiter does not lie so much in the thyroid as in the suprarenals.

Fruhinsholz and Parisot. THYROID FUNCTION AND PREGNANCY. Gynécologie et Obstétrique, September, 1921, IV, No. 3.]

Here the authors collect a large amount of material from many clinical and experimental sources to throw light on the relationship of the thyroid and menstruation. The excessive functional strain on the thyroid during a pregnancy may exhaust it beyond repair they maintain. Women with much deranged thyroids are liable to have their children display a tendency to glandular anomalies, although of different glands. The effect of parathyroidectomy or thyroidectomy in gravid animals can scarcely be compared with clinical conditions, but the improvement or aggravation during a pregnancy of preëxisting thyroid or parathyroid insufficiency paralleled that observed in women.

Rodenacker. ACQUIRED THYROID INSUFFICIENCY. [*Deutsche Zeitschrift für Chirurgie*, September, 1921, CLXVI, Nos. 1-4.]

The author is an interrelationist. He emphasizes the fact that of late our knowledge of the ductless glands shows that not one gland but the whole endocrine system is deranged when one gland shows signs of disturbance, which any one with a grain of sense should know if the "body as a whole" is kept in mind. In a boy of six years the picture of cretinism was manifest. He also was 4 cm. too short for his age. His vocabulary was limited to five or ten words. He had been a strong and lusty infant but at the age of six months a severe gastrointestinal derangement occurred which seemed to check development. The family history also showed endocrine anomalies. Thyroid and suprarenal as well, were indicated from the familial history. The outcome was surprising. In three months the boy had grown 10 cm., and two years after beginning the treatment he had learned to read and write. In mathematics he made little progress. The author states that therapy should plan to combine several glands according to the age of the subject. Deficiency in the glandular functioning entails the necessity for treatment along this line for protracted periods.

Lahey, F. H., and Jordan, S. M. VALUE OF BASAL METABOLISM IN THYROID DISEASE. [*Boston Med. and Surgical Journ.*, March 31, 1921, J. A. M. A.]

From an experience in metabolism studies in connection with thyroid disease, involving 304 metabolism estimations on 135 patients Lahey and Jordan conclude that active hyperthyroidism probably does not exist without an increase in the metabolic rate. Such study is of great value in separating those cases of neurasthenia and associated neurologic and cardiac lesions, such as effort syndrome, which often present signs closely simulating those of hyperthyroidism, in that these conditions show metabolism estimations within normal limits. It is of value, further, in determining the presence of secondary hyperthyroidism in those cases of adenoma of the thyroid in which the symptoms of hyperthyroidism are not markedly evident. Even slight degrees of secondary hyperthyroidism are demonstrable by increases in the rate of metabolic activity. Metabolism estimation correlated with the clinical examination, is also of marked value in indicating the ability of a patient to withstand surgical procedures of various magnitudes; for example, in deciding whether the ligation of a single thyroid pole should be employed, whether it would be wise to ligate both thyroid poles, or whether it would be safe to employ partial thyroidectomy as a primary procedure. It is of further value in deciding when to follow the preliminary pole ligation with the partial thyroidectomy. Up to recently it has been the authors' custom to ligate the superior thyroid poles and then send the patient home for eight weeks, at the end of which time the patient returned to the hospital for the complete operation. As the result of their metabolism

investigations, they have been finding that in some cases, by waiting eight weeks, they have passed the period of maximum improvement, as indicated by a rise in the metabolism rate from the rate representing the maximum drop after pole ligation. They have, therefore, come to the conclusion that during the intervals between pole ligation and partial thyroidectomy, metabolism estimations should be made every two weeks, and partial thyroidectomy employed as soon as the maximum gain indicated by a drop in metabolism and pulse is made. Partial thyroidectomy may be employed as a primary measure, unpreceded by ligations, in most cases showing increases in metabolic rates of not over + 35. In all such cases, however, careful consideration must be given to the apparent degree of toxicity of the diseases, as evidenced by the clinical signs, and this consideration must not be biased by the degree of increase in basal metabolic rate, however moderate it may be. Careful consideration must also be given resulting or associated lesions, such as myocarditis and renal lesions. Most patients showing basal metabolic rates above + 50 are safest when submitted to primary ligation of one or both of the superior thyroid poles. In patients showing metabolic rates of from + 75 up, extreme caution must be exercised in the extent of the surgical treatment given.

McCarrison, R. FATS IN RELATION TO THE GENESIS GOITER. [Med. Record, 1922.]

Robert McCarrison reports feeding experiments carried out on pigeons in the Nilgiri Hills of Madras, 6000 feet above sea level, where goiter is practically unknown. The incidence of goiter in pigeons fed on mixed grains and butter, but without onions, was 65 per cent; in the remaining 35 per cent there was no goiter. The cases that did not develop thyroid hyperplasia have a significance second only in importance to those that did. They suggest that the excess of butter was not in itself the cause of the goiter, but that it was made a potent contributing or determining cause by the operation of some other factor or factors. In other animals under similar conditions oleic acid and cod-liver oil were substituted for the butter. The outstanding results of the experiments were: 1. The potency of the conditions of close confinement, want of exercise, over-feeding, and fecal contamination in the causation of goiter. 2. The completeness of the protection against goiter afforded by cod-liver oil. 3. The influence of butter in favoring the development of the thyroid swelling, and the still greater influence of oleic acid in so favoring it. 4. The pronounced individual idiosyncrasy to the disease as evidenced by size of the goiter. The latter fact suggests the possible influence of individual variations in metabolic rate in determining the size of the goiter, the greater need of some individuals for iodine than of others, and the more potent operation in some cases than in others of bacterial agencies in the digestive tract in hampering the absorption or utilization of iodine.

The fact that the free oleic acid appears to be the more potent in favoring thyroid production than butter suggests that it may be by means of the free unsaturated fatty acid derived from the butter in the digestive tract that the latter exerts its harmful action on the digestive tract. Experiments on tadpoles showed that an excess of the several fats in the food caused remarkable retardation in their rate of growth. Iodine in amounts of 0.5 to 1.0 mg. per gram of food mixture tended to prevent the retardation of growth induced by butter and oleic acid, but not that induced by cod-liver oil. So far from iodine exercising any compensating action on the retardation of growth induced by cod-liver oil, the retardation was increased by the iodine. The retardation of growth induced by the fats was associated by delayed development of the thyroid gland; it appeared to cause a diminution of the colloid content of the gland out of proportion to its retardation in development. It would seem that oleic acid has a special tendency to prevent the storage of iodine-containing colloid in the thyroid gland. The writer points to the possibility that abnormal conditions may arise in connection with the "fat-thyroid-iodine balance" in consequence of bacterial action which would render by one means or another the small amount of iodine available in the food relatively deficient, or free oleic acid relatively excessive. He is glad that this latter aspect of the problem is at length receiving attention.

Simon, Levin. ELEVEN HUNDRED FORTY-SIX GOITERS IN 1783 PERSONS.

A statistical study of 1783 unselected persons was made in the Great Lakes goiter belt, Houghton County, Michigan, of the incidence and distribution of goiter according to sex, age, social and residential relationship, and according to the three types of goiters found,—simple goiter, adenomatous and cystic, and colloid. Careful charts with mean curves demonstrate the various facts. Exophthalmic goiter was rare, although hyperthyroidism was not uncommon, on account of the goodly proportion of adenomas. There were 1146 goiters among 1783 persons,—682 simple goiters, 420 adenomas and cystomas and 44 colloid goiters. The incidence curves show that goiters increase in both sexes during puberty, dropping a small per cent after the growth of the individual is attained. The curve remains in the female for the child-bearing period, going down at about thirty-eight to forty years, when it rises again toward the menopause. In the male, the curve gradually drops until thirty-five or forty years, when there is a small rise due to the growth in the glands asserting themselves, the male having no special metabolic change to influence the enlargement. The simple goiters maintain the high percentage until thirty-five years, and the adenoma and cystoma sustain the height of the incidence curve after that age. Unhygienic living is unknown here. Spring water or water from Lake Superior does not alter the percentage of the goiters differently. The influence of the prevalence of goiters in the mother as to the number of goiters in the children was four times as that in the father. Goiters in both

parents leave the offspring without the smallest possible chance of not developing goiters, if they continue to live in this district.

It was found by the statistics of the length of residence that, if one were born elsewhere in a non-goiterous district and moved to this region, the liability of becoming goiterous would depend on the length of residence and the age of attaining the same, the earlier the age the greater the danger of thyroid enlargement. I deduced from the figures obtained that, being born or acquiring a residence of fifteen years or more here would entitle one to an enlarged thyroid according to the percentage for that year as the charts demonstrate. Females aged 13 years and over equal 80 per cent; males between 13 and 35 years equal 66 per cent; and males 35 and above, 45 per cent. The liability to develop Group 2, or adenomas and cystomas, is as follows: Females from 5 to 35 years of age, 20 per cent; females 35 and above, 62 per cent; and males from 5 years up, 20 per cent. All adenomas and cystomas, and distinct old colloid goiters are not physiologic, but surgical. Simple enlargements may be only a physiological response to internal needs or external influences. The thyroid gland, no doubt, plays an important rôle in the endocrine hormone in maintaining the balance of metabolism in the body and being prominently located exhibits its response more markedly than do its associates. Long continued hypertrophy means permanent enlargement and one must always keep in mind the definite pathologic potentiality of this most active tissue. When hyperplasia occurs in simple goiter or adenomas, whether fetal or adult, true exophthalmic goiters and hyperthyroidism, respectively, may follow. [Author's Abstract.]

II. SENSORI-MOTOR NEUROLOGY.

1. PERIPHERAL NERVES

Froelich. BRACHIAL BIRTH PARALYSIS. [Revue de Chir., 1921, Vol. LIX, No. 5.]

The after history of 10 cases of brachial paralysis in the new-born is here studied; also 20 in very young children, and 7 in children between the ages of ten and fifteen years. Three cases in which the total paralysis of the arm was grave only were seen and there seemed no outlook for improvement. The total paralysis at birth generally heals without disturbance. It may entail a flail shoulder joint, however. Contractures with displacement of the head of the humerus occurs later. Or ankylosis of the head may result, or the arm shortened, the movements of the shoulder restricted. The treatment is minutely described. His treatment of the condition in the new-born consists in immobilizing the arm in a position which frees the roots of the plexus from traction, and is antagonistic to the position entailed by the pathologic contracture. The arm should be held in 90 per cent abduction, the forearm flexed at a right angle, the hand extended, the hand and fingers in supination.

Lahey, F. H., and Clute, H. M. SPINAL ACCESSORY PARALYSIS FOLLOWING NECK DISSECTIONS. [Boston Med. and Surg. Journ., December 29, 1921, Vol. CLXXXV, No. 26.]

These authors here call attention to the loss of function secondary to spinal accessory paralysis. It is to be considered of serious consequence, limiting power and motion as it does. It occurs frequently in neck dissections because it is practically impossible to preserve the nerve and remove diseased foci, and interruption in conductivity may follow even when the nerve has been preserved. If extensive neck dissections are to be done the surgeon should familiarize himself thoroughly with the course and relations of the spinal accessory and second, third, fourth and fifth cervical nerves. In 132 cases investigated postoperative paralysis occurred in 12—nearly 10 per cent.

Kato, Shizume and Maki. THE NATURE OF THE PARALYSIS OF NERVE IN BERI-BERI. [Japan Med. World, July 15, 1921. B. M. J.]

The authors here record the results of an extensive investigation into the nature of the nervous paralysis in beri-beri. Working with chickens, they found that the velocity of propagation of a nervous impulse was considerably slower in the case of diseased than in the case of normal birds; moreover, in the former the extent of the muscular response was greater when the peripheral portion of the nerve was stimulated than when the electrode was applied to the central end, showing that a loss of potential occurred during the process of conduction. This alteration of nerve-muscle function could only be substantiated in birds which were definitely suffering from beri-beri; birds which had merely been starved behaved in the normal manner. By injecting rice bran extract into the affected chickens they succeeded in restoring the propagation velocity of the nervous impulse to the normal rate. Concluding from this that the paralysis was of a functional rather than an organic nature, they performed certain experiments, the result of which was to show that the paralysis was due to the absorption of hydrogen ions by the nerve. They discovered that if a nerve were soaked in a weak solution of an acid paralysis was produced, and that this could be removed by simply replacing the acid by an extract of rice bran. The action of the extract was similar to that of a buffer solution; not only, however, did it render the hydrogen ions inactive, but it replaced those which had already become attached to the nerve. Further, they were able to prove that the hydrogen ion concentration of the nerves of diseased birds was higher than that of the nerves of normal birds. This increase was found to be localized to the nerves which were most affected from the clinical point of view. For instance, in cases where the bird was suffering from marked cramps there was an increase in the hydrogen ions in the spinal cord, while in cases of paralysis of the leg it was the sciatic nerve which showed the increase. With regard to the blood, only a slight increase in acidity could be demonstrated; the alkali reserve, however, was definitely diminished.

Interesting as these experiments may be, they are not sufficiently extensive to render complete the proof of the proposition which is advanced.

Albanese, A. CHANGES IN NERVE IMPLANTS. [Arch. Ital. di Chir., November, 1921, Vol. IV, No. 3.]

Albanese's experiments included transplanting segments of rabbit nerves in dogs and of dog nerves in rabbits, in addition to auto-implants and implants of nerves from the same species. The results confirm anew that heterogenous tissues seem to possess some mysterious property which interferes with the normal development of the biologic processes when transplanted. He gives three colored plates showing the difference in the histologic findings in these different conditions.

Wirth, E. SUTURE OF SEVERED MEDIAN NERVE. [Br. Med. Journ., November 26, 1921, Vol. II, No. 3178.]

In this clinical case the median nerve was severed cleanly by a piece of glass. Immediate suture was performed. Two days after the operation the patient showed distinct improvement in flexion at the wrist, pronation of the forearm, opposition of the thumb, and abduction of the thumb. The terminal phalanges of thumb and index finger were impaired in their function, however. There was almost complete return of muscle power after six weeks. The sensory changes remained involved. Two months after the injury trophic skin changes in the thumb, index and middle fingers.

Harris, W. PERSISTENT PAIN IN PERIPHERAL AND CENTRAL NERVOUS LESIONS. [Br. Med. Journ., November 26, 1921, Vol. II, No. 3178.]

This author advocates a conservative attitude in any form of surgical treatment for psychalgias. He holds that in these conditions the pain is apt to get worse, or spread to another area, and once an operation has been performed, it is difficult to sift the complex interactions and arrive at a just estimation of the situation.

Nathan and Madier. REGENERATION OF NERVE TISSUE. [Bull. de l'Académie de Médecine, November 8, 1921.]

This pathological experimental study on animals shows that a regenerating nerve may send fibers into the interstices of a strip of loose connective tissue serving as a guide. The fibers from two stumps may thus meet and regeneration of the nerve may take place even with considerable space between. Experiments on one dog resulted in a bridging of a long gap, while in a second the end of the nerve fiber was turned back by some intervening tissue.

Ott, W. O. EPIDURAL INJECTIONS IN SCIATICA. [Minn. Med., December, 1921, Vol. IV, No. 12. J. A. M. A.]

In thirty-four cases of sciatica in which a definite removable cause could not be found, the removal of possible foci of infection in 62 per

cent combined with repeated epidural injection gave a permanent cure in 27 per cent, and permanent amelioration of symptoms; in 40 per cent, the patients were able to continue their occupation with a fair degree of comfort. Thirty-three per cent did not obtain permanent beneficial results. The technic of epidural injection has been described quite fully by Cathelin, Strauss, and others. Of the thirty-four patients, fourteen received one injection, thirteen two injections, four three injections, two four injections, and one five injections. Nine patients received complete and permanent relief; fourteen received partial relief, which allowed them to return to work; eleven did not receive any permanent benefit from the injection. Temporary relief, that is, for from two days to two weeks, either complete or partial, was obtained by thirty-one patients.

Thorborn, Holmes et al. TREATMENT OF PERSISTENT PAIN DUE TO NERVE LESIONS. [B. M. J., December, 1921.]

A discussion took place in the Section of Neurology of the Royal Society of Medicine, on November 10, on the treatment of persistent pain due to lesions of the central and peripheral nervous system. Thorburn emphasized the extreme difficulty of judging of the results of treatment in painful affections. The treatment of symptoms, as apart from the treatment of lesions was, of course, always a doubtful matter, especially if the symptoms were such as were almost impossible of description and quite impossible of exact measurement. It was very easy to be misled into thinking that the pain had been cured when actually the measures adopted had been of no value whatever. He instanced the procedure—now obsolete, he believed, but at one time supposed to have great efficacy—of stretching the sciatic nerve for the relief of lightning pains in locomotor ataxia. On the other hand, people who had long suffered from painful diseases had generally degenerated into such a mental condition that they would still imagine themselves to be suffering from recurring pain, especially if they had been for a long period under the influence of drugs, after the original painful cause had without question been removed. He went on to speak, in the first place, of conditions in which the actual objective of operation was most definite and certain, and those in which a lesion rather than a symptom was attacked. The cases in which the most clearly defined pain-producing lesion had to be dealt with were those due to pressure on the nerves. In these cases, and in traumatic affections of the nerves, there was, as a rule, a clear issue. If the source of pressure was removed the pain was cured, with, however, this proviso: there was a strong probability that in old-standing cases of pressure lesions, whether due to cervical ribs or other causes, there was ultimately produced a certain amount of neuritis with cicatricial changes within the nerve, so that in such cases where a neuritis had occurred, spreading beyond the original boundary of the pressure lesion, it was not to be expected that recovery would be invariably obtained. With regard to injuries, the most typical examples were the end-bulbs

found upon nerves after amputations. Here again it was important to take into account what might be called accessory pathological changes—changes inside the nerve—in the case of a nerve which had been long exposed. In the ordinary case of a painful stump the removal of the bulbs would be generally quite sufficient to produce cure of the pain, but not always; in a certain proportion of cases pain still persisted after a thorough removal of the bulb, and even after the excision of the nerves for a distance of a good many inches above the point where the bulb was formed. These were also cases in which the removal of the original source of the trouble might be followed by a progressive neuritis. Sometimes the pain extended so far that the most extensive resection was entirely unable to bring relief, and the only recourse appeared to be division of the posterior spinal nerve roots of the affected region. What could be done in the direction of preventing the nerve bulbs? His experience went back to a day when, apart from war surgery, amputations were a good deal more common than now, and he considered that the one definite cause of end bulbs of the nerves was sepsis, and that if the nerves were cut high up at the time of amputation, then even if—to speak after the old fashion—the wound should be septic, end bulbs were not in the least degree likely. He himself had never adopted special measures, such as crushing, to obliterate the ends of cut nerves, and he was not aware of any amputation of his in which there had been trouble from end bulbs forming at a later date. The nerves had been cut short, and, of course, all the precautions had been taken to make the operation aseptic. Along with these conditions, cases of causalgia had to be considered. Here resection and suture did not invariably cure; out of twenty operations in Manchester sixteen only were cured, but he would like to know from those who had practised in war hospitals at home, where, unlike war hospitals abroad, there was opportunity to treat these cases, what treatment was found most useful. Another type of pain in connection with traumatic injuries was painful cicatrix of the scalp following on a head injury, not necessarily of a severe nature, and often taking place a long while before the pain developed. Why scalp cicatrices should present this peculiar tendency to pain he did not know; possibly it was because the scalp, which was very mobile, was anchored to the immobile skull, and the constant traction on the intervening cicatrix caused pain. Sir William Thorburn went on to deal with cases in which the issue was a little less clear, such as pains which probably arose in connection with ganglia, spinal or cerebral, including trigeminal and other neuralgias and the localized tabetic pains. In trigeminal neuralgia he was in the habit of dividing the operations into two great classes, namely, those which did and those which did not imperil the eye. For himself he practically always adopted Schlösser's method, or, if that failed, the method of Jonathan Hutchinson, Jr., which involved the removal only of the lower two-thirds of the ganglion, and had the merit of leaving the eye quite safe. With this method he had not found any

recurrence. In posttherapeutic neuralgia the cases were so few that it was difficult to make any generalization. He only knew from practical experience of two types which he need mention—the supraorbital type and the spinal type. He used to think that cases of the former type were ideal for alcohol injection into the supraorbital division, but he had been disappointed more lately in the results. Pain could be cured certainly temporarily by ablation of the nerve, but he had had no good results from alcohol injection. After speaking of tabetic pains and the good results to be expected from posterior rhizotomy, he said that there was a good deal of evidence that locomotor ataxia, like many other diseases of the spinal cord, was likely to be improved considerably by the mere operation of spinal drainage.

The most doubtful group of all was that which included the ordinary brachial neuralgias and so forth. Here he was not prepared to dogmatize as to any method of treatment. By the time they came to him the great majority of these cases had had a sufficiently prolonged experience of medicinal treatment, hydrotherapeutic and electrotherapeutic methods, and injections. He did not want to be regarded for a moment as despising any of these methods, which could all claim numbers of cures, just as a good many cases were cured under the influence of rest alone. But the cases he received were those in which these methods had been tried and had failed. He liked to expose the affected nerve, or as much of it as he could get, and such an exposure would, in a certain number of cases, indicate some source of pressure which would otherwise be overlooked, and in quite a large number of cases there would be found around the nerve adhesions to surrounding structures such as did not pertain to a normal nerve. At operation these things could be seen and dealt with. A neurolysis could be done if required, and probably this operation might be combined with a certain amount of nerve stretching. At any rate, to expose the whole length of the nerve was no more risky than to practice methods of injection and the like. Finally the speaker remarked on the large number of cases of so-called neuralgia which were talked about as rheumatic and so on, but were really due to intrathecal spinal tumors, which were liable to be overlooked for a long period, until perhaps it was too late. He was quite convinced that, if not in London, there were parts of the country where, through faulty diagnosis, one of the most curable diseases of the nerve system—an intrathecal tumor of the spinal cord—was frequently overlooked.

Dr. Gordon Holmes said that it was the teaching of English neurology that most diseases of the central nervous system which did not involve the meninges or extend to the posterior or other sensory roots ran a painless course. That that doctrine was true in the majority of cases there could be no doubt, but he was afraid it had been applied rather too widely. It was generally assumed that spinal diseases could produce pain only when the posterior roots were involved, but as a result of his war experience of gunshot injuries he thought it must be regarded as a

possibility that a traumatic injury of the pain-conducting tracts within the spinal cord could bring about pain of certain specific character. Its nature could not be definitely outlined at the present time but it was within the experience of many surgeons that such central pain disturbances were found. Repeated observations over long periods of time and later sectioning of the spinal cord will clear up many mooted points.

Bramwell, E., and Dykes, H. B. RIB PRESSURE CAUSING BRACHIAL PLEXUS PARALYSIS. [*Edinburgh Med. Jour.*, July, 1921, Vol. XXVII, No. 1. J. A. M. A.]

The question of brachial plexus palsies due to rib pressure is discussed by Bromwell and Dykes and eight cases are selected from twenty-three cases to illustrate the points made. Cervical ribs were present in few of the cases. Pressure symptoms referred to the brachial plexus may be caused by a cervical rib, by a rudimentary first dorsal rib, or by a normal first dorsal rib. The greater frequency with which symptoms of rib pressure are observed in the female as compared with the male sex is striking. The age at which symptoms appear is of interest. Thus, in twenty cases the average age was twenty-two. Posture, and notably confinement to bed, is a factor of importance. Thus, two patients first developed symptoms while in bed after an operation for appendicitis, one during an attack of influenza, one while ill with diphtheria, one after a confinement, one after sitting in a dentist's chair for a couple of hours, while two attributed their symptoms to carrying a young baby. Debility, anemia, loss of weight and general ill health undoubtedly play a rôle in certain instances, while trauma has been the obvious determining cause in some cases. The nervous symptoms due to rib pressure are commonly referred to the first dorsal root, the eighth cervical root, or the lowest cord of the brachial plexus. Exceptionally, however, symptoms referable to a higher level have been observed. Pain referred to the inner side of the forearm is the symptom for which advice is most often sought. Subjunctive sensations, such as tingling, numbness, and "pins and needles" in the finger-tips, and particularly a feeling of coldness in the hand, are of frequent occurrence and are sometimes observed in cases in which there is no complaint of pain. No objective sensory disturbance may be detected, although very usually some sensory loss, which corresponds more or less to a root distribution, is present, and it is, as a rule, of a dissociated character, tactile sensibility being less affected than painful and thermal sensibility. The sensory impairment, when present, is most commonly situated along the inner side of the forearm, while the little and ring fingers are usually involved; in rare cases the anesthesia is limited to the hand. Although sensory symptoms may be alone complained of in many cases, motor symptoms are also observed, while exceptionally the patient complains of motor weakness only. Vasomotor changes, blueness and coldness of the nails, are met with in a small proportion of cases. Cases of rib pressure in which the symptoms are not pronounced

may sometimes be materially benefited by attention to the general health, and do not call for surgical treatment. When pain, occurring from time to time, is alone complained of, this symptom can usually be relieved by a sling which supports the elbow, while a blister above the clavicle may be helpful. When pain due to rib pressure is so severe as to cause constant annoyance, or when pain or muscular weakness, or both, are producing such inconvenience as to interfere with the patient's occupation, surgical intervention is indicated. The results of operative treatment in those cases in which pain is the prominent symptom are most satisfactory for the pain is usually completely relieved.

2. CRANIAL NERVES.

Fiorenza, I. FAMILIAL OPHTHALMOPLEGIA. [Pediatria, March, 1921, Vol. XXIX, No. 5.]

In this clinical report three men in the family are involved. Two presented partial external ophthalmoplegia, and a third, total. The ages were from sixteen to thirty. The maternal grandmother had had occasional convulsions, otherwise no hereditary clue was obtained.

Ombredanne, L. CORRECTION OF FACIAL PARALYSIS. [Presse Médicale, August, 1921, Vol. XXIX, No. 64.]

The description of a contrivance in the form of a hook worn on a back upper tooth, which lifts up the corner of the mouth which droops.

Heynix. FACIAL PALSY DUE TO A METASTATIC ABSCESS OF THE PONS. [Rev. de Laryngol., d'Otol., et de Rhinol., October 1, 1921, XLII, p. 513 (2 figs.).]

A woman, thirty-eight, who had been laid up for months with pelvic suppuration and septicemia, showed a right facial palsy, slight paresis of abducens, intermittent neuralgias of right trigeminus, and commencing paresis with tingling of left limbs (*i.e.*, the Millard-Gübler hemiplegic syndrome). There were also right hypoacusia, without middle ear lesion, and functional delay in right vestibular nerve and in right cerebellar lobe. Diagnosis was a metastatic abscess of the right lower half of the pons, with extension toward the right pontocerebellar angle, consequent on the prolonged pelvic suppuration and septicemia. The symptoms gradually increased, the right eye became necrosed from involvement of origin of right trigeminus, and death occurred in three months. Necropsy confirmed the diagnosis *in toto*. As to drainage of an abscess of the lower half of the pons, Heynix suggests a combination of two known surgical avenues of approach, *viz.*, (1) the transmastoid-vestibular used by Janssen, and (2) the trans-squamous and suprapetrous used by De Beule for retro-Gasserian resection of the trigeminus. He thinks this would prove to be the surest way to drain such an abscess. The operation considered by Krause, of trephining the basilar apophysis of the occipital bone was barred by reason of the obscuration of the field of

operation by the bleeding from the basilar artery and also by the risk of infection by this buccopharyngeal route. [Leonard J. Kidd, London, England.]

Titone, M. SPINOFACIAL ANASTOMOSIS FOR FACIAL PARALYSIS. [Lyon Chirurgical, September–October, 1921, Vol. XVIII, No. 5.]

An anastomosis of the spinal accessory nerve with the facial nerve is here advocated with the view of innervating the facial region paralyzed by trauma of the seventh.

Burian, F. CORRECTION OF DEFORMITY FROM FACIAL PARALYSIS. [Revue de Chirurgie, 1921, Vol. LIX, No. 1.]

The author has obtained excellent results in traumatic facial paralysis by suspending the corner of the mouth paralyzed by a muscle implant in the lips. A narrow strip of fascia lata was also wound around the median palpebral ligament, and then one end was drawn through the lower and the other through the upper lid. This gave an excellent control of the eyelid after suturing the two. Later muscular training is necessary.

Gibson, A. FACIAL PARALYSIS. [Surgery, Gynecology and Obstetrics, November, 1921.]

This article discusses the subject of facial paralysis with special reference to the operative treatment of the condition. The course of the neural path influencing the facial musculature is dealt with and a short consideration of the lesions in different localities with the etiology, the prognosis, and the appropriate treatment follows. The bulk of the paper is devoted to the subject of nerve-anastomosis for relief of the symptoms of facial paralysis of the peripheral type; eight cases being recorded from the writer's own practice in which anastomosis of the hypoglossal to the facial was performed.

Plastic operations have been devised to correct the two main deformities, viz., drooping of the lower eyelid, and of the angle of the mouth. Of these, the author has no personal experience, and the results of nerve anastomosis have been so gratifying that he suggests that such muscle—or fascia-flap transplants—should be reserved for cases in which nerve anastomosis has been tried and has failed. The history of the operation is traced at some length, credit being given to Ballance for the first operation of the sort, performed in 1895, "the spinal accessory being cut half through and the facial sutured into the cleft with fine silk." The first actual facio-hypoglossal anastomosis was performed by Koerte in 1901. Details of the technique of the operation are fully described and illustrated by diagrams. For the suture material catgut and fine silk have been employed, preference being given to the latter on the ground that it is less likely to lead to the formation of much scar tissue. No fascia or other material is used to wrap the junction.

Eight cases are described in detail, and photographs of the patients are given. In all of them, except the last case in which deliberate section

of the facial nerve was performed for intractable facial tic, voluntary movement is present. Several of the photographs indicate the resulting atrophy of one side of the tongue and the comparatively trifling disability which results from this. Emphasis is laid on the view that return of voluntary power in the facial muscles marks only the commencement of recovery. Systematic education in the way of muscle training must be persevered with for a very long time. In none of the cases observed has emotional movement been regained and the reason for this is discussed at some length. "Obviously the only means of reacquiring emotional activity in the facial muscles is by educating the hypoglossal cortex to perform the complex work of the facial cortex, or by connecting the facial cortex with the tongue cortex so intimately that the path for impulses from the facial cortex through tongue cortex to facial muscles is as free as it was formerly when it ran directly from facial cortex to facial muscles." An attempt is made to analyze the elements in the result which would enable one to estimate the question of success or failure. These may be grouped according to the anatomical region, the brow, the palpebral fissure, the cheek, the mouth and the tongue. Each of these again may be regarded from the standpoint of appearance and that of function. The value of each element may be differently appraised by different people so that the question of success or failure must always be to some extent an individual proposition.

The author concludes that the evidence is sufficient to warrant the opinion that facio-hypoglossal anastomosis is "a measure of distinct utility." The article is copiously illustrated, and a very full bibliography is appended.

Fallas, A. PARALYSIS OF THE RIGHT HALF OF THE TONGUE AND OF THE RIGHT LOWER FACIAL. [Rev. de Laryngol., d'Otol., et de Rhinol., January 15, 1921, p. 27.]

Fallas reports a case of paralysis of the right half of the tongue with paralysis of the muscles supplied by the lower branch of the right facial nerve, in a woman aged thirty-eight, of four days' duration. The reaction of Bordet-Gengou was negative, but she had had two children who died very young, one miscarriage, and she has a child who has bad health, so that the existence of syphilitic endarteritis in the patient was thought of. Treatment by sulpharsenol gave a rapid definite improvement of her palsies. [Leonard J. Kidd, London, England.]

Gerdil. OCULAR DISTURBANCES CONSECUTIVE TO INFLAMMATION OF THE MIDDLE EAR. [Paris Thesis, 1921.]

Ocular complications in the course of otitis media consist of paralysis of the abducens, encountered in 9 per cent of such cases, and papillary stasis with or without neuritis; the latter is of extremely frequent occurrence, being noted in 60 per cent of recorded observations. Paralysis of the sixth motor nerve is met with particularly in the course of the intra-

cranial complications of otitis; it is due to quite diverse causes, such as circumscribed meningitis, cerebellar abscess, and thrombophlebitis; cases have, however, occurred in which the paralysis was not accompanied by intracranial complications; the pathogeny of such cases is very difficult of explanation; very probably the underlying condition is an affection directly involving the nerve. The alterations of the optic nerve in the course of otitis are of two forms: simple papillary stasis without immediate functional signs with ventricular hypertension alone; stasis with neuritis and rapid failure of vision when ventricular hypertension supervenes upon meningeal infection along the sheaths of the optic nerve. Systematic examination of the fundus, in the course of otitis media accompanied by symptoms of wider involvement, will reveal these alterations of the optic nerve. Treatment is based upon early diagnosis; good results may be obtained, particularly in papillary stasis. Lumbar puncture is of value in cases of slight hypertension, but it must be repeated several times. In cases of hypertension with papillary stasis recourse should be had to a decompressive craniotomy; to be of use, intervention should be practised before atrophy has had time to occur. In stasis with neuritis, vaccinotherapy is indicated, especially where the infectious organism has been isolated.

Veronese, L. D. CHVOSTEK'S SIGN. [Policlinico, October, 1921, Vol. XXVIII, No. 44.]

Chvostek's sign was looked for in 413 children examined in the last two years. Twenty-one per cent of all children between five and nine years showed a positive Chvostek. In 49 children of about the same age but who were rachitic it was present in 28.5 per cent. In 41 tuberculous children he found it in 22 per cent.

Pentimalli. NYSTAGMUS IN PROTEIN INTOXICATION. [Reforma Medica, June, 1921, Vol. XXXVII, No. 25. J. A. M. A.]

Pentimalli has encountered nystagmus quite frequently as a manifestation of anaphylaxis in man and in animals. It may be the only symptom of the protein poisoning, or it may accompany convulsions, dyspnea or other features of the anaphylactic shock. One rabbit being treated with parenteral injections of milk presented the nystagmus regularly, and he theorizes to explain this, and also the arrest of the nystagmus and of the other manifestations of anaphylaxis under ether anesthesia.

Nager, P. ENDOCRINE DEAFNESS. [Schweiz. medizin. Woch., November 3, 1921, Vol. LI, No. 44.]

Endemic cretinoid deafness is a not infrequent finding in the ear infirmary in Zurich. Goiter in the families and other signs of hypothyroidism call for long continued thyroid or iodine treatment. The type of deafness is labyrinth or auditory nerve degeneration. The hearing is not much benefited by the treatment.

Van Allen, C. M. TRANSORBITAL PUNCTURE OF GASSERIAN GANGLION. [Annals of Surgery, November, 1921, Vol. LXXIV, No. 5.]

Puncture of the Gasserian ganglion across through the orbit is a relatively simple means of securing block anesthesia for operations in the trigeminus region. Where general anesthesia is contraindicated it is indicated.

Sachs, E., and Alvis, B. Y. ANATOMIC AND PHYSIOLOGIC STUDIES OF EIGHTH NERVE. [Am. Archives of Neur. and Psychiatry, August, 1921, Vol. VI, No. 2. J. A. M. A.]

In their study of the eighth nerve, Sachs and Alvis failed to find fibers running directly from the semicircular canals to the nuclei of the vestibular nerve. The fibers running from Deiters' nucleus anteriorly in the posterior longitudinal bundle are few in number and stop before they get to the third and fourth nuclei so that it is doubtful whether there is any connection between Deiters' nucleus and the other nuclei. This is the oculovestibular tract spoken of by Wilson and Pike. No fibers were found passing from Deiters' nucleus to the lateral lobes of the cerebellum where the centers Bárány has described lie. All anatomic evidence to support Bárány's contention as to the connections between Deiters' nucleus and the cerebellum is lacking. Fibers from Deiters' nucleus end in the posterior corpus quadrigeminum of the opposite side, but no neuron goes directly to the external geniculate. All fibers of the vestibular nerve end in one of the three vestibular nuclei or in the nucleus tecti of the vermis. Circus movements, rolling over and over, ataxia, swinging of the head, attitude of the head, hitherto described as due to a lesion of the eighth nerve or destruction of the semicircular canals, are due to injuries to the cerebellar nuclei or middle peduncle.

Achard, C. DIPHTHERITIC PARALYSIS. [Bull. Méd., July, 1921, XXXV, No. 28.]

Paralysis of the velum first attracted attention in two cases to a puzzling type of palsy. In one woman of forty-five years of age this paralysis of the velum had been noted fifteen days after a sore throat; a man of twenty-eight had it nearly a month after a sore throat, which in both, was assumed to be diphtheritic and healed by antitoxin. Both recovered.

Costiniu and Vasiliu, J. TRAUMATIC PARALYSIS OF VAGUS, GLOSSOPHARYNGEAL, SPINAL ACCESSORY, AND HYPOGLOSSAL NERVES. (JACKSON'S SYNDROME.) [Rev. de Laryngol., d'Otol., e. d. Rhinol., XLIII, March 31, 1922, p. 239.]

A man, fifty-eight, was unconscious for two hours after a carriage accident. He began to speak a fortnight later. On admission, a month after the accident, he had a raucous voice with difficulty in deglutition and respiration. No syphilis and no previous disease. He had a rightsided

Jackson's syndrome (palsy of vagus, glossopharyngeal, spinal accessory, and hypoglossal nerves). Radiological examination revealed evidence of injury to the atlas and bony projections which prevented the determination of the extent of the lesions along the cranial base. Patient was improving when he left the hospital. The writers think that in this case there was, in addition to the lesion of the atlas, a fissure of the foramen lacerum posterius; in consequence of this a hematoma appeared and gave rise to a subsequent neuritis of these four hindmost cranial nerves. Apparently this is the first recovered case of a traumatic Hughlings Jackson's syndrome. [Leonard J. Kidd, London, England.]

Turner, A. L. PARALYSIS OF VOCAL CORDS. [Journal of Laryngology and Otology, August, 1921, XXXVI, No. 8.]

Vocal cord palsy is a by no means infrequent indication of involvement of the recurrent laryngeal in carcinoma of the breast with extension. The author reports on six cases. In three the right breast and in three the left breast was involved. The breast and the axillary glands of the same side had been removed in all six women. One was a case of melanotic sarcoma, and five were scirrhus cancer. The hoarseness developed at varying periods after removal. In the sarcoma, the symptom was noticed eight months after amputation. Of the five cases of scirrhus cancer, hoarseness developed at periods varying from two and one-half to five years, the average period in the five cases being three years and six months. The vocal cord involved varied according to the metastatic extension.

Moulonguet. SUDDEN DEAFNESS WITH MUMPS. [Méd., January, 1922, III, No. 4.]

Sudden deafness is a rare but not an exceptional complication of mumps. It may occur at the onset or during the course or decline of the mumps. No age seems exempt. The cause is probably pressure upon the auditory trunk, either at the base (meningeal signs are here obtained by lumbar puncture) or in the auditory canal.

Vernet. TREATMENT OF OTOGENOUS VERTIGO. [Méd., January, 1922, III, No. 4, J. A. M. A.]

Vernet remarks that when there is some local cause for irritation in the labyrinth, which it is impossible to remove, and also after exclusion of impacted cerumen, cholesteatoma, obstruction of the tube or other manifestation of otitis media, palliative treatment is the only recourse. From simple fleeting vasomotor disturbances up to the full Menière syndrome there are all kinds and degrees of sympathetic vasomotor capillary derangement. This has an endocrine basis, and epinephrin has an unmistakable beneficial action in these conditions. It stimulates electively the terminals of the sympathetic nervous system, while regulating the blood pressure and exerting an antitoxic action. He gives ten drops half an

hour before meals twice a day of the 1 : 1000 solution, on alternate weeks. No other drug should be given with it, but in some cases the vertigo yields better to pilocarpin than to epinephrin.

Broca, A. SEMICIRCULAR CANALS. [Bulletin de l'Acad. de Med., January 25, 1921.]

The author here comments on the teleological advantages of the slightly oblique arrangement of all the canals. A slight turn of the head will tend to mitigate the disadvantages that arise from an injury of any of the canals.

McEvoy, F. E. OPERATIONS ON GASSERIAN GANGLION. [Surgery, Gynecology and Obstetrics, March, 1921.]

The author discusses a technic employed in the Mayo Clinic. It is simple and can be made and closed rapidly. The possibility of injury to the temporal branch of the facial nerve is precluded. Being within the hair-line no visible scar is possible. The swelling so prone to occur in flap incisions about the orbit is obviated. The incision begins at the lower border of the zygoma, 1 cm. in front of the ear, and extends backward and upward 8 cm. in the direction of the temporal muscle fibers. The incision is extended through the skin, fascia and muscle, but in addition the temporal fascia is divided parallel with the zygoma for a distance of 0.5 centimeter in each direction from the oblique incision, thus affording greater exposure of the lower angle. A self-retaining retractor is used to expose the bone for decompression with removal of bone down to the floor of the middle fossa.

Fumarola. AUDITORY NERVE TUMOR. [Il Policlinico, February 1, 1921.]

A clinical report of two cases of auditory nerve tumor in men of twenty-six and thirty-four years of age respectively. The clinical diagnosis of a tumor in the cerebellopontine angle was confirmed at autopsy. In one the symptoms developed a war wound of the head in three weeks.

Payr, E. TRIGEMINAL NEURALGIA. [Münch. med. Woch., August 19, 1921, LXVIII, No. 33, J. A. M. A.]

Payr emphasizes the importance of the correct order in the choice of therapeutic methods; namely, difficult and dangerous procedures must not be employed until milder, harmless methods have been tried. The various methods must be chosen in such a manner that a method taken out of its order does not make the following ineffective, or at least of doubtful value. For technically easier methods with poor lasting results, more radical methods should be substituted, even though more dangerous, provided the prospects for a permanent cure are better. Internal treatment combined with the use of cathartics, morphin withdrawal, psychotherapy and antisiphilitic therapy (if there is the slightest suspicion of syphilitic infection) must certainly be tried as the first stage before any more radical methods are considered. Anesthetization and deep

roentgen irradiation constitute the second stage, and alcohol injections and operation the third stage. Roentgen irradiation must precede not only alcohol injections but also peripheral extraction, since otherwise it has little prospect of success owing to scar formations about the nerve trunks. It must be admitted that alcohol injections make future surgical intervention more difficult owing to extensive scar formation, which obscures the topographic relationships. Peripheral extraction is indicated only when the neuralgia is confined to the frontal and supraorbital nerves. He states his reasons why he opposes its application to other branches.

Bárány, R. DISEASE OF THE OTOLITH APPARATUS. [Journal of Laryngology and Otology, May, 1921.]

A woman of twenty-seven years of age had suffered for a year from headaches. The caloric reaction on each side was normal. Thickenings of the neck and shoulder muscles were present. They were rheumatic in character. She had suffered from attacks of giddiness of half a minute's duration for about two weeks during which marked rotary nystagmus to the right, with an upward vertical component, was observable. These attacks occurred when the patient turned on her right side. After an attack the patient had to remain for a time on her back or left side, before another attack could be induced by turning her head to the right. Position rather than movement evoked the attack. He quotes Wittmaach who showed that when guinea-pigs were rotated at the rate of 2,000 revolutions a minute, the otolith membrane became detached and the researches of Magnus which showed that when this membrane was detached, all the so-called compensatory eye movements (*i.e.*, the reflex of position) were absent, while the movement reflex (*i.e.*, the semi-circular canal reaction) was present.

Jonnesco, T. TREATMENT OF FACIAL NEURALGIA BY RESECTION OF THE CERVICOTHORACIC SYMPATHETIC. [Compt. Rend. de l'Acad. des Sciences, October 24, 1921, CLXXIII, 746.]

Jonnesco attributes the failure of the old operation of partial resection of the sympathetic for tic douloureux to the fact that only the superior cervical ganglion of the affected side was resected. This was inadequate, for the action of the sympathetic on the trigeminus nerve is not direct, but is exerted by the vasomotor nerves which modify the circulation in that nerve and its ganglia (he appears to include Meckel's ganglion with the Gasserian), and so cause the neuralgia. He therefore now completely removes both cervical sympathetics and both first thoracic ganglia. The vasomotor nerves of the sympathetic which act on the intracranial blood-vessels pass by two paths: (1) by the prevertebral cord with its three cervical ganglia for the carotid arterial areas, and (2) by the vertebral nerve, coming from the inferior cervical and first thoracic ganglia, which traverses the intervertebral canal and accompanies the vertebral artery which forms the basilar arterial zone of the intracranial vessels. Jonnesco

practices this complete bilateral resection of the cervicothoracic sympathetic under superior rachianesthesia (introduction between the seventh cervical and the first dorsal vertebra of 2 centigrammes of stovaine and one milligramme of strychnine). He performs it in two stages, each comprising the complete resection of the sympathetic on the affected side. A few days later this is similarly done on the sound side. In two cases thus treated he has had complete success. [Leonard J. Kidd, London, England.]

Mygind, S. H. VESTIBULAR FACE REFLXES. [Journal of Laryngology and Otology, July, 1921, also Uges. k. f. Laeg., 1919, 1209.]

While performing a series of vestibular examinations in infants this observer noted that, when the child was rotated in the sagittal plane, a reflex was induced in the form of a vertical nystagmus, with the slow phase upwards and that this was accompanied by a lifting of the upper eyelid, a wrinkling of the forehead and sometimes by an upward curl of the upper lip. When a nystagmus with slow phase downwards was induced, there occurred an active drawing down of the eyebrows, a smoothing of the forehead and sometimes a slight downward curl of the lips. Mygind also found that, in connection with horizontal nystagmus, a facial reflex occurred both during and after rotation in the form of a contraction appearing in the cheek on the side to which the slow phase of the nystagmus was directed, the corner of the mouth being pulled a little to the side and upwards and the palpebral fissure on that side becoming slightly enlarged. Bartels and Bárány have called attention to these reflexes. Mygind has found these reflexes in prematurely born children at the seventh month, but not in infants over six weeks of age. It appears when the child is awake or asleep. Its disappearance soon after birth he ascribes to the increase of the development of the cortical cerebral tracts. He thinks that the reflex itself may be due to a deep running reflex arc in the cerebellum (as demonstrated by Mgvar), involving cerebellar centers of the facial nerve, representing, like other nerves there, directions of movement rather than anatomical groups of muscles or peripheral nerves.

Schmidt. PARALYSIS OF THE LARYNGEAL NERVE. [Hospitalstidende, January, 1921.]

This is a clinical analysis of 100 cases observed in two Danish hospitals. Up to the age of three years there were only bulbar paralysis, postinfectious and traumatic. From thirty-five to sixty there was a steady rise in the frequency of this paralysis, followed after sixty by an equally steady fall. There were 24 cases of cancer of the esophagus, among which there were only three women. Diseases of the lungs and mediastinum accounted for 14 cases, equally distributed between the two sexes, and aneurysm of the aorta accounted for 13 (9 males). In several of these cases hoarseness developed before any other symptom indicative of disease. There were 8 cases of heart disease (all women), and,

curiously enough, in two of these cases the paralysis was right-sided. Of the remaining 6 left-sided cases 3 were associated with mitral stenosis. All the 9 cases of tumor of the neck were right-sided. This finding the author explains by a reference to the course of the recurrent nerve in the neck being more superficial and exposed on the right than on the left side. When the paralysis was associated with goiter (9 cases) it was anticipated that the disease would in most cases prove to be malignant; but in reality this was the case only in 3 of the 9. The group of 6 post-infectious cases was very mixed, including as it did typhoid fever, influenza, diphtheria, and rheumatism. Among the bulbar and pseudo-bulbar cases (7) were 3 with syringomyelia. The rest of the 100 cases were made up by a few obscure cases and pathological curiosities. In about 60 cases the cause of the paralysis was situated below the upper aperture of the thorax, in 45 the cause was carcinoma or sarcoma, and in about 70 the disease was fatal.

3. SPINAL CORD.

Noica. STRÜMPELL'S PHENOMENA. [Revue Neurologique, 1920.]

Long ago Strümpell called attention to what he called the "tibialis phenomenon" in spastic cases. Flexion of the leg is accompanied by an involuntary dorsal flexion and adduction of the foot, sometimes also dorsal flexion of the toes, especially marked in the big toe, constituting a positive Babinski. To elicit Strümpell's sign place the hand on the knee so as to resist gently the flexion of the leg. Through experiments on the cadaver Noica offers an explanation of the mechanism of the phenomena. After overcoming the rigidity of the lower extremities by passive movements the leg was flexed on the thigh—the hand supporting the knee meanwhile—and no attempt made to guide the movement of the foot. It was observed that flexion of the knee was invariably accompanied by dorsal flexion of the foot. That is to say, the foot acted as a lever resting with one end—the heel—on the table, while the other end of the lever—the toes—was raised mechanically. Consequently Strümpell's phenomenon must consist of an active, muscular contraction in addition to this mechanical action observed in the cadaver (Babinski). Marie and Foix have also maintained this view. Noica next tried to elicit Strümpell's sign in a normal individual, a boy of fifteen. Dorsal flexion of the tibiotarsal joint and of the toes was again observed, especially of the big toe, but adduction of the foot is inconstant. It may occur, but most of the time the foot is flexed without deviating from the median line. In the normal *adult* the same phenomenon is also observed, though not as constantly as in the young. While Noica does not wish to disclaim all pathological significance for Strümpell's sign, one could hardly claim that it indicates a lesion of the pyramidal tract, since it is present in normal individuals.

Under what conditions, then, may we find Strümpell's sign in lesions

of the pyramidal tract? We may find it in hemiplegia and in paraplegia *only when some muscular power remains* in the muscles of the knee joint, and possibly in the flexors of the ankle joint. Noica has examined a number of cases of spastic paraplegia and hemiplegia, and, like Marie and Foix, has frequently found that voluntary flexion of the knee remains after the power of flexing the foot alone has been lost. In such cases, in flexing the knee the patient firmly presses the heel against the surface of the bed, which enables him to get the most out of the remaining muscular power of the extensors so that he can accomplish dorsal flexion of the foot and also place it in adduction by the action of the tibialis anticus, which is the best preserved. There is not enough voluntary motion left to accomplish this when the knee is extended, as then the Achilles tendon must be put on the stretch, and also overcome the resistance of the lower ends of the tibia and fibula in the tibiotarsal joint to place them against the posterior end of the foot in order to flex the foot. This would indicate that Strümpell's phenomenon does not arise through the medullary automatic mechanism (Marie and Foix). Since flexion of the knee, with slight resistance, is accompanied by an involuntary dorsal flexion of the foot and also of the thigh in normal individuals, especially in the young, Noica refers to this flexor response as "sympathetic voluntary movements." It remains to determine why in normal individuals the foot remains in the median line usually, while in hemiplegias and paraplegias the tibialis anticus produces an adduction of the foot, while the big toe is in dorsal flexion. The answer is that normally the power of adduction is greater than that of abduction, and that therefore the adductors will be more apt to have retained power of motion in paralysis. This also explains why the big toe is more forcibly flexed than the other toes, being the strongest even under normal conditions.

Strümpell's phenomenon, then, depends directly upon *voluntary motion*, and cannot be elicited unless the voluntary motion remains. Noica adds that in his opinion the sympathetic voluntary motion is developed in the individual before isolated motion. In cases of lesion of the pyramidal tract it would therefore naturally be the last to disappear. [Author's abstract.]

Grünbaum. TREATMENT OF INTERMITTENT CLAUDICATION BY DIATHERMY. [Wien. klin. Woch., October 21, 1920.]

This clinical study is of eight cases of intermittent claudication successfully treated by diathermy. Six were in men and two in women, aged from forty-one to fifty-six. Of the men four were heavy smokers, one a slight smoker, and one a nonsmoker. Of the two women one was a heavy cigarette smoker, and the other a very moderate smoker. Syphilis was denied in all cases. In seven cases the condition was bilateral, and in one unilateral. Treatment by diathermy, which was continued for four to eight weeks, was very satisfactory. Improvement of the sub-

jective symptoms occurred in all, and in some cases the patient was enabled to walk long distances without interruption and free from pain. Each sitting lasted ten to twenty minutes, the strength of the current varying between 400 and 800 milliampères.

Ravaut and Rabeau. THE VIRULENCE OF THE CEREBROSPINAL FLUID IN GENITAL HERPES. [Compt. Rend. Soc. de Biol., December 17, 1921, LXXXV, p. 1132.]

In 1903 Ravaut was struck by the intensity of the nervous symptoms in many cases of genital herpes, and he found modifications in the cerebrospinal fluid in 21 out of 26 cases; in one case of neuralgic herpes it was turbid. The writers, after inoculating a rabbit's cornea with a few drops of the spinal fluid from a case of neuralgic genital herpes, found no corneal lesions. But fifteen days later the animal showed nervous symptoms, wasted, and died twenty-eight days after the inoculation. On necropsy, the cerebellum, Sylvian aqueduct, and midbrain showed lesions absolutely identical with those of human encephalitis and of herpetic encephalitis. The fluid from the herpetic vesicles of this patient produced in another rabbit a typical keratitis, followed by encephalitis on the seventh day after inoculation. [Leonard J. Kidd, London, England.]

III. SYMBOLIC NEUROLOGY.

1. PSYCHOLOGY—PSYCHOANALYSIS—NEUROSES.

Gordon, Alfred. NEUROLOGIC MANIFESTATIONS OF PUBERTY. [Phil. Neur. Soc., 1921.]

Adolescence presents an active developmental period. It is a time of great physical and mental stress. New traits, sex interest, new sentiments make their appearance. The brain is more active in circulation and metabolism. We have good reasons to believe that the ductless glands, which influence greatly the autonomic nervous system and therefore the sympathetic, play normally a certain rôle in changes of disposition, mood and consequently of conduct and behavior. During puberty these glands by reason of a very active circulation are more apt to modify the mode of feeling and therefore of acting. Adolescence is a critical period of life. The coming man or woman cannot readily abandon the traits of the passing childhood. There is naturally a struggle. Natural tendencies are now more in evidence, they may become perverted, exalted or abolished according to whether the combat between the infantile forces and the new requirements ends in favor of one or the other. It is at this period of life when the mind either reaches a new development or succumbs under the new intolerable burden. Frequently this great physiological crisis precipitates mental and nervous disorders if the predisposition is neuro-pathic. In normal condition we frequently witness a very manifest

change of character; the individual may become reserved or authoritative. There may be euphorism or depression.

From a practical standpoint the chief feature of the crisis in puberty is the continuous endeavor on the part of the adolescent to adjust oneself to the new physiological and psychic forces. Should the adjustment fail, neuroses and psychoses will ensue.

Hysteria with all its physical and mental characteristics, obsessions, phobias, abouliias, hypochondriasis, anxiety neurosis, tics, spasms,—all are morbid manifestations to which an adolescent is particularly predisposed by reason of the above-mentioned peculiarities. In other words, functional nervous disorders which are psychogenetic in origin, character and evolution find a large and a fertile soil during a period of life when feelings, emotions or affects in general are especially mobile and consequently exercise a greater influence on behavior, conduct, activities, and formation of character.

Installation of puberty is one of the most potent factors which facilitate the formation not only of neuroses but also of psychoses. Dementia precox occupies the most conspicuous place among all. Periods of exaltation alternating with periods of depression known under the name of cyclothymia (in mild form) or manic depressive insanity (in a pronounced form) is another affection not infrequently encountered in adolescence. The process of development of puberty with its stormy changes in psychic life occurring at that period contributes to those psychoses a special mask, character and color.

Besides the study of specific nervous and mental disorders there is another problem of greater magnitude which deserves our attention. It is the problem of mental deficiency which acquires a special importance from the standpoint of puberty. If this special developmental period of life is associated with important physiological and psychic changes; if sentiments, tendencies, penchants and all sorts of traits are particularly disturbed during the period of the struggle between the infantile and juvenile forces, finally if adjustment of the former to the latter is the principal, if not the only aim, during puberal evolution,—by reason of these circumstances, mental defectives will naturally show total inability and succumb under the tremendous burden. The result will be approximately as follows: obtusion of moral conscience, no struggle against passions; violent impulses, no judgment, no will, ego accentuated, intolerance, strong degree of envy and jealousy, bigoted hatred, cruelty, sexuality to a pronounced degree, finally criminality in all its forms. Criminality as an essential characteristic tendency of mental defectives is one of the most important problems confronting us. Statistical studies show strikingly the effect of mental deficiency during the adolescent period of life. According to the Bureau of Education in Washington, 20 per cent leave school at puberty because of an inherent mental inability to advance. Petty and serious crimes committed by this large army of juvenile delinquents are a matter of common knowledge.

The brief survey of nervous and mental manifestations during the developmental period of puberty in normal and defective individuals leads us logically to a consideration of an outline of therapeutic and prophylactic conduct. It is obvious of course that intense attention to this important problem is indicated during childhood, long before the serious physiological crisis commences to develop. All our efforts must be directed toward preparing the child for that important period of life in order to enable it to meet the great conflict between various forces. The preparation must be first of all physical with its normal physiological requirements, next affective, viz., all pertaining to the emotional side of the child's life. Two elements must be borne in mind: inherited constitution and influences from without.

In bad heredity the child must be placed under favorable conditions: good nutrition; reasonable exercises; no overstrain; train resistance in case of pain and discomfort; control strong passions; train to overcome anger, worry; cultivate elevating emotions, such as hope, joy, expectations, love; they are all constructive and must be specially insisted on. On the contrary, depressive emotions, such as despair, sorrow, are damaging to the nervous system. Joy of work compels concentration of attention. Idleness is education to nervousness. Regular systematic work is wholesome. To solve the problem of the nervous child medicine, psychology and pedagogy must all be concerned.

The greatest therapeutic management should be undertaken in childhood and should be preëminently prophylactic. One must fight against undesirable predisposing factors which govern the destiny of the future man or woman. To strengthen the psychic forces is one of the most important measures in the course of preparation of a child for the adolescent period. [Author's abstract.]

Raeffler and Schultze-Rhonof. HYPNOSIS IN GYNECOLOGICAL EXAMINATIONS AND TREATMENT. [Zentralbl. f. Gynäk., September 10, 1921.]

At the Heidelberg clinic, hypnosis is employed as a preparatory measure to the vaginal and abdominal examination of pregnant subjects. The patients receive hypnotic treatment half an hour before the instruction classes commence. Suggestion is made that they will fall into a deep sleep, that the abdomen and genital organs will become anesthetic, that amnesia will follow in respect of the events taking place during the sleep, and that deafness will be induced to all noises and voices save the voice of the hypnotizer. It is recorded that the patients remain perfectly quiet and flaccid during the subsequent examinations, of which they afterward retain no recollection. In certain cases posthypnotic anesthesia of the parts is also induced for forty-eight hours. Raeffler records treatment of three gynecological cases by hypnosis. In the first patient, a nullipara aged twenty-one, suffering from vaginismus, deep hypnosis was secured at the third sitting; at the fourth and fifth, anesthesia of the vulva was suggested; at the subsequent sittings anesthesia of the

vagina and toleration of the introduction of increasingly large specula were secured. In the waking condition the patient now experienced no dyspareunia, and she speedily became pregnant. The other two cases were examples of dysmenorrhœa in young nulliparæ.

Quinan. SINISTRALITY IN RELATION TO HIGH BLOOD PRESSURE AND DEFECTS OF SPEECH. [Arch. of Int. Med., February 15, 1921, Vol. XXVII, No. 2. J. A. M. A.]

The literature of the subject is reviewed by Quinan and he presents the results of an investigation of left-handedness in relation to high blood pressure and speech defects. Among 600 men examined forty-two sinistrals were found. High arterial tension was found to occur more frequently in left-handed than in right-handed people. Evidence is submitted that left-handedness is hereditary, and that it indicates a defective organization of the central nervous system. Hence it is concluded that hereditary predisposition is a definite factor in the etiology of high blood pressure, and that high arterial tension is suggestive of constitutional inferiority. As compared with dextrals, stammering occurs in sinistrals with a frequency from three to seven times greater.

Long, Constance E. THE PSYCHOLOGY OF PHANTASY. [Collected Papers. Review by British Med. J1.]

Dr. Constance E. Long is one of the leading exponents in England of the Jung school, and has been largely responsible for making the work of the Zurich psychologist accessible to the English reader. She has now collected a number of her personal contributions, and has published them in a book with the title of *The Psychology of Phantasy*. The book will be read with interest as indicating the psychological outlook of the particular school of which she is an adherent. Eleven papers are included in this volume, and they cover a variety of topics of psychological interest. The first four are concerned with the mental development of children, with special reference to mental conflicts, the unconscious mind, fear, authority, and discipline. In her preface Dr. Long states that a candid friend, who happened to be an academic psychologist, told her that her book had nothing to do with psychology. This may or may not be so; but, whatever her book has to do with, its author has certainly a sympathetic understanding and insight into the mind of a child, and has much to say of value to those who are in a measure responsible for its satisfactory development.

In subsequent chapters Dr. Long discusses such matters as the censor and unconscious symbolism in dreams, sex as a basis of character, unconscious factors in sex education, and the significance of phantasy in the production of the psychoneuroses. She also devotes a chapter to the discussion of Jung's *Psychology of the Unconscious*—a book which Miss Long rightly describes as "formless," and one which many of its readers will be glad to have explained. A careful study of these papers

will make the reader conversant with the difference in outlook between the opposing schools of Jung and Freud, because Dr. Long writes not only attractively but clearly. She herself thinks that many ideas are implicit in the *Traumdeutung*, which have been explicitly developed by the school to which she belongs, though the Freudians strenuously deny this. It may be so; but her book would seem to show that the differences between the two schools are fundamental and irreconcilable. It is one thing to explain the Oedipus complex psychologically in terms of regression to a childish longing for love and protection, and quite another to do so concretely and physically. It is difficult to harmonize the view of an unconscious "as the source of intuitive knowledge and origin of religions . . . the germinal place of emotional and mental forces . . . a chaos of infinite resources . . . the kingdom of heaven within us," with that of an unconscious "incompatible with the civilized conscious personality . . . sexual in character . . . of a crude and infantile type." Nor is it easy to find obvious points of contact between a psychology which seeks to interpret a dream in terms of some high task in life unfulfilled and one which does so in terms of some base and heavily disguised desire, furtively seeking expression under cover of darkness. Dr. Long suggests that the difference between these divergent views is, in a measure, a matter of emphasis. It is doubtful whether she really thinks this, and still more doubtful whether her readers will do so. It is not for the reviewer to determine which is right, but the difference between these two schools of thought is certainly fundamental.

Bolton, H. THE SYMPATHETIC NERVOUS SYSTEM IN THE NEUROSES.
 [Psychiat. en Neurol. Bladen, January-April, 1922, Nos. 1 and 2,
 p. 48.]

Bolten strenuously combats the prevailing tendency to regard the symptoms of all the neuroses as attributable to a primary hypertonia in one of the two great divisions of the vegetative nervous system. He claims that in the neuroses we see the expression of a latent inborn inferiority of the sympathetic nervous system. This reveals itself in the cardiovascular symptoms and the trophic disturbances connected with them. The spastic constipation likewise is to be interpreted as an expression of sympathetic-insufficiency, and the eosinophilia is always accompanied by other signs of incomplete action of the sympatheticus. A deficiency of sympathetic-innervation is likewise responsible for the metabolic disturbances, such as fermentation-processes, purine metabolism, and glycogenesis. And the general hypotonia of the muscular system is to be laid to the account of the sympatheticus to a large extent. It is around this nucleus of signs of sympathetic-insufficiency that are grouped symptoms that indicate a secondarily increased vagus-tonus. In the treatment of the neuroses Bolton naturally upholds the use of thyroid preparations: by this means the defective sympatheticus is restored to its normal tonus, and the equilibrium between the two divisions of the vege-

tative systems recovers. It is essential to keep up this treatment for a long time. It is by no means contraindicated by a quick pulse; but it is to be avoided in cases that show hypertension or any organic-cardiac affection. [Leonard J. Kidd, London, England.]

Fry, Frank R. THE PITHIATIC MASK. [Missouri State Med. Assoc. Jour., December, 1921.]

The author defines Babinski's term "Pithiatism" and explains that it is used in the title of this paper to impress the fact that in speaking of the objective phenomena or stigmata of hysteria, we should have definite ideas of what these are, *i.e.*, that we should know the various sensori-motor and vasomotor signs of hysterical origin and how to regard them clinically. The theme of the paper is to impress the fact that often there is found more or less hidden under a mask of hysterical symptoms, physical lesions which have a causal relation to the hysteria. By way of illustration he cites three instances. The first of these was a woman thirty years old who for two days had been having attacks of "grand hysteria" and a left hemianesthesia and hemiparesis. A comparison of the reflexes of the two sides and a careful sensory examination revealed the fact of cerebral lesion. She died a few days later of a septic embolism of the brain. The author uses this simple example to remind the reader how great pains Babinski and others had taken to show the value of careful examination of reflexes in deciding between organic and functional paralysis. The second instance was that of a woman forty-four years of age, who had been in a very spectacular automobile accident. She was greatly agitated but at the time it was a question whether she had sustained any physical injuries whatever. A very superficial and small bruise at the left shoulder was the only sign. Within the next few weeks she complained of increasing pain and helplessness in this left shoulder and arm. Such examinations as were made revealed no signs of injuries. The writer saw her ten weeks after the accident and found a hysterical hypaesthesia of the whole member up to the shoulder, and the X-ray showed that quite a sliver of bone was broken from the tip of the acromion. The third instance was that of a young woman twenty-seven years old, whom the writer first saw three years after she had been thrown from a buggy in a runaway accident. There was found a hysterical paralysis and hypaesthesia (and some anesthesia) of the whole left lower extremity. The patient had been confined to bed for over two years and was in a deplorable "nervous" condition. The X-ray showed extensive pathology in the low lumbar and left sacroiliac regions. After a year of careful orthopedic and neurological work, the patient had been greatly improved and the diagnosis confirmed. These two cases emphasize the necessity of X-ray investigation in all similar situations. An overlooked and neglected lesion acts as a "sustained trauma," a psychic trauma, producing in the predisposed, hysterical syndromes often of the most intractable kind. [Author's abstract.]

Marx. NEUROLOGY IN ART. [Jour. A. M. A., April 16, 1921.]

In 1861, the medical historian K. F. X. Marx published an essay of seventy-four pages on medicine in the graphic arts, containing the first list of paintings and engravings relating to medicine. Unnoticed in its time, this pamphlet opened a new pathway of research which has since been retraced and extended by many investigators, more particularly in the subsequent lists made by Sudhoff, in the well known illustrated books of Charcot, Holländer, Müllerheim and Parkes-Weber, and in various magazine articles of more recent date. The subject is one of immense interest to the physician who loves his profession, for paintings and engravings, old and new, tell more about the physician's social and professional status in the different periods than does the printed literature. Many diseases have been accurately represented (without diagnosis tag) in the paintings and sculptures of the past.

At a meeting of the Medical Society of Hamburg, November 30, 1920, Dr. Wilhelm Weygandt gave an exhaustive account of the illustration of neurology and psychiatry in the graphic arts. His lecture was illustrated with about 100 lantern slides. Even prehistoric and primitive artists, he points out, noted pathologic appearances now regarded as characteristic of civilization, e.g., the obesity of the "Venus of Willendorf," the representation of facial paralysis and of the act of trephining in Peruvian pottery, and micromelia (achondroplasia) in the Egyptian god Bes and in the bronze figures made by the African savages of Benin. The Japanese employed for decorative purposes such pathologic motives as turriccephaly, hydrocephalus, dancing lunatics, "running amuck," etc., motives which are lacking in the art of classical antiquity. In the Middle Ages, the hysterical *arc en cercle* in the figure of Salome on the bronze door of San Zeno (Verona) is noteworthy. Figurations of this kind are abundant in the multiform art of the Renaissance period—for example, the representation of ecstasy in Raphael's Transfiguration, Ribera's picture of unilateral paralysis in a beggar boy, the cretins, idiots and hydrocephalic dwarfs of Velasquez, Dürer's Melancholia, Careno de Miranda's fat girl (dystrophia adiposogenitalis), and Rubens' representations of epilepsy, demoniac possession, microcephalus and alcoholism. Drunkenness is a favorite theme of all the Dutch painters from Rembrandt and Hals to Jan Steen, Teniers, Jordaens and Molenaer, and latterly of Hogarth (Rake's Progress, Gin Lane). Gerard Dow's love-sick girls (*mal d'amour*) have sometimes the facies of exophthalmic goiter. Insanity is featured in the works of Goya, in Kaulbach's *Narrenhaus*, and by Géricault, Wiertz and Riepin. Modern decadent art has for its avowed aim the purposeful deformation of objects in order to intensify emotional expression. The subjective visual phenomena (entoptic appearances) of Purkinje and Johannes Müller are objectified in the paintings of Picasso and others. It is known that the drawings of the insane are singularly like those of primitive man, and the paintings

of Cubists and Futurists, Weygandt thinks, have features common to the art productions of children, and of primitive and insane people. The use of insignificant objects, such as newspaper clippings, buttons, thumb-tacks and baby carriage wheels, as decorative motives, Weygandt regards as further evidence of artistic impotence and mass-psychology, particularly of the snobbish tendency of artists, critics and exhibitors alike, to encourage any eccentric thing that seems in "the spirit of the times."

A complete inventory or card index of the graphic illustrations of neurology, along the lines of Weygandt's paper, and inclusive of such little known pictures as Rops' drawings of neurotics or MacCameron's wonderful absinth drinkers in the Corcoran Gallery at Washington, would be an interesting line for some art-loving neurologist to follow up. It is a curious fact that since the days of the Dutch painters, few great artists have consciously delineated a sick or neurotic patient as such, although physicians of artistic talent have made atlases of pathologic illustration in plenty. The subject of endocrinology in art has been treated in an article in the Spanish journal *Plus Ultra*, an abstract of which will be found in THE JOURNAL, August 2, 1919, page 374.

Meijer. PSYCHOANALYSIS. [Ned. Tijds. v. Genees., November 26, 1921, Vol. II, No. 22.]

In this study the author again points out that which has been observed for all new ideas. He says that Freud's methods are criticized by persons who have not taken the trouble to really comprehend the principles. He shows this by some quotations from recent textbooks. He emphasizes further that none of the data accumulated by the world war can be shown to conflict with Freud's views.

Laird, Donald A. THE FUNCTIONAL AND DEVELOPMENTAL RELATIONS OF THE NERVOUS MECHANISM. [Medical Record, November 19, 1921.]

Studies of the nervous system in the higher animals, including the embryology of nervous tissues, is quite apt to be misleading regarding the place of these structures in the total range of animal life. Embryological recapitulation is greatly modified and abbreviated; and the higher and more complex forms of animal life are dominated largely by neural control. An account of the development of the nervous mechanism based upon the comparative anatomy and behavior of various animal organisms is given in this paper. Three functional divisions are to be distinguished. Following Parker and others it is necessary to term it a mechanism since more than genuine nervous tissues must be included in approaching this problem biologically. The divisions of this mechanism are receptors, intermediaries, and effectors which include musculature. Phylogenetically the muscular functions become specialized prior to the others, and, in the lower organisms, may function independently of all nervous connections. Vestiges of this condition still persist in man in

the sphincter pupillæ and in the myogenetic heart beat of the vertebrate embryos. Ascending the animal scale, in the coelenterates the beginnings of true nervous tissues are found in the form of receptors, which are in immediate contact with the effectors. This condition persists in man in Meissner's plexi of the sympathetic system. Above the coelenterates the truly intermediate neurones make their appearance and centralization of structure begins. [Author's abstract.]

Keller, Henry. ORTHOPEDIC SURGERY FROM A PSYCHOLOGICAL POINT OF VIEW. [New York Medical Journal, May 18, 1921.]

Psychological processes involved in the practice of orthopedics is the author's theme. He describes reflex action and points out that the more completely the control of muscles is assumed by the higher cortical centers, the less does the spinal cord act as a reflex center for movement. Flechsig is quoted to support the view that association tracts in the cortex are not inherited, but are established in the individual after the brain has begun its functional activities. The sensation aroused by movement forms the basis of the individual's perception of the movement of the body and limbs and takes a place in the field of education and consciousness through the association areas in the cerebral cortex. The principle of kinesthetic equivalents expresses the truth that the person must in every case have some thought or mental picture in his mind which is equivalent to the feeling of the movement he desires to make; if not, he cannot succeed in making it. Pain is discussed in connection with orthopedic affections and the author points out that, even after the removal of the physical cause of pain, the patient may suffer from the mental recollection of it for a period extending into weeks. The mental attitude of the cripple is discussed. The difference between the sexes in regard to a deformity is analyzed. For the boy, deformity means dependence on others in the struggle for existence; for the girl, independence is not such a desirable thing. Deformity tends to detract from her appearance and thus makes independence a necessity. Boys are anxious to have disability removed, girls are most concerned with improving appearance.

Monrad, S. HYSTERICAL SPASM OF ESOPHAGUS IN CHILDREN. [Acta Paediatrica, March 15, 1921, Vol. I, No. 1. J. A. M. A.]

In one of Monrad's three cases the child of five had actually swallowed a caustic, but without apparent damage until several months later, after hearing stories of persons unable to swallow after drinking lye. The second patient was a boy of five and the spasms occurred before the child was a year old, which misled the diagnosis, a congenital diverticulum seeming probable. The spasm changed its location in this case; when first examined it was 25 cm. from the teeth, but, on a second examination, only 15 cm. below the teeth. The child's elastic esophagus did not seem to suffer from the effects of the distention. In the third case,

hysterical anorexia in the second and third year of life had been ineffectually combated for several years, and the child when nearly six was brought to the hospital for treatment. After considerable improvement she was taken home, but the condition then became aggravated to actual spasm of the esophagus. The parents applied to a surgeon who diagnosed a diverticulum and told the parents the stomach would have to be incised preliminary to the operation on the esophagus. The previous hysterical anorexia was the basis of Monrad's assertion that merely hysterical spasm of the esophagus was involved, and under treatment by introduction of a large bougie, plus suggestion, clinically normal conditions were promptly restored. But the tendency to hysteria persists, and psychotherapy will probably have to be continued for some time before the hysteria of this child can be eradicated.

Coriat, Isador H. AN ANCIENT EGYPTIAN MEDICAL PRESCRIPTION FOR HYSTERIA. [Annals of Medical History, 1921, Vol. III, No. 1.]

In the "Daily Life Room" of the ancient Egyptians, at the Metropolitan Museum of Art in New York, there is an irregular piece of limestone measuring about 7 cm. x 6 cm., which is written upon both sides; one of the oldest prescriptions known in the history of medicine. The limestone specimen is termed an "ostrakon," which seems to have been a cheap substitute for papyrus. This prescription dates from about 1500 B.C., or about one hundred years later than the date of that most important of medical papyri known as the Ebers Papyrus, which is one of the oldest systematic medical compilations in the world.

Prof. Muller's translation of one side of the ostrakon is as follows: Lapis-Lazuli, two particles; green stone, two particles; ki-bu (for fumigating), one particle; ssyt (plant from Kosi), one particle; raisin (Nubian kind?), one particle; wine, one kobe (jug).

An analysis of the prescription shows that the important ingredients consisted mainly of precious stones to be used either for fumigation or internal administration. Ground precious stones were familiar remedies among ancient Egyptians for hysterical manifestations and were employed in the treatment of globus hystericus. The internal evidence also shows that the prescription was to be used for fumigating.

This primitive conception of hysteria and its treatment with precious stones by internal administration, fumigation or inhalation, for the purpose of driving down the misplaced uterus which was supposed to produce the globus hystericus, is practically identical with the physical treatment of hysteria by drugs. Such drugs as valerian and asafoetida are often mentioned in modern textbooks as being efficacious in the treatment of hysteria. A further interesting analogy may be drawn when it is stated that pleasant odors, such as various perfumes, stimulate the sexual feeling and act as aphrodisiacs, whereas the disagreeable odors of valerian and asafoetida tend to inhibit the sexual feeling. When the erotic importance of perfumes in the cultural and esthetic history of

mankind is realized it is easily seen how an evil smelling substance was almost arbitrarily, perhaps unconsciously, selected to drive away the sexual feeling, or in the primitive conception of the physically erotic basis of hysteria, to repulse that uterus whose wanderings about the body were held directly responsible for the hysterical symptoms. These drugs were formerly administered on the supposition that evil smelling substances tended to drive the uterus down to its proper place from its wanderings about the body. The wanderings of the uterus formed the old physical conception of the disease as opposed to the modern idea of its psychogenetic basis, for instance, if it wandered into the throat, it produced the globus hystericus by an obstruction of respiration.

The Freudian conception or repression of the sexual instinct as the underlying cause of the protean manifestations of hysteria is not an echo of this primitive theory as some of its critics claim, because first, Freud's theory is a psychogenetic and not a physical one, and secondly, hysteria may occur in male as well as female. Furthermore the brilliant results of psychoanalytic therapeutics in the treatment of hysteria is sufficient in itself to invalidate any such claim. The origin of this therapy of hysteria, based on the old theories of the disease, being largely forgotten, the only survival was in this particular drug treatment (valerian and asafoetida), and led to the explanation being invented that these drugs acted as antispasmodics. Stranger still, these same drugs were finally enclosed in capsules, or sugar or chocolate coated pills or even the newer synthetic preparations were introduced, all for the purpose of hiding the evil smell and taste which were supposed to make it so uncomfortable for the wandering uterus, that it finally returned to its proper position. This use of evil-smelling drugs in hysteria for many centuries, is an example of what may be termed rationalization. Since neither clinical experience has upheld the old conceptions of the wanderings of the uterus as a cause of hysteria, nor pharmacological experiment has ever demonstrated that asafoetida or valerian have the slightest antispasmodic action, it must be concluded that such treatment is merely a blind adherence to a tradition, the origin of which has been largely forgotten. The only rational and sound treatment for hysteria is psychoanalysis, as psychoanalysis is alone able to remove those repressed emotions which are the mischief makers in the unconscious mental life of every hysteric.

This persistence of the physical therapy of hysteria has shown how we all tend to preserve uncut and intact those umbilical attachments which bind us to medical tradition. For this reason the master minds in medicine were compelled to struggle with the indifference of their contemporaries, who did not wish to be disturbed by any new conceptions breaking up the continuity of their accustomed mode of thinking. It is a general human attitude to take a phantasmal comfort in present intellectual convictions rather than have these disturbed by mental conflicts involving readjustment to new ideas. Consequently all new discoveries in medicine have met at first with more or less violent opposition, and

neurology because it deals with such manifold and complex integrations, has been one of the last of medical specialties to succumb to the newer dynamic conceptions. [Author's abstract.]

Bénard, R. and Rouquier, A. SPINAL FLUID AND BLOOD IN HYSTERIA.
[Paris Médical, March 12, 1921.]

In this communication the author reports an abnormally high albumin content in the spinal fluid in eight of fifteen patients with convulsions or hysteria motor phenomena. In thirteen cases the sugar content was above the average. In a severe narcolepsy urea was found in the spinal fluid also and 0.8 per thousand in the blood. Two days later the urea in the blood had dropped to 0.44 per thousand but the Ambard constant was 0.15. The laboratory findings thus suggested epidemic encephalitis but complete recovery under psychotherapy was considered as demonstrating the diagnosis.

Clark, L. Pierce. MENTAL THERAPY IN ORGANIC NERVOUS DISORDERS.
[Medical Record, April 29, 1921.]

The author considers in this clinical study the results of mental therapy in the treatment of functional, constitutional, or organic nervous disease. The material is exclusive of those cases with hysterical and psychoneurotic components, and embraces an effort to extend the usefulness of interpretation and treatment of mental therapy in a domain of general medicine not yet well defined or understood. In his cases of spasmodic torticollis, the main advantages of this plan of therapy were not only its apparent completeness of cure and its enduring character, but also the individuals so recovered gained a wider usefulness, personally, socially and economically. In dealing with periodic depressions, the real problem in this field of therapeutics is to discover a plan of treatment which shall so influence the fundamental makeup or constitutional inheritance that the episodic recurrences may be obviated. With this view in mind the author undertook several years ago a thorough analysis of a few selected cases, and about a dozen cases were requisitioned and carefully followed both in treatment and in after-observation. Most of the cases have now been free for several years from subsequent mental episodes. It is interesting to review what the members of this group indicate afterward what really helped them most as the result of treatment. They all state it was the transference, and none are able to give any accurate or precise statement of the main faults disclosed in the analysis. While this explanation may not be uncommon in even the simpler neuroses, the depressant's attempts at explanations are cruder than the average analytic cases. Whether the analysis is really so painful as to require being repressed or whether the piecing together of the personality faults is too difficult, the author cannot say. Perhaps the hypothesis is of sole value to the analyst who, through his insight and mastery of the problem, makes the patient's proper transference possible.

In applying mental therapy to epileptic cases, the author states that so long as we must look upon essential epilepsy as an organic or at least a constitutional disorder with certain mental attributes as the most outstanding diagnosticable elements of the disease, we must place the emphasis of training and educational treatment upon the fundamental makeup rather than upon the convulsive part of the disease; and if we develop the epileptic as an individual within the healthful range of the possibilities of his egocentric nature we may so stabilize him to a healthy arrest from the more violent aspects of his epileptic reactions. This analytic plan of mental therapy is entirely compatible with the acceptance of an organic view of the disorder, whatever it may ultimately prove to be. True neuralgias and migraine, exclusive of the false types of hysteric or physical conversion symptoms, have a variantly construed neural and chemic pathology. Hardly anyone assumes other than a somatic basis for the true neuralgias. The author gives two illustrative cases in which a combination of physical and mental therapy was successful in removing the symptoms and conserving the individuals to a life of normal activity and usefulness. In conclusion the author states that sufficient data are now at hand to show that improved principles of pure mental therapy have already shown how all sorts of spasmodic disorders constitutional or functional in origin and many psychotic syndromes supposedly of analogous somatic basis may be radically helped or cured by such therapy. Further, various other visceral disorders may not only be cured or brought to a practical arrest by mental treatment but this whole psychic approach in general medicine bids fair to offer one of the best rational explanations of some organic disease. By due heed and caution in the earliest application of mental therapy the method may offer one of the greatest advances to preventive medicine of recent times. [Author's abstract.]

Keith. DARWIN'S THEORY OF MAN'S ORIGIN. [London Letter J. A. M. A., April 16, 1921.]

Beginning a series of lectures on this subject at the Royal Institution, Professor Keith said that it is now fifty years since the "Descent of Man" fell like a bombshell on the world. Writers are now fond of saying that the Darwinian theory has broken down; but biologists know that it has been much better substantiated, and in its broad outlines it stands. If called to edit that famous book, Professor Keith said that he would scarcely alter a single statement but he would have much to add. Additional evidence has accumulated since Darwin's time, comprising: (1) An improved knowledge of embryology. Thanks to the unrequited labors of hundreds of embryologists, every stage in man's development except the first four or five days is known. It all supports Darwin. (2) The discovery of fossil man with features found nowhere to-day in living man but present in apes. (3) Human weapons found in geological strata, which carry man back one and one-half million years or more. (4)

Increased knowledge of the anatomy of apes. (5) Experimental physiology. In his experiments on the brain, Horsley found that the animals nearest to man, such as the orangutan, are the best guide. Sherrington found the same. (6) Experimental pathology. The animals nearest to man are those most inoculable with his diseases, the chimpanzee and the orangutan, as, for example, in the inoculation of syphilis. The domesticated chimpanzee is liable to have appendicitis. (7) the blood affinity of the chimpanzee and the anthropoid apes to man, the greatest among animals. (8) The discovery of hormones. This would have helped Darwin in his great difficulty. How do favorable characters arise? Their survival afterward is an easy matter. Take as a concrete instance the evolution of the human from the simian hand. Long before the fetus moves its hands it has folds adapted to movements. Darwin said that there must be some mechanism by which use and disuse are inherited, that the habits of the race bear back on the seed. The physiologists of his time could give him no hint as to how useful variations arise, so he framed the theory of "pangensis." He supposed that there was an extraordinary "postal system" by which cells threw their experiences into the circulation and reached the germ cells, where they were stored. No one believed him, but his hypothesis, at that time, was an extraordinarily acute forecast of the hormone mechanism.

Waller, A. D. MEASUREMENT OF HUMAN EMOTION. [British Med. Jour., March 12, 1921.]

The discourse at the Royal Institution by A. D. Waller was concerned with the galvanometric measurement of manifestations of emotion in man. Physiologically all emotions, he pointed out, are expressed as neural outbursts from the central nervous system through efferent nerves to muscles and glands. The manifestations in general were due to intensified physiological activity at the periphery, such as a blush, pallor, a rush of tears, or a dilated pupil. The physical sign of emotion known, since the observations of Veraguth of Zurich in 1909, as the psychogalvanic reflex, afforded the most convenient gauge of human temperament, since it declared how much a given subject was moved by his thoughts and feelings. The emotive response was in the main a phenomenon observed in the palm, though it occurred also in the sole. If the hand and the forearm of an ordinary individual were connected with each of two galvanometers and two Wheatstone bridges, the reaction of the arm was steady, while that of the hand was irregular. To a sudden pinprick, threatened or real, it gave a smart and obvious response. The magnitude of the response in either case varied with different people; in those who might be called "positives" little or no disturbance was caused by the threat, but in those whom he termed "imaginatives" or "sensitives" a large response occurred to the threat, larger, it might be, than to the real pinprick. The "imaginatives" might be further distinguished into different classes; high in the scale were persons who could at will

either keep quiet, or think thoughts, or see imaginary visions or hear imaginary words. To watch the galvanometric signs of these subjective phenomena was very interesting both to the onlooker and to the subject, especially the latter, to whom to sit quietly watching himself think became an absorbing pastime. The emotive response varied in different individuals and in the same individual with different states of mind and body. The distribution of the response over the body was especially interesting. In normal persons it was confined to the palms of the hands and the soles of the feet, but in "sensitives" it extended up the limbs. The few spiritualistic mediums Dr. Waller has been able to examine had, with one exception, given the reaction proper to "sensitives." Diurnal variations of the reaction occurred, the responses being best about the middle of the day, when physiological activity was high. The question had been asked whether pleasant and painful sensations produced similar or opposed galvanometric deflections. The emotive response was a sharp movement and occurred always in one direction—decreased resistance—that is to say, increased permeability. Increased resistance was never observed, but only sometimes diminished permeability. Dr. Waller went on to make a further classification of individuals into (1) "sensitives" or "imaginatives"; (2) "normal," including the majority of men and women; (3) "insensitives," in whom were included hysterical subjects (pythitics); and (4) certain other cases that might be called "supersensitives"; some shellshock cases were included in both the third and fourth categories. In concluding his lecture, Dr. Waller said that these cases required further investigation, and that, in fact, no general conclusions could justifiably be drawn from the facts he had put forward until more data had been collected.

Krimmins. CHILDREN'S DREAMS. [Edit. Br. Med. J1.]

Dreams are a source of perennial interest. To the foolish they are omens of profound import. To the wise they are a subject of curiosity and provide room for thought and memory searching in an effort to discover what brought them about. Both wise and simple are influenced by them, for a happy morning waking dream means a fair start for the day, and a nightmare a gloomy breakfast. The dreams of our childhood were as real a matter as the facts of our daily experience, and the meaning of these in the physiology of the child mind, has been studied by Dr. Krimmins, and his results have now been published in a small volume. His investigations were made upon London elementary school children. His method was to secure their narration individually by the younger children to skilled observers, and to arrange that all dreams of children over eight years of age were recorded by the dreamers themselves in response to the request, "Write a true and full account of the last dream you can remember. State your age, and also say about how long ago you had the dream you have described." Some 6000 records were obtained from children aged from eight to fourteen years. He notes that in spite

of fear dreams, children in normal health delight in dreaming, and it is an evident pleasure to them to talk about and record their dreams. There is also a remarkable power of graphic description which exceeds their ability in ordinary essay writing and is so much in advance of their general standard of achievement that it would appear as though some fresh element had come into play. Dreams are far clearer and more vivid in the calm country than in the noise of London. Change of environment stimulates, and hard mental work increases the tendency to dreams; a stuffy bedroom diminishes their clearness. Persons of well-developed intelligence dream far more frequently than those of low culture. Dreams of motion, falling, flying, are rare under the age of nine or ten years; they then increase in frequency up to the age of seventeen or eighteen. Regular institutional life tends to diminish this type of dream; the deaf scarcely ever experience it; febrile states accentuate the liability greatly. The fear dream is very common in quite young children; 25 per cent were of this nature, and were chiefly of the dread of objectionable men; the fear of animals was more common amongst boys than girls. School activities appeared little in the dreams of children of any age. Air raids figured little, for the last of them occurred seven months before the investigation was made. Domestic occurrences and fairy dreams delight the girls, rarely the boys. The dream ghost has almost vanished. In dreams of adventure, common with boys, the dreamer is usually the hero or heroine. Amongst the blind and deaf dreams are lacking in variety; fear dreams are excessive—fear of animals particularly with the deaf, fear of fire with the blind; to the blind the air raid was a far greater terror than to the normal child, and the impression of it extended to a year after the last raid; for the deaf the raid had no terror. The dreams analyzed afford no evidence that a child blind from birth ever sees as a dreamer, but abundant evidence that those who have recently become blind see clearly. It is suggested that a careful study of children's dreams may throw much light on the special interests and desires of the child at different ages, and (especially where dreams of unfulfilled wishes recur persistently) on those elements which are conspicuously lacking in the life of the child, and may seriously interfere with his natural development. Of these, the most obvious are dreams which indicate underfeeding and those which give evidence of stress and strain.

Reichardt, M. NEURASTHENIA. [*Deut. med. Woch.*, January 6, 1921. J. A. M. A.]

Reichardt distinguishes three types: (1) Pure exogenous nervous exhaustion of the brain; (2) endogenous and constitutional nervousness, and (3) endogenous nervousness from internal causes. Group 1 is caused by long continued, excessive mental exertion, combined with emotional stress, inappropriate mental work and unhygienic mode of living, or in consequence of cerebral poisoning, as after typhoid, influenza and chronic alcoholism. The occasion of the neurasthenic condition

must have been of such a character that it would be actually capable of overfatiguing or exhausting a healthy brain with average resistance. On removal of the cause, the neurasthenic condition disappears in a short time. Endogenous and constitutional nervousness constitutes the major portion of the cases of neurasthenia as described in the textbooks. Differentiation between Groups 1 and 2 is not always feasible. Group 3 comprises cases of endogenous nervousness due to internal causes, without any recognizable external cause. It may suddenly appear at any time while the patient is apparently in perfect health, and may continue for years.

Renault, A. HYSTERIA. [Bull. d. l. Soc. Méd. de Hôp., April, 1921, Vol. XLV, No. 13.]

This clinical report is of a patient who developed ileus, cystitis and desquamating urticaria at the age of sixty-two under the influence of worry on account of a small hernia which she feared was becoming uncontrollable. She presented hysteric fever at the same time, and sudden huge edema in the legs and hand, but all these hysteric phenomena disappeared in a few months.

Mott, F. W. THE FREUDIAN DOCTRINE. [London letter. J. A. M. A., October 10, 1921.]

On presenting the prizes to successful students at Charing Cross Hospital, Sir Frederick Mott said that if he had the opportunity of again teaching physiology he would, in the light of experience gained in the last eight years, give special attention to the influence of the mind on the body and the body on the mind. Physicians seemed to have neglected this branch of medicine too much, and the consequence had been Christian Science, faith-healing, neuroinduction and other forms of inspiring faith. Before the war it was thought that the neuropathic tendency occurred seldom in men as compared with women, but the formation of a conscript army, in which only physical disabilities were recognized as causes of unfitness, had shown that a large percentage of men were neuropathic and liable to neurosis, hysteria and neurasthenia, provided stress was sufficient. With a few notable exceptions, physiologists had ignored psychology, and psychologists had ignored physiology because academic psychology was mainly introspective and metaphysical. The Freudian school asserted that *all* [Not so. Freud has always maintained the importance of the ego as paralled to the sex instinct in unconscious processes.—Ed.] psychic energy had its roots in the sexual instinct, and maintained that the sexual life began development at or even before birth. The energy of the sex instinct might undergo sublimation or diversion into other channels. He agreed entirely with McDougall in the acceptance of the general truth of the Freudian doctrine, without, however, committal to the acceptance of all or even, indeed, any of the other doctrines of sex instinct of Freud. He was of the opinion that the sex

instinct, serving as the great source of psychic energy, was a fundamental principle of psychology. The researches he had been carrying on for many years on the reproductive organs in normal and insane persons supported this conclusion and explained why the biogenic psychoses came on in adolescence and at the climacteric.

Friedländer, F. SENILE HYSTERIA. [Medizinische Klinik. July, 1921, Vol. XVII, No. 30.]

Friedländer's case was a combination of hysteric astasia-abasia in a man of seventy with spasms of the esophagus, cardia, stomach, bowel and bladder sphincter—the spasms all traceable to intense vagotonia.

Rows, R. G. PSYCHIC, NEUROLOGICAL AND AUTONOMIC SYMPTOMS. [J. A. M. A., November 15, 1921.]

Among the psychic signs noted by this author in his case, were stupor, confusion, hebetude, acute depression and epileptic attacks. The neurologic symptoms included difficulty of speech, and sometimes tremors of the arms and legs, at other times slow, stiff movements. There was difficulty in walking. The reflexes were altered and varied at different examinations; the Babinski sign was now present, now absent. Among the autonomic signs were diffuse edema of the skin of the head and neck, and dilatation of the vessels, with cold and blue extremities similar to those so often seen in dementia precox. The pupils were sluggish and unequal; the tongue was furred; there was excessive salivation and incontinence of urine and constipation. Some of the autonomic symptoms were almost constant; the neurologic signs varied a little and the psychic disturbances a great deal, from stupor through a slight hebetude to comparative clarity of mind. The fits of depression were temporary. This case is of the utmost significance because it demonstrates that small, discrete patches of disturbance can occur in the sympathetic system and give rise to limited, local symptoms. The intimate association existing between a past experience and a later disturbed function, mental or physical, is clearly evidenced.

Pery and Courbin. POSTABORTIVE PSYCHOGENIC CLONUS. [Gaz. Hebd. des Sci. Méd. de Bordeaux, December 4, 1921, 586.]

The writers report the case of a woman who had had no nervous antecedents and had simply had two pregnancies terminated before term or had given birth to macerated infants (which suggested the possibility of syphilis). She was admitted with the diagnosis of puerperal tetanus. The history was that seven days after an abortion she was seized with rhythmical shocks, affecting the whole of the abdomen, which lasted for several hours. These attacks could be produced at will by mere grazing of the abdomen, and especially by pressure on the right iliac fossa. The clonus was mainly abdominal, but sometimes it extended to the thorax without the least respiratory difficulty, and she was always fully conscious

in the attacks. As sedatives failed, she was told that a lumbar puncture must be performed, and that if it failed a laparotomy would be necessary. Immediately after the lumbar puncture all clonus vanished suddenly. [Leonard J. Kidd, London, England.]

Ball, Charles R. PSYCHOANALYSIS. [New York Medical Journal, November 16, 1921, p. 580.]

Psychoanalysis has two chief objectives. The study of the various qualities of personality and the endeavor to establish equilibrium in these qualities when the balance is lost. The qualities of personality are dependent on many factors of which the brain may be regarded as only one. Less important anatomical structures, such as the size of the hands and feet, the shape of the ears, the color of the hair, whether the nose is Roman or beaklike, the legs bowed or straight, the stature tall or short, must also be considered as contributing influences in its composition. Dejerine has said that every emotional reaction is the function of a particular personality. The importance of the emotions in the development of personality naturally makes environment as well as inheritance a very powerful factor. One may say in general that good impulses create healthy, emotional reactions, while bad impulses cause the reverse. Hysteria is not a condition which follows as a result of success but comes rather as a reaction of disappointment and failure. The so-called "shell shock" case is a good example of this. "Shell shock" did not occur in those who received the frightful wounds, but rather occurred in those who had never received any serious injury whatever. As an explanation of this, one may infer in the one instance there was sustaining emotional reaction as a result of the consciousness of having done well. In the other, the depressing and demoralizing effect as a natural sequence of a general defalcation in obligation and the performance of duty. In other words, "shell shock" was a defensive reaction. Both Kraepelin and Forster have emphasized the importance of the rôle which the motive plays in the causation of functional nervous conditions, when they state that the symptoms stand in the service of the motive. When the motive no longer exists, the symptoms disappear.

Freud has said that there is no direct relationship existing between the motive and the symptoms. The reaction of one personality with fundamentally the same motive, may in the one case cause a hysterical paralysis—in another, the reaction may take an entirely different trend and manifest itself in an antisocial or criminal manner. The problem of psychoanalysis is to discover the motive. These cases themselves are entirely unconscious of the motive. For this reason, special methods of examination are absolutely essential to bring about the exposure. The pathopsychograph, as described by Erich Stern, is an important procedure in the technique of the examination. As this author says, the pathopsychographic examination has to consider that previous acts in our lives either influence or create the influence or tendency to things

we do later. This method of examination is direct. In order to avoid the danger of being misled by the patient indirect means of examination, such as dream interpretations and the associations test, are very necessary. By such indirect methods of examination, the examiner is enabled to get a glimpse into the real mental content of the patient, when the censor as symbolized by the will is not on guard. The exposure or revelation of the motive to the patient is only one of the aims in psychoanalysis. When this is completed the task is just begun. The other objectives may be summed up in the one expression: Character building. The baser qualities which go to make up the personality must be discouraged and repressed. The nobler ones stimulated and encouraged. The endeavor should be to make the individual again adequate to his environment. This is sometimes a slow and painstaking process, often requiring months and years for its accomplishment. [Author's abstract.]

Friedjung, J. K. SEXUALITY IN CHILDREN. [Zeitschrift für Kinderheilkunde, November 22, 1921, Vol. XXXI, Nos. 1-2. J. A. M. A.]

Friedjung protests against the prejudices and disregard of one's own childhood experiences in the placid assumption that childhood is asexual or presexual. The tremendous changes at puberty do not come out of nothing; there has been a gradual development up to this stage. He has been collecting material in this line for ten years, and presents examples of three types of erotic manifestations in normal children, those connected with the child's own person, with the person of another, and those in the psychosexual sphere. He includes in the first type, the *autoerotik*, the pleasurable sensation which is a factor in the child's sucking the breast. Some infants suck their fingers even a few minutes after birth. The child does not learn to suck to get food, but it gets the milk as an unexpected by-effect of its erotic sensation from the sucking movements. He agrees with Freud that the mouth is one of the erogenous zones, relating an example of thumb-sucking continued into married life, and one of the factors in the divorce. The erotic sensations from rhythmic movements, rocking, etc., belong in this category, as also those connected with defecation and urination. The urethra is another erogenous zone; many cases of enuresis are traceable to this. He has witnessed erection in a three weeks' infant, and the daily necessary washing of the genitals attracts the infant's attention to this region. If the cleansing is neglected, then itching and smarting have the same effect. Perhaps, he suggests, it is a functional necessity for the attention to be called early to this biologically important organ. He gives instances of habitual onanism in infants of nine and thirteen months, and says that as the children grow older and are chided for it, they merely become secretive, both girls and boys. He has never seen any severe injury result from the masturbation which is so frequent preceding puberty. He gives a number of examples of *heteroerotik*, including the case of a boy of three and one-half with erections when taken into bed with his young mother, and a girl of two who,

taken into her father's bed, hugged and kissed him and suddenly urinated. A number of instances of Freud's *Œdipus complex* in very young children are related, and examples showing the craving of children of even three and four to learn where babies come from. He reiterates in conclusion that all the examples he cites are of normal children whose further development he has followed for years, some into mature life. Physicians are constantly asked for advice in this field and they can tranquilize and advise and ward off danger if they do not wilfully close their eyes to experience.

Payssé. PSYCHOLOGY AND PSYCHIATRY. [Revista Méd. del Uruguay, February, 1920, Vol. XXIII, No. 2.]

This author, who is alienist to the Vilardebo Hospital, presents the thesis that there is great need for applying psychological methods in psychiatry.

Nicole. EDUCATION AND ITS RÔLE IN PREVENTION OF NEUROSES. [Journ. of Neur. and Psychopath., November, 1920, Vol. I, No. 3.]

Nicole points out that from an educational point of view, the importance of the unconscious should be appreciated; its characteristics in the different types of psychologies; the significance of the primitive tendencies responsible for the faulty repressions, the signs of which must be recognized; the normal and abnormal developments of child mentality and their influence on adult character; and finally, the necessity for an individual and rational education that will help to close the wrong paths, and open up the right ones for the various sublimating processes essential to human progress and development. Moreover, it is not enough for a few people to become versed in analytical psychology in order to correct in children the faulty influences of an ignorant home education; for it is only when everyone is acquainted with the psychic principles that will help toward the avoiding of developmental errors, that we may cease to do harm and perhaps do a little good.

Morgan. PSYCHOLOGY AND MEDICAL CURRICULUM. [Journ. of Neur. and Psychopath., Nov., 1920, Vol. I, No. 3, J. A. M. A.]

Man is not only a complex physiologic system, but an equally complex psychological system—conscious, but with unconscious foundations; the medical practitioner has to deal with the man as a whole; therefore, Morgan says, in current practice some knowledge of psychology is of real value; in specialized practice it is essential. The time has come to consider whether the psychologist should not have a status on the staff of a medical school analogous to that of the physiologist. Some adequate instruction should be given to all medical students, not too early, say after they have been well grounded in physiology; and that more should

be given to specialists toward the close of their curriculum, or in a post-graduate course. The work should be given by a psychologist who has been trained not only in a school of philosophy but also in a school of biology. He must not be out of touch with his colleague, the physiologist. He must know not only about the emotions but about internal secretions. And he must have adequate acquaintance with the manner in which what he teaches shall be applied in the practice of the profession. If he himself be a member of the profession, so much the better; but he must by a psychologist.

Lashley, K. S. VICARIOUS FUNCTIONING AFTER DESTRUCTION OF THE VISUAL AREAS. [Am. J. Physiol., 1922, Vol. LIX, No. 44. Med. Sc.]

The visual area in the rat, which is restricted to the occipital pole, is the only part of the cerebrum concerned with the performance of visual habits. Its destruction is always followed by loss of visual habits, while closely adjacent areas may be destroyed without affecting visual discrimination. The visual habits, lost by its destruction, may be reacquired rapidly. This capacity of the central nervous system for vicarious functioning in learning, which is not restricted to the visual area but holds good generally, raises the question whether or not its mechanism is based on cerebral localization. In order to test this question the visual area was destroyed in fourteen rats. These were then trained to discriminate differences of light intensity. When the habit was acquired a second operation destroyed some other cerebral area. Tests were then made to determine loss or retention of the habit after the second operation. The habit survived the destruction of any given third of the cortex left intact by the first operation. The only part of the cortex which remained unexplored was a small area in contact with the floor of the cranial cavity. It is certain, therefore, that there is no cerebral localization in vicarious functioning, at least so far as the visual area is concerned.

Jones, E. PROFESSOR JANET ON PSYCHOANALYSIS: A REJOINDER. [Int. Ztsch. f. a. Psychoanalyse, Vol. IV, No. 1.]

Jones finds that Janet's criticisms of Freud's views are unjust, saying that in abnormal psychology from time to time writers prefer to substitute a polemical discussion of a given investigator's views for a scientific criticism of them. If one sets out in such a discussion with manifest object of discrediting the investigator in question the readiest method is either to distort his views or to impute to him views which he never held. This, Jones continues, is what Janet has done, misinterpreting Freud's statements, omitting portions which are necessary for the understanding of them and where these milder methods do not suffice, inventing entire views and imputing them to the school. Over and over again, says Jones, he describes Freud's views in terms of traumatic memories, suppressing the fact that in the past twenty years Freud has advanced far beyond this starting point. Of the same order are Professor Janet's repeated

statements that psychoanalytic interpretations are merely arbitrary, capricious, and "can with the greatest ease be varied in infinity." The statements are quite worthless, says Jones, for Janet simply does not know that the interpretations are just the reverse of this, being based on objective principles that have no reference to individual opinion, but only to the evidence of the facts themselves. At the International Congress of Neurology and Psychiatry, held in Amsterdam in 1907, Professor Janet dismissed Freud's theory of hysteria as being merely "une mauvaise plaisanterie." And it may be left to the reader's judgment to decide whether his present attempt at criticism has succeeded any better in contributing something of positive value to our knowledge. In Jones' opinion Janet's attack on Professor Freud's work, delivered before the International Congress of Medicine in 1913 is marked by the grossest lack of objectivity. [J.]

Payne, C. R. PSYCHONEUROSES OF WAR. [N. Y. State Journal of Medicine, May, 1921, Vol. XXI, No. 5.]

In the world war, a striking number of casualties was caused by the psychoneuroses. Two developments of the art of war were mainly responsible for this increase of psychoneurotic cases over previous wars: (1) Trench warfare; (2) prodigious use of high explosive shells and bombs. Another factor was the drawing of large numbers of civilians into the armies without sufficient time for these men to become inured to the hard life of the soldier. Symptomatology of the psychoneuroses of war was the same as in similar conditions of peace time, namely, symptoms of hysteria, neurasthenia, psychasthenia, anxiety and obsessional neuroses. Treatment was psychotherapy plus rest, proper feeding and hygiene.

Comparison of psychoneuroses of war with those of peace time: Those of war seem to have been due to conflicts between the individual's ego instincts and the demands of his environment while those of peace time result more from conflicts between the sexual instinct and the demands of environment. Repressions in peace time psychoneuroses are deeper and the symptoms correspondingly harder to eradicate, hence more time demanded for cures. Necessity for careful study of the psychoneurotic's character makeup. The two chief lessons regarding psychoneuroses demonstrated by the war are, (1) psychogenesis of the psychoneuroses; (2) effectiveness of psychotherapy in curing psychoneuroses. Man is more than a collection of organs; he is a biological unit and must be studied as a whole and in relation to his environment. [Author's abstract.]

BOOK REVIEWS

Richet, Charles. TRAITÉ DE MÉTAPSYCHIQUE. [Felix Alcan, Paris.]

In view of Richet's work on Anaphylaxis, and his numerous physiological researches, his editorial work on his famous dictionary of physiology, one would hardly expect to find him what in popular parlance might be termed a "psychic researcher." He dedicates his work to Dr. William Crookes and Frederick Myers, whose work in the English Psychic Research Society is so well known.

"Those who seek to find umbrageous considerations in this book concerning the destinies of man, upon magic, upon theosophy will be disappointed. I have wished to write a work of science, not of dreams." Such are the opening lines in the author's preface.

This new science of "Metapsychics" he proposes to deal with under three main categories: (1) Cryptesthesiae: *i.e.*, lucidity of previous authors—or the faculty of knowing which is different from the normal sensory type of knowing. (2) Telekineses—*i.e.*, mechanical actions different from the known mechanical forces, those which act without contact, at a distance, under certain determined conditions on objects or persons. (3) Ectoplasms, or mateliarizations of older authors. The formation of diverse objects which seem to come from the human body and take on the appearance of reality—clothing, veils, living substances, etc.

This makes up the body of metapsychics. To go so far may be too far; further certainly science cannot go. But he believes that the three phenomena just mentioned should be admitted into the fold of scientific investigation.

He devotes 808 pages to a recompilation of the material already spread *ad nauseam* in the pages of the Psychological Research Society.

The testimony of audacious crooks as well as serious minded investigators are set down side by side—all with almost borous attempts to be judicial. Of the numerous efforts of psychiatry to understand the phenomena in question—not a word. Freud's studies of unconscious processes, which is an excellent road into his first category, Cryptesthesiae, are not mentioned. Bleuler's Autistic Thinking, which will explain most of the so-called "data"—is not mentioned.

Although very wordily repetitious, this work is so carefully phrased that it will be much enjoyed. It may lead a few into the psychiatric realm where a start has been made in a true science of "metapsychics." For this it will be praised. It will give to many muddy thinkers a fillip to greater muddiness.

We do not find it as stimulating as the work of Flournoy who

really, while investigating the phenomena had an inkling of the nature of the processes going on in the observer. Bleuler in his work on autistic thinking has shown us clearly the unconscious roots of our credulity, and an application of his principles in this new science would probably show that the "strange" has been known for many a day and that the rest is largely "self-deception." At the worst self-deception needs explaining—but here again we enter the psychiatric domain.

If physiology had not divorced itself so entirely from psychology (psychiatry) the author would have given us a really lasting contribution. As it is, it is perhaps worth while—but one has to go through so much rubbish to get the little worth while.

Zappert, Julius. KRANKHEITEN DES NERVENSYSTEMS IM KINDE-SALTER. [Georg Thieme, Leipzig. \$1.00.]

Schwalbe of Berlin is editor of a series of monographs on Diagnostic and Therapeutic Mistakes and their Avoidance. They cover the entire field of medicine. This is Vol. I in the section on Pediatrics. In it the author discusses the Meningitides, Poliomyelencephalitides, Chronic Brain Disorders as Tumors, Hydrocephalus, Cerebral Palsies, Imbecilities—Epilepsia, Spasmophilia and Psychogenic Disturbances.

Special stress is laid upon the differential diagnostic features.

Whereas there is little new or striking in this work of 125 pages it is very well done and considers the therapeutic sides of the problems involved more than the usual text book.

Fuller, Sir Bampfylde. THE SCIENCE OF OURSELVES. [Oxford University Press, London, 1921.]

This book presents a worthy effort to ascertain the causes of certain phenomena of behavior. A broad, tolerant, yet penetrating analysis is given with an earnest effort to find truth. Many stimulating concepts are formulated and no doubt the reading of this well written philosophical discourse will be instrumental in helpfully influencing many thinkers. The author attacks from many angles and takes into consideration phylogenetic development not neglecting early ontogenetic considerations.

While he will find many who will not completely agree with his psychological and emotional formulations yet his material is presented with so much flexibility that no ruts are gotten into. His plea throughout is for original thinking or, this failing, thinking. He thinks it of more value to stimulate thought than the following of mere morphological dicta. No one will dispute the value of this.

Of interest is his delineation of the processes of speech and writing. His chapter on these functions is supplemental to that philosophical attitude taken by Bianchi in his recent monograph on cerebral localization. His deductions seem sound though he follows no school of philosophy. A worthy conclusion to this work would be a continuation into the workings within the realms of the uncon-

scious. Fuller's works should have an extensive influence among workers who wish to get a better working knowledge of the behavior of man. [Stragnell.]

Cassirer, R. KRANKHEITEN DES RÜCKENMARKS UND DER PERIPHERISCHEN NERVEN. [Georg Thieme Verlag, Leipzig.]

It was an ingenious title that Schwalbe gave to his series of monographs published by Thieme of which this, the eleventh left in the field of internal medicine, is by Cassirer, the most gifted of Oppenheim's students, and his practical successor.

"Diagnostic and Therapeutic Mistakes and their Avoidance" is the keynote of this interesting series and it is ably sounded by the present volume on the Diseases of the Spinal Cord and Peripheral Nerves. Tabes, Multiple Sclerosis, Tumors, Anterior Poliomyelitis, Myelitis, Trauma to Spinal Cord, Progressive Pyramidal Tract Disorders, these are the subjects discussed under the head of spinal cord disorders; Facial Palsies, Cranial Nerve Neuritides, Upper Extremity Neuritides, Palsies of Arm and Shoulder, Neuritides of the Lower Extremities, Polyneuritis, and Mistakes in the Treatment of Traumatic Injuries of the Peripheral Nerves, the chapter headings in his second section.

Cassirer is always interesting. He speaks freely and freshly and his great polyclinic material studied as Oppenheim's right hand man gives a definite experiential stamp to his statements. The monograph of approximately 160 pages is a very creditable performance.

Achard. L'ENCÉPHALITE LETHARGIQUE. [J. B. Baillièrè et Fils. Paris.]

The author tells us he prefers this title to many others mentioned in his Preface. After a brief, superficial, and yet quite readable historical résumé of the possible references in classical authors to this kaleidoscope syndrome—he takes up a study of the symptoms. He first comments on the polymorphism seen; Dubini, who described his electric chorea is quoted first. Achard then develops the general syndromy which the numerous studies have made classical: somnolence, agitation and delirium. Paralyzes, particularly oculomotor, abnormal movements, such as myoclonias, tics, convulsions, choreo-athetoid and other incoördinated movements, are rapidly sketched. He then discusses the physiognomy, the gait, the reflexes, the sensory anomalies, respiratory, circulatory, and general disturbances. Humoral modifications is an interesting chapter in which the modifications of the blood, urine, C.S.F. are indicated.

Chapter III takes up the clinical course. This is illustrated by case material chosen to show the various kaleidoscopic forms under which the syndromes may develop. Light cases, severe cases, lethal cases, and others illustrating the clinical syndromes previously described are detailed, with numerous citations and comparison of contemporaneous material. In this chapter he attempts a "classical picture," in the reviewer's opinion a pure artefact—but possibly supported by statistical predominance.

Chapter IV discusses the lesions and the interpretation of the syndrome; an excellent résumé. The neuroanatomical schemata are general, but in essence, accurate enough for the purposes. An excellent series of paragraphs take up the explanations of the syndromes. Here the various hypotheses are collected. It is surprising to see how cleverly and yet lightly the author disposes of these. Such are the exigencies of bookmaking. To adequately analyze a myoclonia would probably require an encyclopedia. The conceit of *Homo sapiens* that summarizes it as an "alteration of the optic thalamus and of the cerebral peduncles" is sublime even if pathetic.

This is not meant to particularize the author, any more than the neurologist in general. His explanations are brave gestures. Valuable for the majority.

We cannot particularize further the latter half of this interesting monograph, save in the expression of the opinion that it represents a very readable, and fairly faithful portrayal of the phenomena collected over the globe. The author shows a wide acquaintance with what has been described, and has made a valuable effort to present it.

It is a valuable record of the encephalitis epidemic and much can be gathered herein.

Bundy, Walter E. THE PSYCHIC HEALTH OF JESUS. [New York. Macmillan Company, 1922.]

No attempt is made to discover motives or causative factors in the life of Jesus. Bundy after a critical survey of the literature on the subject is of the opinion that there is no need for research of this kind. He feels that all the information necessary for a complete understanding of the character of Jesus can be found in the Old Testament. Many writers, influenced by Freudian teachings, have not reached this conclusion and recently have added much new material of value to the understanding of the behavior of Jesus. Bundy feels that Jesus should not be dissected as an ordinary mortal and any attempt of this kind is unjustified and wanton. Some will agree, others will continue to search for material of value. [Stragnell.]

Lippmann, Walter. PUBLIC OPINION. [New York. Harcourt Brace & Co., 1922.]

Much interesting data concerning the late war and the formulation of the peace are presented in Lippmann's book. One may read this book without danger of being influenced by Mr. Lippmann's conclusions. According to him all is well—that is to say almost well, and with a bit of fixing according to his set formulas we would have the almost perfect state. This optimism is charming and tends to create a tolerance among one's self, but it leads nowhere. The intelligenciers have long made use of eloquence such as Lippmann shows, but in a crisis they and their superficial ideas are cast aside for sterner stuff more in keeping with real things.

In a vague way Lippmann shows that emotions influence public opinion vastly. That this swaying is due to a false value being set

on subjects. This false valuation is merely a substitute for other vague ideas held by members of the herd. These vague ideas in turn are established through various impressions which are created through the subjective affects of various vendors of information. Lippmann feels that if more accurate information could be gathered by "intelligence" groups these false values would be avoided. Unfortunately, or fortunately, he will find few who will follow him in agreement. The book on the whole is an accurate revelation of the mind of the liberal, full of Lippmann's own subjective affects, showing how he capitulated to his environmental conditioning.

Stekel, Wilhelm. IMPULSHANDLUNGEN (WANDERTRIEB, DIP-SOMANIE, KLEPTOMANIE, PYROMANIE UND VERWANDTE ZUSTÄNDE). STÖRUNGEN DES TRIEB UND AFFEKTLEBENS No. VI. [Urban and Schwarzenberg. Berlin, Vienna, 1922.]

Stekel's well known series of studies receives a valuable addition in this volume and one particularly pertinent to the troublous times in which we live. It examines into those special forms of behavior which perplex society, put it upon the defensive but leave it in ignorance of the inner nature of the actions and therefore of an effective treatment of the problems which they occasion. Stekel's wide experience with the analysis of the unconscious, as this book shows, has included very definite work in the field of such impulsive actions. Thus he brings the individual worker to their source. He offers to society the challenge to understand them in their significance as affectively impelled actions arising out of the infantile complexes of the unconscious. He expresses his hope that in such understanding shall come about the cure of these ills in society through readjustment in the individual.

Stekel's interpretations through his own particular psychoanalytic theories are sometimes open to question. As his rapid pen lays them down before the reader and his own attainment of results is described the reader is not always convinced of the infallibility of his point of view or of his superiority in some of these details over the opinions of those whose work he subjects to comparison. Yet the presence of such features is an insignificant part of a work illuminating in character and convincing on the whole in its report of results. One accepts the challenge to personal investigation and practical service in the same field.

OBITUARY

EDWARD ANTHONY SPITZKA

Death by cerebral hemorrhage suddenly overtook Edward Anthony Spitzka in the midst of an active career. His fame as an anatomist of the brain grew out of work in this field carried on from his student days. He was in fact engaged in the work in which his father, Edward Charles Spitzka, had already made himself a name. The son was educated in New York City, the place of his birth. He was trained in the public schools, the College of the City of New York and the College of Physicians and Surgeons, from which he received his degree in 1902.

He entered into all his work with the accuracy and zeal which belong to detailed investigation but also with the broader and deeper interest of the cultural scientist. He was a scholar and a man of force and of marked originality. His interest lay largely in the evolutionary development of the nervous system which he studied comparatively in the primates and the higher mammals. This interest led him also to the comparative study of human brains among those who had excelled in scientific attainment or those whose activity had been that of crime. One of his earliest investigations was upon the brain of Czolgosz, the assassin of President McKinley. Spitzka, then a junior medical student, performed the detailed anatomical work in assistance to Dr. Carlos F. MacDonald. He was alive to all the problems of criminology, studying both the criminal and the means of punishment. He directed his attention in a special way to the subject of electrocution as a mode of punishment.

Dr. Spitzka was a writer upon brain anatomy and evolution, upon criminology, anthropology and kindred subjects. His articles are found in the *Encyclopaedia Britannica* and in various special journals with a number of which he was associated. He was well known through his revision of *Grey's Anatomy* in 1913. He entered upon his teaching service as demonstrator of anatomy at Columbia which position he held 1904–1906. He then became Professor of Anatomy at Jefferson Medical College, Philadelphia, which post he held until 1914. He served as lieutenant-colonel in the medical division during the war and at the time of his death held the position of chief medical officer of the War Risk Bureau. He was planning a clinic for ex-soldiers at Grand Central Palace, New York. He was also examiner in lunacy for New York State up to the time of his death. He was a member of the American Anthropological Society, the American Philosophical Society, the American Association of Anatomists and fellow of the American Association for the Advancement of Science. His early death was a tragic culmination of a life full of early promise and of frustrated achievement.

WALTER CHANNING.

The death of Walter Channing occurred at Brookline, Massachusetts, November 23, 1921. He was one of those figures who represent culture manifested in activity. There were gathered within him ancestral lines of strength which had already found distinction in New England.

He was born at Concord in 1849 as the eldest son of William Ellery Channing the poet. His great uncle also of the same name was one of the fathers of Unitarianism in America, a body to which Walter Channing remained loyal in faith and official service. After the early death of his mother, a sister of Margaret Fuller, he spent much time with his grandfather, Walter Channing, who was the first professor of Obstetrics and Medical Jurisprudence at Harvard University and editor of the *New England Journal of Medicine and Surgery*, the forerunner of the *Boston Medical and Surgical Journal*.

The grandson Walter Channing, after a preliminary training, received his medical education at the College of Physicians and Surgeons in New York and at the Harvard Medical School. He was trained further as interne at the Massachusetts General Hospital and in Vienna. He devoted himself to mental medicine when this branch of interest was still awaiting pioneer effort.

He was chiefly interested in the large movements of better care and treatment for the insane. He opened a hospital for the insane at Brookline as early as 1879 to which he gave his service for the remainder of his life. He later built a sanatorium at Wellesley where he could put his theories of treatment into practice. He was instrumental in establishing a department for mental diseases at the Boston Dispensary and also in creating the State Psychopathic Hospital in Boston. As chairman of the board of trustees he was able to put into effect the transference of the insane of Boston to the care of this hospital, a change for which he had long worked. He had an active interest in the promotion of education through the public schools and in many other projects of social welfare. He was a trustee of the New England Conservatory of Music and a member of many prominent social clubs.

His membership in many special organizations attested his wide and active interest in the possibilities for advance and for service which lay in his specialty. He was one of the founders of the organization as of the Boston Society for Psychiatry and Neurology of which he was first president. He was a member of the American Medical Association, the American Medico-Psychological Association not to mention other important affiliations which touched closely upon his work. He held the chair of Professor of Mental Diseases in Tufts Medical School from 1895 to 1903. He received from Tufts College the degree of LL.D. in 1900. He published articles upon mental diseases in various journals. He was frequently called to testify as an alienist in legal situations, one of his earlier experiences in this field being the examination of Guiteau, the assassin of President Garfield.

NOTES AND NEWS

Professor O. Binswanger, the former director of the Nerve and Psychiatric Clinic in Jena, celebrated, October 14, his seventieth birthday. He was a pupil of the psychiatrists Ludwig Meyer in Göttingen and Karl Westphal in Berlin. He presented in 1882 his inaugural dissertation and, that same year, he was called to Jena as head professor and director of the Landes-Irrenanstalt. Among his numerous writings on affections of the central nervous system and on the clinical manifestations of mental diseases, I will mention more particularly "Studies on the Finer Changes in the Cerebral Cortex in Progressive Paralysis," and "Experiments on the Motor Areas of the Cerebral Cortex," especially on the psychomotor portions. His work on "The Acute and the Early Forms of Progressive Paralysis" and on "The Relationship Between Moral Insanity and Heredity Degenerative Mental Disease" are worthy of note. His smaller works on "Public Care of the Insane" and "Zur Fürsorge für geistig minderwertige und geistig abwegige Kinder" present considerable interest. It is worthy of mention that Friedrich Nietzsche was admitted as a private patient to his institution. With regard to the mooted question whether or not Nietzsche suffered from genuine progressive paralysis (paresis), Bingswanger once told me personally, in response to my query, that his condition represented probably an atypical form of that disease. [Berlin letter to J. A. M. A., November 11, 1922.]

Dr. Groves B. Smith, psychiatrist of Gregory, Ill., has accepted an assignment offered him by the Commonwealth Fund of New York. He will make a survey of all prisons in New York state before drawing up recommendations to the governor for changes in the penal system regarding abnormal mental states of prisoners. A similar survey was recently conducted in St. Louis, and about 70 per cent of the prisoners were found to be suffering from some abnormal mental condition.

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.

The Journal

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An American Journal of Neuropsychiatry, Founded in 1874

ORIGINAL ARTICLES

TOTAL IMMOBILIZATION IN THE EXTREMITIES THROUGH HYPERTONIA AFTER EPIDEMIC ENCEPHALITIS.*

(In one case also with neoformation of bone of Dejerine-Ceillier type)

BY PROF. KARL PETRÉN AND LEONARD BRAHME

LUND, SWEDEN

In this part of Sweden encephalitis lethargica could not be detected as an epidemic before about the middle of the year 1920, and up to date (August, 1921), about 30 persons have been received into the Lund Medical Clinic for this disease. While the most of these patients have not shown symptoms which differ appreciably from those so often described in the literature of the subject, some cases have nevertheless presented certain features and phenomena on account of which they may be of interest.

In one of these cases the patient was for months in a condition of almost total immobilization (only respiration, swallowing and eye-movements possible); in this case there also appeared paraosteal ossifications like those which have shown themselves after traumatic injury to the spinal cord, and which since the war have been demonstrated by *Dejerine-Klumpke* and later described by Ceillier in his thesis of the year 1920.

In another case there was almost complete inability to move the left arm and leg; the power of movement afterwards came back completely, but in the opposite order to that which takes place in lesions of the pyramidal tracts, in this case, namely, proceeding from the distal to the proximal parts of the extremities.

* From the Medical Clinic, Lund, Sweden (Professor Petré).

In the following these cases will be described in the above order.

Case I. A. S., laborer, sixteen years old. The patient had had diphtheria and chickenpox as a boy, but had otherwise always been healthy until on October 20, 1920, he began to suffer from headache, which, however, was not so bad as to prevent him from getting up and performing his work during the three days immediately following, but after this he had to take to bed. On November 11 he received medical attention in his home. Was then apathetic, but answered questions clearly. When left to himself he lay and rambled slightly. The patient already had a double ptosis, but otherwise showed no signs of any paralysis of the muscles of the eyes nor of any other paralysis. No stiffness of the neck could be demonstrated. The pulse was frequent, the temperature about 39° C. The same day the patient was received into the epidemic hospital of his native town, where he was tended by Dr. Wallengren¹ until nearly the middle of March, 1921. During the days immediately following his admission into the epidemic hospital the patient became still more apathetic: he lay dozing for the most part all day long, snoring deeply as he breathed. When awake, he yawned constantly. After some days in the hospital noncoordinated twitchings began to appear over the whole body; these ceased after a week. The patient did not speak spontaneously, but he still answered questions clearly and knew those around him. During the first fourteen days after his admission into the hospital the temperature remained between 38 and 39° C.

November 19: Widal for typhus and paratyphus, negative.

November 20: Pat. now lies sleeping practically the whole day long, and no longer answers questions. Urine and faeces pass off spontaneously. Pat. does not react to a needle-prick. Ptosis still remains on both sides. Perhaps a slight strabismus; heavy perspiration.

November 26: Pat. now has stiffness in the neck and shows a general rigidity of the muscles. The eyes are constantly closed.

November 30: To-day the patient begins to be able to open his eyes and without strabismus follow persons in the room. Does not speak, but stretches out his hand on request. The stiffness in the neck is now not so pronounced as before. Still a general rigidity of the muscles.

December 8: During the last few days the patient's condition has grown worse. He lies now entirely soporous, and no longer reacts either to questions or to the prick of a needle. Stiffness of the neck and rigidity of the muscles are once more pronounced. The pupils are of different sizes (the right wider).

December 27: Pat. has to-day signs of thrombosis in ven. femoral. sin.

¹ We desire to express our thanks for the detailed description of the patient's symptoms during the early stages of his illness which Dr. Wallengren has most kindly placed at our disposal.

January 15, 1921: The patient has now brightened up. His somnolence has entirely vanished, and he follows with interest everything that goes on in the room. The stiffness of the neck has disappeared completely, and there is now no ptosis. The pupils are still different size. The rigidity of the muscles still remains, resulting in a "claw-like hand" and a talipes-equinus. The patient cannot move any extremity in the slightest degree, nor can he perform any movement whatever of the trunk or the mimic musculature. He lies, therefore, motionless and dumb, and except that he can move his eyes, he has in every respect the appearance of a statue. He has a strong tendency to decubitus. Urine and faeces still pass off spontaneously.

February 1: The patient has now a swelling of several phalangeal joints and neighboring parts. In the right upper arm there is a rather considerable and very sensitive swelling.

February 15: The swelling in the upper arm has now considerably diminished and is no longer much sensitive. However, over the distal portion of the right femur there has appeared a similar swelling, which is very painful. The patient still lies quite dumb and motionless.

February 18: Pat. has to-day begun to open his mouth and from time to time utters a nasal sound.

February 28: Of the swelling in the upper arm there now remains only a hard lump of the size of a hen's egg, on the medial side. The swelling on the femur has now diminished and is less tender than before. In the proximal part of the tibia, on the other hand, there has appeared a swelling which, like the others, is painful. Further, a slight effusion in the right knee-joint can now be seen.

The patient was taken to the Lund Medical Clinic on March 12, 1921, and his case presented the following appearance on his admission:

The patient lies quite motionless in his bed. Follows intelligently with his look all that is going on around him in the room, but with the exception of these movements of the eyes and the movement of the arms mentioned below he is unable to perform the slightest visible active movement. Has therefore very much the appearance of a statue. The right corner of the mouth is somewhat drawn up, the expression of the face stiff and mask-like. Pat. is very thin and pale. Perspires extremely. Temperature 38° C. Pulse frequency 120 per minute. On attempts to change the patient's position in the bed he moans with a dull nasal sound. When attempts are made to perform passive movements of his extremities, they evidently cause him pain, for he not only utters the above-mentioned sound but also sheds tears. Not the slightest trace of any other manifestation of pain can be seen. When one tries to make oneself understood by the patient, one can discover after some practice that he rightly understands what is said to him, since he can utter "Yes" and "No" with a certain difference. But these are the only words

the patient can pronounce, and that only very indistinctly. He can take only liquid food.

Over os. sacrum are two deep bed-sores, each of them about the size of a florin. On each heel there is a sore about as big as a farthing, and on all the fingers as well on the ears are a number of sores of a similar kind.

From heart and lungs: 0.

The arms are held fixed at the elbow-joints at an angle of about 20 degrees; the hands are in a position of maximum volar flexion. The four ulnar fingers of the right hand are in a typical claw-like position with considerable hyperextension of the metacarpo-phalangeal joints. The right thumb is strongly adducted and opposed. The forefinger of the left hand is held extended in both the metacarpo-phalangeal and the interphalangeal joints. Otherwise the same conditions as in the right hand. The patient cannot perform the slightest movement either in the elbow-joints or in the joints of the hand; but on the other side he can, to a very slight extent, perform movements of the shoulder-joints; he can lift his arms about 45 degrees from the bed by means of a movement of the shoulder-joints and a rotation of the shoulder-blades. The lower extremities are fixed at the hip-joints and knee-joints at angles of 30 and 40 degrees respectively. Attempts at passive movements of these joints hardly any movement is attained. Dorsal flexion of the feet is not possible. Patient has no active power of movement whatever in any joint of the body, with the exception of the above-mentioned shoulder-joints. On account of the muscular rigidity, it is only after a certain resistance has been overcome that the head can be bent forward toward the sternum, but this movement is entirely successful, so that there can be no question of any real stiffness of the neck. Both pupils react normally to light. The right is greater than the left. The eye-movements are performed to the normal extent, and are coordinated. Attempts at blinking set up a considerable trembling in both eye-lids. The patient cannot wrinkle his forehead or round his lips in an attempt at whistling. When different means are tried to cheer him, it is found that little twitchings take place in the right corner of his mouth. As far as can be seen, this and the movements of the eyes and the eye-lids are the only signs of active muscular contraction that the patient shows. One must conclude that his tongue partially has power of motion, since he is able, although with a certain difficulty and indistinctness, to say "Yes" and "No." But when he is asked to stretch out his tongue, not the slightest movement of this organ can be discovered.

On the testing of the reflexes of the sole of the foot both great toes, and also the other toes, remain quite still. No reflex of the Achilles tendon can be obtained in either foot, and in the right leg no patellar reflex can be carried out, though in the left leg a normal reflex can be demonstrated. The cremaster reflexes are lively and so also are the abdominal reflexes. Also the corneal reflexes are

normal. Sense of pain and touch, nothing to note anywhere. As far as the muscular sense can be judged, this appears to be intact.

Examination with faradic current produces anywhere contraction in the upper extremities on irritation of both nerves and muscles. On stimulation with galvanic electricity of the flexor and extensor groups of the upper and under arms, and of muscoli interossei abduct. pollic. et digit. v., cathode-closing spasms were obtained with a current of five milliamperes, cathode-opening spasms with a strength of current of six and eleven milliamperes respectively. The spasms were not slow.

In the lower extremities, the left leg in its entirety showed a reduced power of stimulation by faradaic current, and in the right leg no muscular reaction could be induced by stimulation with the same current. On stimulation with galvanic current closure-contractions were obtained at the positive pole in the left leg at four milliamperes; opening-contractions could not be induced at these poles. Closure- and opening-contractions were induced at the negative pole with six and eleven milliamperes respectively.

April 1, 1921: Patient can to-day lift his arms about 60° from the bed. He still has no active power of movement whatever in the toes, and can perform neither dorsal nor volar flexions of the foot-joints.

April 20: Patient can to-day perform flexion of the hip-joints about 20°.

May 1: Has now begun to make a little flexion at the knee-joints (about 30°), and can further raise his arms from a lying position to the vertical plane.

May 10: Now flexion of the hip-joints about 50°. The movement is carried out slowly, and if one tries to continue it passively, strong resistance is felt, and since, moreover, pain is caused, the attempt fails.

May 30: Patient can now perform flexion of the hip-joints without difficulty at normal speed; can make flexion of the knee-joints at 90°, but still cannot stretch them out. The flexion proceeds with a certain slowness. Passive attempts to bend the knee-joints still further fail, since pain is set up and also a definite resistance is met with. Patient can now perform small movements of the foot-joints; these movements are, however, hindered to a certain extent by contraction in the Achilles tendon. Further, the patient can now make flexion of the elbow-joints to the normal extent, and can stretch out his right arm almost completely at the elbow, though the left can only be stretched out to 150°. The wrists are still in a fixed position of contracture which cannot be overcome either actively or passively. The same applies to the proximal interphalangeal joints. For the last week or two he has been able to move the right corner of the mouth, when he happens to laugh; but this movement is carried out extremely slowly. He now begins to

make contraction of muscles of the abdomen by trying to sit up in bed. The perspiration has gradually diminished in intensity.

July 2: Patient can now raise himself up in bed. He still lacks power to stretch the knee-joints completely and also the left elbow-joint. In other respects he can perform movements of the main joints to the normal extent. He can now pronounce most words, though with rather great indistinctness. The above-mentioned swellings of the femur and the humerus have gradually diminished in size and sensitiveness, but remains of them can still be detected on palpation. When one tries to let the patient stay upright upon the floor, this succeeds so far that he can keep his balance quite well, although on account of the talipes equinus referred to above it is difficult for him to stand by himself. Moreover, the attempt is rendered difficult by the fact that pain is caused in the leg.

September 3: Patient can now walk without support. In doing so, he keeps his body considerably bent forward and is still not able to set his whole foot upon the floor but must to a certain extent "walk on tip-toe." The hands and fingers still remain contracted but the patient is quite well able to move them, though the movements take place slowly. For instance, he can without difficulty take off his cap, and can also put his own knife and fork to his mouth when he eats.

The X-ray examination of this patient has given the following result:



Fig. 1.



Fig. 4.

March 15, 1921: (See Figs. 1 and 4.) On the anterior medial region of the right humerus from the elbow-joint upward are seen extended, irregularly-shaped calcifications, resembling most closely the ossifications arising after traumata, though the shadows are not characterized by periostitis in the ordinary sense. Along the anterior and medial surfaces of the middle and lower parts of the right femur there is also a similar voluminous lime-shadow uneven, but rather well defined in regard to its surroundings, about 25 cm. in length and 2.5 cm. broad on the plate measured. No changes in the femur itself visible. Around the upper tibial metaphysia are similar stripes of shadow, separated for the most part from the bone by a distance of 2-3 mm. Both the right and the left sides of the tibia show deformities, probably arising from an old rachitis.

The new formations of bone have on the whole rather the character of a myositis ossificans than of genuine periostitis in the ordinary sense.

May 10, 1921: (See Figs. 2 and 5.) The intermuscular calcifications both on the medial and the anterior regions of the right humerus and right femur have diminished throughout in volume and abundance, so that only small parts of them remain.

June 15: Continued diminution of all the ossificated parts.



Fig. 2.

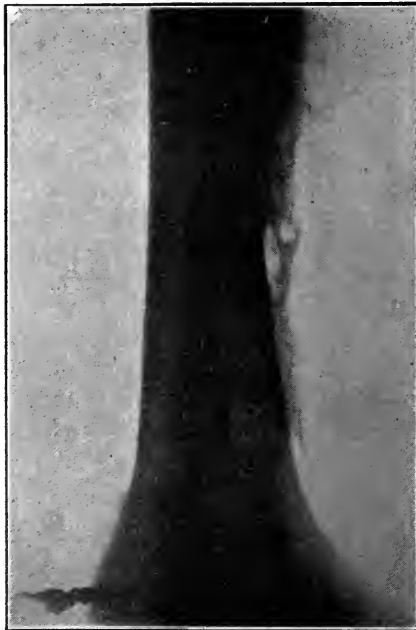


Fig. 5.

July 17: (See Figs. 3 and 6.) Renewed photograph of the right knee-joint shows the same appearance as on the previous examination. The tibia epiphysis is somewhat deformed, depressed medially with the result that the surface of the joint does not lie quite horizontal. The medial femur condyle is large but relatively well-shaped, while the lateral is noticeably small. There is no contraction of the opening of the joint, but one may certainly speak of certain position of subluxation.

September 19: Since July 17 further diminution of the ossification patches.

The patient sickened with symptoms of a general infectious disease, which symptoms after a few days suggested a disease of a cerebral nature. The ptosis and the pronounced tendency to somnolence, gradually rising to perpetual somnolence, were the signs that revealed the nature of the disease to be encephalitis lethargica.

The first point to notice in regard to this case is that the patient was paralyzed for quite a long time (he could perform no other voluntary movements than swallowing and the movements of the eyes), and that it was also impossible to carry out passive movements with the extremities or trunk.

In our examination of the literature (which, however, can make no claim to completeness) we have found that Tilney and Howe have described cases with similar paralysis which is regarded by them as cataleptic, just as in their division of the various forms under which the disease appears they classify these cases as "the cataleptic type." This form of immobilization, however—at least as we have observed it—does not in our opinion by any means correspond to catalepsy in the ordinary sense of the term, since passive movements, too, were impossible (and this was so in at least one of these writers' cases also), so that it was not possible to carry out tests for what is otherwise meant by catalepsy. To us it seems more correct to ascribe the phenomenon to spastic symptoms, increasing to such a degree that passive movements were rendered quite impossible. It may be expressly pointed out that the Babinski reflex in this case was never positive, and nothing justifies the supposition that the pyramidal tracts were affected. The case therefore seems to show (as far as it can be judged from the mere clinical observation) that an affection of the extrapyramidal motor system of the brain stem may also lead to the utmost degree of hypertonia. The (two) cases communicated by Tilney and Howe bear an almost identical resemblance to this one, but it has seemed to us not out of place to contribute to the discussion of the subject with one more similar instance from quite another part of the world. It is well worth while to observe that



Fig. 3.



Fig. 6.

both the patients (whose cases are described by the above-named writers) were, like ours, young, viz., eleven and sixteen years old respectively.

It is of interest to compare the symptoms in this case with those in Parkinson's syndrome, whether it be the ordinary paralysis agitans or the cases of that type which, as we all well know, so often appear after epidemic encephalitis. It is perhaps not so very unusual for the symptoms in one of the two forms of disease just mentioned to develop to such a degree that active movements practically cease, but even in such cases it will still be possible to perform passive movements to a considerable extent, even though they may perhaps be somewhat limited. By the fact that passive movements were here impossible to carry out, this case of ours is therefore characterized as different in nature from cases of the ordinary Parkinson's syndrome, even if the latter had reached its highest stage of development.

In our case there has also been noticed a considerable neoformation of bone on the femur and humerus on one side. These changes are corresponding to the observations made of late years by Mme. Dejerine-Klumpke, who has found that in connection with traumatic injuries of the spinal cord ossification sometimes appears in the extremities that are paralyzed as a result of the injury to the spinal cord. More recently her pupil Ceillier has reported a systematic investigation from this point of view of cases of traumatic injury to the spinal cord (war cases) with paralysis in the lower extremities and the pelvi-trochantric regions. Among 160 cases he was able to demonstrate these ossifications either radiologically or by autopsy in no fewer than 79, or nearly 50 per cent. These neoformations of bone sometimes showed themselves to have no connection whatever with the skeleton, though in general some such connection could be demonstrated at one point or another. In 75 of the 79 cases in which Ceillier was able to demonstrate ossifications the lesion had attained medulla spinalis and in four cases cauda equina was the seat of the lesion. In none of the cases had the cervical part of medulla spinalis been the seat of the lesion. In all the cases in which the writer could demonstrate ossification processes serious anatomical lesion of medulla spinalis were obviously present, and no appreciable amelioration of the paralysis or of the sensibility was attained in these cases. Only in eight of the cases was he able to demonstrate even a slight return of the patient's power to perform voluntary contractions of certain groups of muscles, and that only to a very small extent, so that, for instance, none of his patients could ever make the slightest attempt

to walk. No perceptible improvement of the sensibility seems to have been demonstrated.

In most of the cases described by Ceillier edema appeared in the paralyzed parts of the body, revealing itself in the second or third week after the occurrence of the lesion of the spinal cord. This edema could not be thought to be connected with disturbances of the circulation (due, for example, to thrombosis or obliterating veins), since no signs of the latter could be detected. As a result of his investigations the author concludes that this edema arising in conjunction with the spinal affection, is a factor of significance for the later appearing ossification, which latter was never demonstrated earlier than forty-five days after the injury to the spinal cord.

In none of the cases mentioned in Ceillier's work could it be shown that the ossifications, having once appeared, ever receded or diminished. Further, it is characteristic of Ceillier's material that in no case did paralysis appear in segments lying above the dorsal segments, nor did any ossifications appear in the upper extremities, but they were confined to the neighbourhood of the hip-joints and to the femur, as well as to the upper part of the tibia, but not below. The reason for this limitation must no doubt be sought in the simple fact that patients with such serious injuries as are here in question, localized to the upper or middle portion of the medulla cervicalis, would have small prospects of living so long as would be required for any such new bone formation to take place.

As will be seen from a comparison between Ceillier's figures and ours, the neoformations of bone appearing in our case bear a striking likeness to those described by that author. They appear in multiple form and, like Ceillier's, they have not the character of the ossifications appearing in connection with periostitis. Further, they arise in conjunction with a very serious affection of certain parts of the central nervous system, which has led to complete inability of movement.

The appearance of similar ossification processes has often been dealt with by other writers and it does not seem to be a very unusual phenomenon that they should appear in diseases of the nervous system of various kinds, and especially in those associated with paralysis. Thus Israel, for instance, mentions a case which was entirely analogous to those worked out by Ceillier, since here also a traumatic affection of the spinal cord was involved, and neoformations of bone were developed in the soft parts of the extremity. Apart from these cases, in which processes have arisen as the result of traumata, there exist a considerable number of statements of a

similar ossification process in connection with diseases of various kinds, *e.g.*, dementia paralytica (Goldberg, Epstein), tabes dorsalis (Willms, Steiner, and others), hemiplegia as a consequence of haemorrhagia cerebri (Steinert), syringomyelia (Borchard, Charcot, etc.), and some cases of polyneuritis (Oppenheim).

In regard to the further fate of the new tissue when once developed, there is no statement in the literature that it has ever disappeared or even diminished, but on the contrary it has stubbornly remained and most frequently increased in volume. In this respect our case is so far unique that the X-rays have been able to show that the new formed bone tissue has not only diminished but even in one place (the humerus) almost entirely disappeared. Obviously this resorption of the new formed bone tissue is to be referred to the fact that the functional disturbance of the central nervous system was so far corrected that the power of movements of the extremities returned. For in the observations of a similar neoformation of bone tissue hitherto described, the symptoms from the nervous system have never improved (only in Steinert's case of hemiplegia has a slight improvement been noted).

In regard to the pathogenesis of these ossifications, Ceillier's observation of an edema that is preceding a new formation of bone tissue is of great interest. One is inclined to ask whether it is edema as such that has caused the new formation of bone, or whether trophic disturbances of another nature have been at work or have alone been entirely responsible. In any case the new bone formation must be regarded as an evidence of trophic disturbance. In Dejerine-Ceillier's observations this latter is clearly to be ascribed to the cessation function of certain nerve fibers in the spinal cord. On the other hand one can come to no conclusion as to where in the section of the spinal cord these fibers are situated, since in all these cases the whole transverse section of the spinal was attacked. Since the neoformation of bone in our case was in the most respects identical with that in Ceillier's, it is reasonable to expect that it should also have a pathogenesis entirely corresponding. But therefore the conclusion of our observations, compared with those of Ceillier, will be that these nervous paths, the interruption of which leads to this trophic disturbance, do not only pass through the spinal cord but originate directly from the brain stem (or perhaps cross it), and that they are not localized to the pyramidal tracts nor yet in paths for sensibility of the skin and deeper parts, since these in our case were not affected.

In regard to the treatment in this case, it consisted in urotropine in

doses varying between one and three grammes per twenty-four hours. Further, the patient has later been given general massage, also (a gentle) massage of the regions of new formation of bone tissue. Further movements of the extremities have been ordered, these movements naturally being at first entirely passive, until it gradually became possible to pass over to active movements. Thus we have been able to remove successively the serious contractions arising during the course of the disease, the patients' power of performing active movements has been very considerably increased, as is shown already by the reports of the cases, and there is also hope that this improvement will yet continue to a certain degree. The physical treatment has been pursued according to the lines laid down by me (P.) in *Arch. de Neurol.*, about 1909.

Case II. Male, twenty-eight years of age. Except that he had had the ordinary children's diseases, he had always been healthy until in 1920 he caught influenza cum broncho-pneumon. et pleurit. He was then in bed for about a month. After that he was well until the night between the 6th and 7th of May, 1921, when he began to be troubled by headache, which increased the next day and afterwards remained with a greater or smaller degree of intensity until he came to the hospital on May 10. The pain was relieved after the taking of a salicylic preparate, but it still remained so bad that the patient could not sleep at nights. In other respects he had not been ill but was able to perform his rather trying work. On May 9, however, felt very tired and listless, and the same evening, when he was in the w.c., he suddenly fainted and did not recover consciousness until his mother, finding him remain too long, broke open the door some time afterwards. Afterwards, however, he could still completely perform his work, but when some hours later he was about to take down a book from a shelf, he experienced a sensation as if he had received a box on the ear. At the same time he noticed that he could not move his left arm. He now left his work to go home, a ten minutes' walk or so, and could walk this distance without any real difficulty. Went to bed immediately, but could not sleep during the night on account of headache. As the hours went by, he now noticed that his power to move the left leg was going more and more, so that in the end he could only move his toes a little. Repeated vomiting on the morning of May 10, the day of his admission to the hospital.

Status on admission: Powerfully built man, with general condition not much affected. Flesh and muscles well developed. Heart and lungs, nothing noticeable. Temperature May 10-12: 37.2-37.5 in the mornings and 37.5-37.8 in the evenings. After that, no fever.

The left arm is completely paralytic. The patient can only perform with effort the very smallest movements of the third and fourth fingers. Shows complete paralysis of the left leg and foot. Plantar

reflexes on both feet positive. Patellar reflexes lively on both legs. Lively abdominal reflexes. Pupils react well to light. Feverish shiverings can constantly be seen spreading over the whole body. Patient distinguishes somewhat uncertainly between the head and the point of a pin, but this uncertainty is probably to be ascribed to psychological causes. Lumbar puncture gave 4 lymphocytes per cubic millimeter; pressure 110. The reaction of Nonne negative. Wassermann's reaction negative in blood and cerebrospinal fluid.

May 11: Toes to-day fixed, so that definite plantar reflexes cannot be carried out. Patient has now a certain tendency to clonic twitchings of the left arm and leg, but these are not constantly present. On the (fruitless) attempts at active movements, however, they appear immediately in both arm and leg, on the left side. If attempts are made to carry out passive movements in these extremities, these clonic twitchings at once appear with considerable strength, and moreover great pain is caused. It is suspected that the mouth is to-day drawn down at the right side in an attempt to show the teeth. With side-fixation no nystagmus appears, but with strained side-fixation slightly oscillating movements of the eyes are seen. The tendon reflexes in the arms are present, the reflex being perhaps somewhat more lively in the right arm. There is extreme perspiration.

May 14: If the left leg is raised (which to-day is possible to an extent of about 20°) by holding it under the thigh, the rest of the leg follows, without the patient's being able to lower it. Passive attempts to bring down the lower leg from this position fail and severe pain is caused in the leg. Attempts at passive movements in the arm also cause severe pain. The patient can of himself perform no other movement of the paralyzed extremities than the small finger-movements spoken of on the day of his admission.

May 17: Passive movements with the left arm no longer cause pain, but this is still caused by attempts to bend the left knee-joint.

May 18: To-day patient can of himself move his left arm to a considerable extent. A slight dorsal flexion can be performed in the left ankle, and the patient can in a sitting position carry his left arm somewhat backwards from the frontal plane, reckoned from the head.

May 20: To-day there is a not inconsiderable power to perform flexion of the left elbow-joint.

May 23: Flexion of the elbow-joint now takes place to the normal extent, and the whole arm can be raised by the patient a little from the bed. He can perform the flexion of his left knee to $50-60^{\circ}$. If passive attempts are made to bend the knee further a strong positive resistance is at once felt, and at the same time pain is still caused, though not to such an extent as was formerly the case. No clonic twitchings appear any longer. Patient can still not raise his left heel from the bed, and if passive attempts are made to do this, the operation succeeds only to the extent of a couple of centimeters

from the bed, after which so strong a resistance is felt that all further movement is made impossible.

May 25: Patient can to-day raise his heel from the bed for a moment, but the action causes clonic movements of the whole leg which has a tendency to spread to the whole body. He can now make flexion of the knee-joint to 100° . The movements of the fingers seem now to be perfectly normal. The patient does not lack muscle strength in the dorsal flexion of the left foot, but on the performance of the movement trembling begins in the leg, which troubles the attempt. He can now without difficulty carry a tumbler to his mouth with the left hand.

June 3: The muscle strength in the dorsal flexion of the left foot now further increased, so that it approaches the normal. The patient's power of carrying out the flexion of the knee-joint is also somewhat increased.

June 10: Patient can now perform all movements of both arm and leg to their full extent, and without any apparent reduction of his muscle strength. When he walks, he does so with a certain difficulty, the flexion of the knee-joint still so far incommoding him that he feels stiffness. As he walks it can be seen that the foot is in a position of good dorsal flexion and not the slight tendency to abduction can be detected.

Patient left his bed on June 13 and was discharged from the hospital on June 20.

Later communication from the patient, July 5: He can now walk quite freely, without any support at all. The only inconvenience of his illness which he can still detect is a certain tired feeling in the knee-joint on going upstairs. Otherwise he has no symptoms whatever of a pathological nature.

On September 9, I (B.) happened to meet the patient, who is now quite well.

The symptoms which this patient showed when he fell ill were such that there was little reason to suppose or suspect any other disease than a luetic cerebrospinal affection. The intensive headache, combined with a paralysis of the hemiplegic type developing in the course of a few hours, are symptoms which, at a time when there was no reason to think of epidemic encephalitis, might have been considered as practically pathognomonical for cerebral lues. However, this diagnosis was definitely contradicted by the result of the spinal puncture, on which no increase of the cells or of the amount of globulin could be demonstrated. Further, Wassermann's reaction was negative in cerebrospinal fluid (as also in serum). This fact, coupled with an entire lack of any signs of lesion of the pyramidal tracts notwithstanding the presence of a hemiplegia, made the diagnosis of encephalitis lethargica practically certain, and this assumption was confirmed as the disease progressed.

The feature which on closer analysis proved characteristic of the hemiplegia in this case was that not only did the patient lose the power of active movement, but it was not possible—on account of the decided passive resistance and the great degree of pain caused by attempts to overcome this—to perform any passive movements whatever either. This state of affairs, as will be seen, by no means corresponds to that present in paralysis as a consequence of a lesion of the pyramidal tracts, for there, although powerful attempts to perform a passive movement may indeed produce spastic symptoms which render the movement impossible, yet with careful procedure we may always succeed in carrying out the passive movements, and that for all joints of the extremities immediately after the appearance of the paralysis, and later (when contracture has possibly set in) at least for the proximal joints.

The course of development of the motor disturbances in this case also furnished a striking contrast to what we see in paralysis through lesion of the pyramidal tracts. The power of movement returned here in quite a different manner. With lesion of the pyramidal tracts the movements of the distal joints are the last to return, and especially—where the foot is concerned—the dorsal flexion of the latter: whereas in this case of ours it was not only found that the patient recovered power to move the distal joints simultaneously with those more proximally situated, but it could also be seen that these movements of the distals appeared rather earlier (and, moreover, sooner with a strength approaching the normal) than was the case with the movements of the proximal joints.

It may be especially pointed out that the dorsal flexion of the foot, the preponderating paralysis or paresis of which is such an extremely important phenomenon for the diagnosis of the paralysis through the lesion of the pyramidal tracts, was in the case the first movement of the joints of the lower extremities which the patient recovered, and also the first in which he returned to normal strength. The contrast with the course of the lesion of the pyramidal tracts could not be more strikingly presented.

Case III. The third and last case is that of a woman, aged forty-five, who has been married for twenty-two years. She has five children, all of whom are healthy. For seventeen years she has suffered from heart disease, which, however, has not troubled her to such a degree that she has not been able to look after her home, and she has, moreover, got through her pregnancies well. In other respects she had always been healthy until about a month ago, when she began to become short of breath on moving, and had rather violent palpitations.

On February 27, 1921, at 10:30 A.M., as she was sitting on a sofa, she suddenly felt ill and asked for a glass of water, which she drank, and then lost consciousness. She was brought the same day to the hospital, and remained unconscious till admitted. She has moved in bed, but has not moved the left arm, which from the beginning has been paralyzed.

Status on arrival February 27, in the afternoon: Patient lies in bed pretty much apathetic but on examination she begins to react to questions, which she had not done before. She answers when spoken to, and understands clearly what is said to her. Lungs, nothing noticeable; heart, no pulsations over the right ventricle; ictus not palpable; the left limit is situated a finger's breadth outside the left mammillary line, the right limit lies nearly two finger's breadth outside the right sternal edge; heart frequency high; there is arrhythmia; on the apex auscultation reveals an impure first tone, but no distinct blowing murmur; the second tone is also impure. On examination with X-rays the heart shows on the screen a very clear and not very small diffuse dilatation, which does not preponderate for any special part of the heart. Blood pressure 120.

Nervous condition: Slight ptosis on the left side. Possibly a certain drawing down of the mouth of the left side at an attempt to show the teeth. Cranial nerves otherwise show nothing noticeable. Not the slightest paresis. The patient can move both arms and both legs. No disturbances whatever of the sensibility. Patellar reflexes difficult to obtain, but they are there; so with the abdominal reflexes. Nothing to note on the reflexes of the Achilles tendon. Plantar reflexes on both sides normal.

March 2: Patient is to-day diplopic when looking to the right, the incoordination of the eyes is, however, not to observe.

March 6: Patient is now no longer diplopic. Further, the ptosis has completely disappeared.

March 11: Lumbar puncture carried out, the pressure was 120 mm. Nonne's reaction negative, so also Wassermann's. The cerebrospinal fluid contained one lymphocyte per cmm.

On March 19, 1921: The patient was discharged from the Medical Clinic, entirely free of symptoms, except for the objective findings from the heart.

This patient showed at the outset symptoms which at once suggested that we had here to do with a cerebral lesion of a vascular nature. In view of the fact that the patient lost consciousness one would then be most inclined to assume a haemorrhage of the brain. But there is nothing else in this to suggest that her illness was caused by haemorrhagia cerebri. In the first place she is a woman of forty-five, who shows no signs of disease of the kidneys, for she has no albumen and her blood pressure has not been increased. As is well known, a chronic nephritis with high blood pressure is at that

time of life the most usual cause of haemorrhages in the brain, and since no signs of any such disease are here present, this fact alone argues with great probability against the assumption of a haemorrhage.

It further remains to be seen, however, whether there would be any question of a thrombosis. At that age the most common cause of this is generally the syphilitic endarteritis. However, there was nothing to show that this patient suffered from syphilis. She has five children, all of whom are healthy, and Wassermann's reaction in blood and cerebrospinal fluid was negative, all of which speaks pretty definitely against the assumption of a luetic cerebrospinal affection, while this assumption is above all contradicted by the cytological examination (1 cell per cbmm).

But if these causes of the disease may therefore be excluded, the same is not the case with the assumption of an embolus cerebri. The most common cause of this embolus, namely mitralstenosis, is present in our case, and in that fact we have therefore grounds to suppose the possibility of an embolus. Nevertheless there is reason also against this assumption, for it appears strange that an embolus of the order of size which can be thought of here should have given rise to so long a period of unconsciousness. For this possible embolus could only have obstructed a comparatively small vessel, since on one side the paralysis had only a monoplegic character (though possibly *Facialis* was also affected), while on the other there was no disturbance of the sensibility. All this argues that a vascular lesion, of whatever nature, cannot have affected any of the larger vessels, and that therefore the unconsciousness supervening can hardly have been caused by any embolus. It may further be called to mind, however, that no objective signs could be found to show that the pyramidal tracts were affected at the time of the patient's admission to the hospital, nor could any disturbances of the sensibility be demonstrated. To this it should be added that on the fifth day of the disease there appeared a diplopy which remained a couple of days. This diplopy can hardly agree with the assumption of an embolus as the explanation of the initial symptoms of February 27.

But the possibility may perhaps be urged that just because objective signs of a lesion of the pyramidal tracts could never be demonstrated, we might here have to do with a large embolus in one of the "silent parts" of the cortex of the brain. But this idea is contradicted by the fact that the patient's mind, at least after the first day or two, proved to be entirely unaffected, which would hardly

seem reasonable if in the frontal lobe or anywhere else there were present so large an embolus as we should have to assume in order to explain the long unconsciousness.

A diplopia that is soon disappearing, however, is, as is well known, a not unusual symptom by encephalitis lethargica, and since the diplopia at this case is probably not to be connected with a vascular lesion nor yet with a syphilitic affection of any other nature, this feature argues with great probability for the presence of encephalitis lethargica in our case. The prolonged unconsciousness may indeed seem curious, but in the light of the foregoing case, which also showed prolonged unconsciousness, this feature can by no means be considered to contradict the diagnosis. Nevertheless it may be questioned whether this unconsciousness is to be compared with the somnolence usual in encephalitis lethargica.

If this patient had come under treatment at a time when epidemiological conditions gave one no reason to suspect encephalitis lethargica, her case could with the greatest probability have been diagnosed as cerebral embolism. That persons suffering from epidemic encephalitis have before passed under another diagnosis seems to be quite probable. Also has Antoni, in going through the daily reports of a Stockholm hospital for the last ten years, come to the result that at least six cases coming in during the years 1917-1919, and treated under another diagnosis, were cases of encephalitis.

Further, Wallgren has investigated the propagation of the disease among the workmen at a factory employing 190 hands. One of these came in to the Seraphim Hospital in Stockholm with evident symptoms of encephalitis lethargica. Wallgren now undertook to examine by means of a question schedule whether among this workman's comrades the disease might possibly have appeared in an incomplete form and thus escaped detection. It proved from the seventy answers given that no fewer than fifty-nine of the workmen had had symptoms of the disease during the two preceding months. Among these were some undoubted cases of encephalitis lethargica, while the great majority had only shown vague symptoms which did not permit him to draw any definite conclusions. (Of the fifty who had been ill, forty-seven had had headache, which in sixteen cases was described as severe.)

From the latest researches the conclusion may be drawn that abortive cases of the disease may very well be quite common, as is also suggested by the uncommonly even distribution of the disease, these abortive cases being probably of great importance for the spreading of the infection, as may also be indirectly concluded from

the following piece of research carried out by Kling and Liljequist in the parish of Wilhelmina (South Lapland) at the beginning of the year 1920. While it has been almost impossible to follow closely the way in which the infection is spread in more thickly populated communities and districts with better communications, here in Sweden an excellent opportunity for so doing has been afforded, since in the northernmost parts of the country we have in the mountain districts both an extraordinarily scanty population and also very bad possibilities of communication between the different inhabited spots. As an instance of the scantiness of the population it may be mentioned that within the parish referred to a whole day's journey may be taken between one human habitation and that nearest to it, as one of us (P.) can attest from personal experience. The above-named writers, then, have studied the sleeping-sickness epidemic in the parish in question. Among other things they found that two persons who had visited an area infected with the disease and had afterwards returned to their homes, a distance of nearly 100 miles as the crow flies, fell ill about 8-10 days later with symptoms of encephalitis lethargica. After another ten days or so, several other members of the family also sickened. On account of the above-mentioned great distances between the different places contact between the inhabitants of this district will also naturally be at a minimum, and the possibilities for the transference of the virus will therefore be few. For this reason there is also considerably less likelihood that immunity from the disease would be gained unless its appearance had clearly characterized itself as epidemic. This no doubt explains the (as it were) explosive character which, according to the observations of the above-named authors, the disease appeared to take in this district.

However, as will be seen, it is a necessary presupposition for this view that epidemic encephalitis is an old disease with us and one that has constantly afflicted us, though appearing only in abortive cases or else in more serious forms which, however, have not been grouped together clearly enough for physicians that these have been able to penetrate the epidemic nature of the disease.

If from the epidemiological standpoint this disease be compared with poliomyelitis epidemica acuta, there will consequently be found considerable likeness between the two, the latter disease also giving rise to a number of abortive cases which are of practical significance only for the further spreading of the infection.

In the case of poliomyelitis our experience in Sweden has usually been that when a certain area has been attacked by an epidemic outbreak of the disease, this area has afterwards remained more or less

immune for a greater or smaller number of years, and that even though the epidemic should during that time attack other parts of the country (Wernstedt). From researches carried out by W. in regard to an epidemic of poliomyelitis of the years 1911-1913 it appears that the people of the country districts were attacked by acute epidemic poliomyelitis to a much greater extent than the townsfolk. Thus he was able to prove that in country districts, inhabited by 1,315,667 persons, as many as 7.29 per cent on an average fell ill of poliomyelitis, while of 1,240,920 people living in towns only 0.44 per cent fell ill. But this disease, on the other hand, never spreads at one and the same time to our whole country as has been the case with encephalitis lethargica, the possible explanation being that the latter disease has not appeared during a succession of years to a sufficiently wide extent for us to be able to gain the necessary immunity against the virus in question.

SUMMARY

1. We have observed a case of epidemic encephalitis, where there was present almost complete immobilization of the body (only the ocular, respiratory, and swallowing movements being conserved). Though no true paralysis existed, as a consequence of the hypertonia no movements could be performed, nor were passive movements possible.

2. We have observed a case of hemiplegia, where neither active nor passive movements were possible—in this case also due to the hypertonia and not to a paralysis.

3. In these two cases we found no reasons for a lesion of the pyramidal tracts—Babinski's sign was never present.

4. In the second case the motility returned in some weeks, at first distally and then progressing in a proximal direction (in the lower extremity the dorsal flexion of the foot was the first returning function).

5. It is assumed that the symptoms are due to a lesion of the extrapyramidal motor system. This assumption being right, then a lesion of this system must be capable of causing such an enormous hypertonia, that not even passive movements are possible. Observations which speak for this conclusion have not been published.

6. In the first mentioned case we have seen ossifications in the soft tissue of the thighs and upper arms. These were apparently of quite the same nature as those described by Mme. Dejerine-Klumpke in certain cases of traumatic lesions of the spinal cord.

7. There seems to be reason to presume that the appearance of these ossifications is due to a lesion of certain fibers passing through

the spinal cord (Dejerine-Klumpke) and also, as we suppose, through the brain stem.

8. We have seen a case of unconsciousness lasting for some hours, followed, after five days, by diplopia. This case we interpret as one of epidemic encephalitis.

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CEREBELLAR SYNDROME RESEMBLING MULTIPLE SCLEROSIS

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Under the title *Dyssynergia Cerebellaris Progressiva* or Chronic Progressive Cerebellar Tremor, Hunt (1) in 1914 first directed attention to a disorder of motility which he regarded as a definite clinical entity. The condition was characterized clinically by dyssynergia, dysmetria, adiadokokinesis, hypotonia, asthenia and intention tremors which began as a local manifestation and later involved other parts of the voluntary muscular system. Later (2) following necropsy of his original case Hunt reported that there was a double lenticular lesion.

The following case is reported because it has a symptomatology that differs somewhat from that usually associated with the cerebellar type of multiple sclerosis and has much in common with the above syndrome described by Hunt.

Case I. Family history: Paternal grandparents' fraternity show one brother died of alcoholism and one feeble-minded granddaughter. In the paternal fraternity and the maternal ancestry there is nothing of interest. In the patient's fraternity are one normal sister, two normal brothers, one brother, a case of dementia praecox now in an institution for the insane and one brother who exhibits a nervous manner and stammering speech.

Personal history: The patient's infancy was normal up to the third year. At that age he contracted an acute febrile condition accompanied by convulsions. A diagnosis of infantile paralysis was made at that time. There are no demonstrable residuals from this illness. At about the age of puberty he began having attacks during which he would suddenly become unconscious, fall forward and lie quietly with body rigid and eyes fixed upward. The duration of these attacks was from five to ten minutes and they were followed by a period of about five minutes during which he would lie quietly and relaxed. During the following three years he had probably ten or twelve similar attacks. During the succeeding ten years he presented the usual picture of a low grade imbecile. He was able to do a limited amount of work and required much care and attention. At the age of twenty a motor agitation, volitional in type, began to develop. This made it impossible for the patient to do any work. The tremor was confined to the head and upper extremities and

gradually became more marked. He developed an ugly disposition and became unmanageable. He was disoriented and manifested clouding of consciousness. At this time he was committed to an institution for the insane.

Physical examination: Patient is a well developed and well nourished male. The eyes are deep set and the palpebral fissures are narrow. The ears are large and stand out conspicuously from the head. The genitals show nothing abnormal and the skin is soft and moist. The gait is slightly spastic and distinctly reeling. Muscular weakness is evidenced when walking is attempted. There are slight disturbances of coördination in both the equilibratory and nonequilibratory fields. Apraxia is present. There is no aphasia but the speech is stammering and propulsive. An irregular, slow, coarse, volitional tremor involving principally the hands but which is more or less general is present. The deep reflexes are exaggerated. The superficial ones are present including a double Babinski and its modifications. Ankle clonus is present. The muscle strength is much below par and while the volume and contour of the musculature is normal, hypotonia is distinctly present. There is no nerve irritability and no sensory changes are present. The cranial nerves are apparently not involved. Shortly after admission it was noticed that the patient preferred to remain in a secluded corner where it was quiet. He sat with his elbows on his knees and his hands supporting his head. He explained that this position relieved a tremor that would persist if his head were not supported. His condition grew steadily worse until it was necessary for him to remain in bed continuously. He was removed to one of the infirmaries where he has been under constant observation.

At the end of three years he presents the following picture: He is confined to his bed and practically helpless. Any attempted voluntary movement results in a generalized tremor. The tremor is volitional in type and arrhythmic. Attempted motion of the extremities causes them to be thrown wildly about. He is unable to walk and the moment his feet are lifted from the floor they are involved in a violent tremor that causes him to fall. If he is held erect the involvement soon becomes general, affecting not only his feet but his arms and head. The neuromuscular changes are not only exaggerated since his admission but he shows additional symptoms. Dysmetria and dyssyne-gia are present but difficult to elicit, due to the tremor. The index finger test discloses their presence. Adiadokokinesis is demonstrable and asthenia to the degree described by Hunt is present. The speech defect is more marked and quite typical of that seen in multiple sclerosis. Anesthesia to touch, pain and temperature is found although the mental condition of the patient makes these tests unreliable. A pin pushed beneath the surface of the skin was not felt. The reflexes remain practically the same as on admission except for the further exaggeration of the tendon jerks and the addition of patellar clonus. There appeared to be an involvement of the first, fifth, ninth, and tenth cranial nerves but the apparent inability to distinguish between odors and tastes

might have been due to poor coöperation as well as to an affection of these nerves. No nystagmus or other ocular disorders were present. Recently he has had two fits distinctly of the cerebellar type. Blood serum and spinal fluid were negative to the Wassermann reaction, and to the globulin and colloidal gold tests.

SUMMARY

A case is reported which resembles both multiple sclerosis and the cerebellar syndrome called *dyssynergia cerebellaris progressiva*. Unlike the latter, this case has a positive Babinski, cerebellar fits, greatly exaggerated tendon reflexes and an absence of vertigo. Sensory changes are present. Yet all the clinical manifestations of that condition, *dyssynergia*, *dysmetria*, *hypotonia*, *adiadokokinesis* and *asthenia* as well as the intention tremor are present. The diagnosis is probably an atypical multiple sclerosis with more than the usual cerebellar involvement.

Woodcroft Hospital.

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ON THE PATHOLOGY OF SENILE PSYCHOSIS
THE DIFFERENTIAL DIAGNOSTIC SIGNIFICANCE OF
REDLICH-FISCHER'S MILIARY PLAQUES *

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(Continued from page 25)

Case 13. Clinical Number 21658, Necropsy Number 2227, Danvers State Hospital. *Senile Dementia*. Female, age seventy-seven. Whole duration of mental disease two years. Incoherent. Disoriented. Walked about the hospital ward constantly. Restless and agitated. Mutters and mumbles to herself unintelligibly. Repeats meaningless phrases. Twists her head and picks at her clothing. Conversation is mere jumble of words. Died of general arteriosclerosis.

Macroscopical examination of the brain: Chronic pachy- and leptomeningitis. General atrophy of convolutions. External hydrocephalus. Brain weight 900 grams. Microscopical examination: Arteries not remarkable. Marked cellular degeneration; fatty and sclerotic changes. Degeneration of neurofibrils. Fairly abundant Alzheimer. Ca 100 plaques. They were abundant in cortical margin.

Case 14. Clinical Number 22742, Necropsy Number 2228, Danvers State Hospital. *Arteriosclerosis*. Female, age eighty-six. Whole duration about two years. She has been forgetful for some time and would have excited periods during the last two years. Attempted to get out of the house without any clothes on. She accused people of stealing her things. Was continually hunting for articles that she imagined had been stolen. Was roaming round the house by night. She has lately been seeing all kinds of things, girls flying from heaven, "frieze of darkies" around the room, black devils, etc. She mumbles and mutters in an unintelligible manner. Was disoriented. Showed marked defect of memory and retention. Was restless at night and agitated.

Macroscopical examination of the brain: Brain weight 1230. Slight general atrophy of convolutions. Chronic pachy- and leptomeningitis. Microscopical examination: Marked general cellular degeneration. Cells had to a great extent disappeared. Plaques very abundant, ca. 400 in one field. Cortex appeared to be entirely replaced by plaques. Plaques were found not only in cerebral cortex but basal nuclei, mid-brain and cerebellum. No plaques, however, in spinal cord. Very abundant Alzheimer degenerations.

* From the Pathological Laboratory, Boston State Hospital, Boston, Mass.

Case 15. Clinical Number 22633, Necropsy Number 2224, Danvers State Hospital. *Arteriosclerosis.* Female, age seventy-eight. Last six years she was forgetful and repetitious. Two years previous to her death the symptoms became worse. She could not recognize even the nearest relatives. Was restless, wandering about the house day and night. Was untidy in habits. Unable to carry on conversation on account of her grave deterioration. No hallucinations or delusions. Brain weight 1150 grams.

Macroscopical examination: Marked general atrophy of convolutions. External hydrocephalus. Chronic leptomeningitis. Microscopical examination: Very marked cellular degeneration. General fibrillar and cellular gliosis. Very abundant Alzheimers. About fifty large plaques in one field.

Case 16. Clinical Number 16665, Necropsy Number 18-35, Boston State Hospital. *Senile Dementia.* Female, age sixty-three. Whole duration about two years. The last two years she has had some failure of memory and occasional dizzy spells. She has imagined that her husband is going to shoot or drown her; that he is unfaithful to her and attentive to her nurse; that the nurse is trying to poison her. She said she could smell dynamite. Has had hallucinations of hearing. On admission she was apparently disoriented. Memory defective. Poor retention. Untidy. She died of bronchopneumonia.

Brain: Weight 960 grams. Extremely atrophic. Chronic leptomeningitis. Marked external hydrocephalus. Moderate sclerosis of basal arteries. Microscopical examination: Thickening of the glia fibers of the cell-free border. Fairly marked general cellular degeneration. A few Alzheimer's degeneration. Ca. twenty plaques in one field; mostly large isolated form.

Case 17. Clinical Number 14629, Necropsy Number 19-7, Boston State Hospital. *Arteriosclerosis.* Male, age fifty-five. Used alcohol excessively. Mental symptoms characterized by disorientation for time and place. Memory for remote events fair, for recent very poor; grasp on current events very poor; no delusions or hallucinations. Had some fabrication. No apparent speech defect. No motor disturbance. On account of the alcoholic history the case was once diagnosed as Korsakoff's psychosis. Died of sarcoma of the right jaw.

Brain: Weight 1030. Universal atrophy of convolutions. External hydrocephalus. Chronic hemorrhagic pachymeningitis. Marked general cellular degeneration, characterized by fatty and sclerotic changes, the former being very pronounced in this case. Alzheimer fairly abundant. Ca. eight plaques. No marked arteriosclerosis.

Case 18. Clinical Number 18024, Necropsy Number 19-9, Boston State Hospital. *Arteriosclerosis.* Male, age eighty-six. Whole duration ten years. Onset very gradual, beginning about ten years

before his death. Became irritable with his wife and was quarrelsome. Became headstrong, showed poor judgment; would put money in any scheme. Memory for recent events has become gradually impaired. Has had poor grasp on surroundings for many years. He is fully oriented for all spheres. Retention fairly good for one of his age. No hallucinations or delusions.

Brain: Weight 1165. General atrophy of convolutions. Moderate basal arteriosclerosis. Microscopical examination: Fairly marked general cellular degeneration. Fairly abundant Alzheimers. Ca. thirty very large plaques and small congregated ones.

Case 19. Clinical Number 17955, Necropsy Number 19-36, Boston State Hospital. *Arteriosclerosis.* Female, age sixty-one. Whole duration two years. She imagined that a dead person took her clothes away. Talked to herself; refused food. Was wandering and rambling in her conversation. On admission she was disoriented for time and place. Memory gravely impaired for both recent and remote events. Had hallucinations of hearing. Imagined that electricity was being put on her which caused her hand to swell. She was somewhat depressed on account of her delusions. Died of organic heart disease.

Brain: Weight 1030 grams. Chronic hemorrhagic internal pachymeningitis. General atrophy of convolutions. Marked fatty degeneration of ganglion cells. Degeneration of neurofibrillar structure. Sclerotic cell changes. Alzheimers fairly abundant. Ca. forty plaques, mostly large and some congregated form.

Case 20. Clinical Number 14739, Necropsy Number 19-43, Boston State Hospital. *Senile Dementia.* Female, age ninety-four. Fourteen years before death developed ideas of poisoning and persecution. Gradual failure of memory six years before death; wrote many letters of obscene nature. She was talkative, pleasant and agreeable. Imagined that things were stolen from her. Had delusions of sexual nature. In some occasions objected to baths, because she imagined she was very young and had her menstrual periods. In later years her memory was completely gone. There was marked defect of retention. Died of bronchopneumonia.

Brain: Chronic pachy- and leptomeningitis. Sclerosis of basal arteries. General atrophy of convolutions. External hydrocephalus. Brain weight 1305. Microscopical examination: Atrophic cortex. Marked general fatty degeneration. Two Alzheimers change in one entire section of Ammon's horn. Ca. twenty, mostly isolated small plaques.

Case 21. Clinical Number 19474, Necropsy Number 19-46, Boston State Hospital. *Senile Dementia.* Female, age eighty-four. Whole duration about a year. There has been noted a failure of memory and disorientation. Imagined that her husband was still alive. On admission she showed marked defect of retention. Was

suggestive and showed a tendency toward fabrication. At times was restless and agitated, especially at night. She died of arteriosclerosis and bronchopneumonia.

Brain: Marked diffuse general atrophy. Brain weight 1140 grams. Moderate sclerosis of basal arteries. Microscopical examination: Increase of neuroglia tissue. Fatty degeneration of adventitia. Fairly marked fatty degeneration of ganglion cells. Ca. twenty plaques in one field. Alzheimer's degeneration very few, found only in hippocampal gyrus.

Case 22. Clinical Number 15512, Necropsy Number 19-49, Boston State Hospital. *Senile Dementia.* Female, age ninety-four. Loss of memory for probably ten years. Had delusions for the last three years with regard to daughters. Would wander about the street, begged for money and was very difficult to care for. On admission she showed marked defect of memory and retention. Almost entirely disoriented. No hallucinations. Had vague ideas of persecution. Died of general arteriosclerosis.

Brain: Weight 1150 grams. Chronic pachy- and leptomeningitis. General atrophy of convolutions. Moderate sclerosis of basal arteries. Microscopical examination: Cortex very atrophic. General cellular degeneration; progressive regressive changes of neuroglia tissue. Fairly abundant Alzheimer's change. Ca. eighty plaques in one field.

Case 23. Clinical Number 17501, Necropsy Number 19-54, Boston State Hospital. *Senile Dementia.* Female, age eighty-eight. Onset of psychosis was probably six years before death. Became forgetful and lack of interest in home and personal appearance was first noticed. About two years before death her conversation became rambling and irrelevant. Later became childish and untidy. On admission she was disoriented in all spheres. Extremely forgetful. Memory for recent events completely gone. Had hallucinations of sight and hearing. Vague ideas of persecution and self-importance. Died of bronchopneumonia.

Brain: Weight 1055 grams. General atrophy of convolutions. Chronic pachy- and leptomeningitis. Moderate sclerosis of basal arteries. Microscopical examination: Marked general cellular degeneration. Alzheimer fairly abundant. Degeneration of neurofibrillar structure. Ca. fifty plaques in one field.

Case 24. Clinical Number 16272, Necropsy Number 19-55, Boston State Hospital. *Senile Dementia.* Female, age seventy-three. Onset of the mental symptoms six years previous to death. On admission she was completely disoriented. Memory very defective. Could not retain new perceptions. Possible hallucinations of hearing. Restless at night. Occasionally irritable. Died of gangrene of the foot.

Brain: Weight 930. Very marked atrophy of convolutions.

External hydrocephalus. Chronic pachy- and leptomeningitis. Microscopical examination: Marked atrophy of cortex. General fibrillar gliosis accompanied with regressive changes. Fatty and sclerotic cell changes. Very many Alzheimers. Over fifty plaques in one field. Many plaques in marginal zone. A few in marrow stalk.

Case 25. Clinical Number 15114, Necropsy Number 19-56, Boston State Hospital. *Arteriosclerosis.* Male, age seventy-three. Previous history not obtained. On admission he was disoriented. Showed poor memory, poor grasp on current events. Was very forgetful. No delusions or hallucinations. During the last two months patient showed marked aphasia. He could not express even his physical needs. Paraphasia was also noted. Died of acute hemorrhagic cystitis.

Brain: Weight 1375. Slight general atrophy of convolutions. Chronic hemorrhagic pachymeningitis. Moderate sclerosis of basal arteries. Microscopical examination: Cortex atrophic. General cellular degeneration. Marginal gliosis. Destruction of neurofibrillar structure. Alzheimer abundant. Ca. fifty plaques of very large form in one field.

Case 26. Clinical Number 17179, Necropsy Number 19-69, Boston State Hospital. *Senile Dementia.* Male, age eighty-three. Mental symptoms appeared one year previous to his death. He spoke of people who were dead as being around. No hallucinations or delusions. Memory for recent events very poor. Defect of retention. Disoriented for time. At times extremely irritable and profane, especially at night. Died of cardiorenal-vascular disease.

Brain: Weight 1350. Slight chronic pachy- and leptomeningitis. Moderate sclerosis of basal arteries. Microscopical examination: Moderate fatty pigmentous degeneration. Occasional Alzheimer's degenerations in Ammon's horn. Ca. forty plaques of various types.

Case 27. Clinical Number 10295, Necropsy Number 19-73, Boston State Hospital. *Senile Dementia.* Female, age seventy. Whole duration nine years. She began to talk in a wild and silly way, was irritable, wandered about and got lost. Memory failed, took a dislike to her niece, whom she thought stole from her. Finally failed to recognize her own sister. No hallucinations. Was disoriented in all spheres. Died of general arteriosclerosis and bronchopneumonia.

Brain: Weight 1060 grams. Marked general atrophy of convolutions. External hydrocephalus. Moderate arteriosclerosis of basal arteries. Microscopical examination: Moderate fatty pigmentous degeneration. Neurofibrillar structure well retained. Very few Alzheimer's degenerations only in Ammon's horn. About 100 plaques in one optic field.

Case 28. Clinical Number 20193, Necropsy Number 19-74, Boston State Hospital. *Senile Dementia.* Female, age eighty-one. Three years previous to her death became very forgetful; would wander out and get lost. Disoriented and untidy. Developed delusions of poisoning. Refused food. Destructive and violent at times. Died of erysipelas.

Brain: Weight 1200 grams. General atrophy of convolutions, especially frontal. Moderate arteriosclerosis of basal arteries. Microscopical examination: Moderate fatty pigmentous degeneration. Neurofibrillar structure well retained. No Alzheimer's degeneration. Eight-ten plaques in one field.

Case 29. Clinical Number 15594, Necropsy Number 19-101, Boston State Hospital. *Senile Dementia.* Female, age eighty-six. Three years before death patient began to be forgetful and deteriorated. Finally unable to recognize relatives. One time she fell on the street and got injured. Later she imagined that her grandchild hit her on the head and knocked her down. On admission she was depressed, imagined that her father was in the hospital and worried about him. Very marked defect of memory and retention. She was suggestive and fabricated freely. Died of chronic myocarditis.

Brain: Weight 1240 grams. Moderate sclerosis of basal arteries. Chronic leptomeningitis. Microscopical examination: Marked fatty degeneration of ganglion cells. Increase of neuroglia tissue with degeneration. Few Alzheimers. About twenty plaques of large form.

Case 30. Clinical Number 12778, Necropsy Number 19-112, Boston State Hospital. *Senile Dementia.* Female, age seventy-nine. Onset eight years previous to her death. Restlessness, especially at night. Depressed and threatened suicide. She was admitted in City Hospital, where she jumped out of a window because she saw "electric" at the end of her bed. On admission here she was fairly well oriented. Agitated. Had ideas of persecution. Memory and retention defective. Died of general arteriosclerosis and bronchopneumonia.

Brain: Weight 1125. General atrophy of convolutions. External hydrocephalus. Moderate sclerosis of basal arteries. Microscopical examination: Moderate fatty degeneration of ganglion cells. Slight perivascular devastation and gliosis. No Alzheimers. Eight plaques in one field.

Case 31. Clinical Number 16623, Necropsy Number 20-4, Boston State Hospital. *Senile Dementia.* Female, age seventy-eight. For the last two years patient was very childish, talking to herself, and has gradually become unable to recognize her surroundings and forgot her friends. Would wander away and could not find her way home. Memory defective. Retention very defective, restless and agitated at night. Died of lobar pneumonia.

Brain: Weight 1030 grams. General atrophy of gyri. Microscopical examination: Ganglion cells greatly disappeared. Marked cellular degeneration. Neurofibrillar structure damaged. Very many Alzheimers. Ca. thirty plaques of large form in one field.

Case 32. Clinical Number 20926, Necropsy Number 20-7, Boston State Hospital. *Senile Dementia.* Female, age eighty-three. Three years previous to her death mental symptoms appeared. She began to show a failure of memory, became suspicious, and imagined that her clothes were stolen. Restless at night. Retention very defective. Completely disoriented. Does not remember the location of her bed. No hallucinations. Died of bronchopneumonia.

Brain: Chronic hemorrhagic internal pachymeningitis. Chronic leptomeningitis. Marked general atrophy of convolutions. Brain weight 1005 grams. Microscopical examination: Cortex atrophic. Very marked fatty degeneration of ganglion cells. Also marked cell sclerosis. Alzheimer's degeneration abundant. Increase of cellular and fibrillar neuroglia. Ca. 100 plaques.

Case 33. Clinical Number 9869, Necropsy Number 20-9, Boston State Hospital. *Senile Dementia.* Male, age seventy-five. Has acted queerly for the last nine years. Although physically well, it has been difficult to get him out of bed or clean his room. Accused people of stealing things. Would get excited. The last year he has developed all kinds of fantastic ideas and insisted on going to Ireland. Talks freely of his fantastic ideas, which are somewhat grandiose in nature. He died of bronchopneumonia.

Brain: Weight 1220 grams. General atrophy of gyri. Microscopical examination: Cells and capillaries show very marked fatty degeneration. Few Alzheimer degenerations. Ca. twenty large plaques in one field.

Case 34. Clinical Number 21004, Necropsy Number 20-13, Boston State Hospital. *Arteriosclerosis.* Female, age sixty-nine. One year before her death she began to show progressive failure of memory and mental deterioration. She was completely disoriented. Grave memory defect; did not remember husband's name. At times restless, especially at night. Died of general arteriosclerosis.

Brain: Weight 1120 grams. General atrophy of convolutions. Moderate sclerosis of basal arteries. Microscopical examination: Marked fatty degeneration of ganglion cells in general. Increase of cellular and fibrillar neuroglia. Few Alzheimer's degenerations. Ca. ten, mostly large plaques.

Case 35. Clinical Number 20995, Necropsy Number 20-16, Boston State Hospital. *Senile Dementia.* Female, age fifty-nine. Onset four years before death. At this time family noticed that she was becoming forgetful. She would lose her way on the street. Restless and sleepless at night. Incoherent in speech. No hallucina-

tions or delusions. The speech was characteristic, showing "Haften," almost identical with those given in Kraepelin in cases of Alzheimer's disease. "Their face just as fair, the corpse on the man you can see, the comb and the present, to move, to move and in the bed to the marriage. Mr. Forest courting, I have no court, no more, married as a bare man, mere man. I don't know it, and man, I don't man the man. No, sir, I have no mere man, and baiting boating. I am standing. 'Where are you?' 'Where I have been standing for years.' 'I think I am I can see eyesight in of me, of me, of the little old man, if any can to wear me and man to see to take me. I can coat me bare and to cope man to the man to the man as I love to go,' etc., etc." Showed also a slight indication of apraxia. Cause of death, general arteriosclerosis.

Brain: Weight 1160 grams. Moderate pachymeningitis. General atrophy of convolutions. Moderate sclerosis of basal arteries. Microscopical examination: Very marked cellular degeneration. Neurofibrillar structure destroyed. Very many Alzheimer's degenerations. Gliosis. Ca. 100 plaques throughout the cortex of the cerebellum. Few in cerebellum.

Case 36. Clinical Number 14936, Necropsy Number 20-21, Boston State Hospital. *Senile Dementia.* Female, age seventy-nine. Whole duration four years. Has suffered greatly from insomnia. Has earned but little since the age of thirty-six. Some loss of memory and slight mental failure since the age of fifty-six. Acute mental symptoms began when she was seventy-four years of age; became confused and forgetful, unable to take care of herself, and very restless. On admission she showed marked memory defect and poorly oriented. Poor grasp on surroundings. No hallucinations or delusions. Would forget the location of her bed. Died of general arteriosclerosis.

Brain: Weight 1100 grams. Chronic internal hemorrhagic pachymeningitis. General atrophy of convolutions. Moderate sclerosis of basal arteries. Microscopical examination: Marked general fatty degeneration. Only two plaques in whole of section of the Ammon's horn. Arteries moderately sclerosed. (May be other disease.) No Alzheimers.

Case 37. Clinical Number 15844, Necropsy Number 20-22, Boston State Hospital. *Arteriosclerosis.* Female, age seventy-two. Disoriented for time, place and person. Grave impairment of both recent and remote memory. Flow of thought disconnected; confused. No evidence of hallucinations or delusions. Very restless and resistive. Marked defect of retention. Died of general arteriosclerosis and bronchopneumonia.

Brain: Weight 940 grams. Chronic hemorrhagic pachymeningitis. Extreme atrophy of convolutions. Moderate arteriosclerosis. Microscopical examination: Moderate grade of general fatty degeneration of the ganglion cells. Few Alzheimers. Ca. 20-30 plaques in one field.

Case 38. Clinical Number 20650, Necropsy Number 20-26, Boston State Hospital. *Senile Dementia.* Male, age eighty-four. Very marked memory defect, which affects both remote and recent events. Poor grasp on current events. Fairly well oriented. No delusions or hallucinations. Emotionally unstable. Depressed and cut his throat, attempting suicide. The whole duration one year. Died of lobar pneumonia.

Brain: Weight 1250 grams. General atrophy of convolutions. Slight chronic leptomeningitis. Microscopical examination: Fairly marked fatty degeneration throughout. Marked marginal gliosis. Fairly abundant Alzheimer changes. Ca. fifty plaques of large form.

Case 39. Clinical Number 20050, Necropsy Number 20-28, Boston State Hospital. *Arteriosclerosis.* Female, age sixty-nine. For years was increasingly irritable, violent, fault-finding. Fairly well oriented. Memory poor for recent events. Had numerous paranoid ideas; electricity, hypnotism, etc. Apparently had hallucinations of hearing. Died of general arteriosclerosis.

Brain: Weight 1260 grams. Atrophy of convolutions. Chronic hemorrhagic internal pachymeningitis. Microscopical examination: Marked cellular degenerations with fatty and sclerotic changes. No Alzheimer's plaques. Ca. twenty plaques in one field, mostly large in type.

Case 40. Clinical Number 21846, Necropsy Number 20-31, Boston State Hospital. *Senile Dementia.* Female, age eighty-seven. Mental failure dates back three years previous to death. Memory increasingly impaired. Had ideas of persecution. Imagined that family had stolen her things. Had hallucinations of hearing. Most of her delusions dependent upon failing memory. Obstinate and resistive. Was disoriented in all spheres. At times agitated. Died of bronchopneumonia and arteriosclerosis.

Brain: Weight 1120 grams. General atrophy of convolutions. Sclerosis of basal arteries. Microscopical examination: Fairly marked arteriosclerosis. Progressive and regressive changes of arteries. Slight perivascular devastation. Few Alzheimers. Fatty degeneration of ganglion cells. Ca. 100 plaques of large and congregated form.

Case 41. Clinical Number 20641, Necropsy Number 20-36, Boston State Hospital. *Senile Dementia.* Female, age seventy-three. A year before her death patient began to show failing memory, confusion. Later reacted to hallucinations of hearing. Destroyed clothing, dressed peculiarly, became careless in habits. Retention very poor, fabricated freely. Died of acute enterocolitis.

Brain: Weight 1010 grams. Slight chronic hemorrhagic pachymeningitis. Microscopical examination: Marked general cellular degeneration. Fairly abundant Alzheimers. Ca. forty plaques, mostly large in type.

Case 42. Clinical Number 22007, Necropsy Number 20-38, Boston State Hospital. *Senile Dementia.* Female, age eighty-two. About four years previous to her death she became very forgetful of recent events. For three years she has had hallucinations of sight, seeing men, women, sometimes rows of animals, in her room. She was completely disoriented. Showed marked fabrication. No insight. Died of coronary sclerosis and chronic interstitial nephritis.

Brain: Weight 1070 grams. Marked general atrophy. Microscopical examination: Marked cellular degeneration with resultant cell poverty. Alzheimers changes few. Fifty plaques.

Case 43. Clinical Number 22229, Necropsy Number 20-44, Boston State Hospital. *Arteriosclerosis.* Female, age sixty-two. For the last year she showed lack of interest in keeping her room clean. Gave to church more than she could afford. Showed speech disturbance; her speech became thick and indistinct. Numerous distressing ideas; thought that the place was on fire. Restless at night. Cause of death acute vegetative endocarditis.

Brain: Weight 1320. Marked frontal atrophy. Chronic leptomeningitis. Microscopical examination: Marked cellular degeneration. Increase of capillaries. Abundant Alzheimers. Ca. fifty plaques in one field.

Case 44. Clinical Number 22661, Necropsy Number 20-67, Boston State Hospital. *Senile Dementia.* Female, age seventy-seven. For one year previous to death she showed loss of memory. She would tear her clothes, would not eat, did not have sense enough to feed herself. Imagined that she was falling into water and a dog was following her in her room. Memory seemed very poor. Imagined that her mother is still living. Disoriented for time, place and person. Died of chronic interstitial myocarditis.

Brain: Weight 1120 grams. General atrophy of convolutions. Microscopic examination: Fatty degeneration of ganglion cells, neuroglia and adventitia. Destruction of neurofibrillar structure. Abundant Alzheimers. About 100 plaques.

Case 45. Clinical Number 20927, Necropsy Number 20-70, Boston State Hospital. *Senile Dementia.* Female, age eighty-six. For several years before death she showed mental symptoms. She talked with imaginary people. At night wandered about the house, very restless and did not sleep. Has left the home clothed with a petticoat on over her nightdress. Would forget that she had her meals and would ask for some food. Had hallucinations of hearing and sight. Imagined that her mother was still living. Disoriented for time and place, only partially oriented for person. Died of general arteriosclerosis.

Brain: Weight 1150. Marked general atrophy of convolutions. Moderate sclerosis of basal arteries. Microscopical examination: Marked general fatty and sclerotic cell change. Many Alzheimer degenerations. Ca. thirty plaques in one field.

Case 46. Clinical Number 23183, Necropsy Number 20-81, Boston State Hospital. *Senile Dementia.* Female, age eighty-one. Complete loss of memory. Entirely disoriented for all spheres. Retention very defective. Imagined people stole clothing from her. Marked fabrication. Contented and happy. Died of cardiorenal disease.

Brain: Weight 1210 grams. Chronic pachy- and leptomenigitis. General atrophy of convolutions. External hydrocephalus. Microscopical examination: General fatty and sclerotic cell change. Slight perivascular gliosis. Many Alzheimers. Over 100 plaques in one field.

Case 47. Clinical Number 12354, Necropsy Number 20-82, Boston State Hospital. *Arteriosclerosis.* Male, age sixty-nine. Two years before death started to scratch, thought he had lice. Thought bugs were in his nose. Became forgetful, would turn on the gas and then not light it. He was fairly well oriented. Very poor retention. Died of chronic interstitial myocarditis.

Brain: Weight 1330 grams. Slight chronic leptomenigitis. Moderate arteriosclerosis. Microscopical examination: Marked cellular degeneration. Very abundant Alzheimer's degenerations. Ca. twenty plaques in one field.

EPICRISIS

In analyzing these cases, the writer must, first, make clear his basis of interpretation of senile dementia. In senile dementia the clinical symptoms, although most carefully studied and analyzed into different forms by Kraepelin and others, appear in various nuances which make the differential diagnosis extremely difficult. Arteriosclerotic dementia, general paralysis in old age, syphilitic dementia, dementia praecox in old age, etc., often present clinical symptoms very similar to those of senile dementia, and the diagnosis made from mental symptoms only is hardly justifiable. Even with consideration of history, mental and physical symptoms and course of the disease, the diagnosis is sometimes very difficult and almost impossible to make. This is a fact, the writer believes, recognized by every psychiatrist directly engaged in clinical work.

Are there any characteristic findings which prove to be pathognomonic in the anatomy of the brain of senile dementia? If so, the diagnosis can be made solely from the anatomical observations. Unfortunately, however, opinions of the authors differ as to the pathological nature of senile dementia. Binswanger and Alzheimer (1894) were the first to differentiate arteriosclerotic dementia from typical cases of senile dementia because of the difference in clinical

symptoms and anatomical alterations. Kraepelin states that the brains of senile dementia show alterations in fine capillaries, while the arteriosclerotic brains present pathological changes in large vessels.

Alzheimer's interpretation that the pathological changes found in brains of senile dementia are only an intensification of physiological senile alterations, has found support from many workers, such as Cramer, Robertson, Frankhauser, Leri, Carrier, Sinchowicz, Fuller, and Spielmeier. On the other hand, however, a number of authors (Verga, Hansemann, Siemerling, Fischer, Southard *et al.*) maintain that there must be some other pathological changes for senile dementia which do not appear in the simple senile atrophy.

Thus the nature of the pathological process in senile dementia is not quite well understood. However, from what has been studied by authors it appears to be certain that the brains of senile dementia show diffuse parenchymatous alteration, while in arteriosclerotic brains the pathological process manifests itself in a focal manner. In this present study, therefore, cases showing diffuse parenchymatous alteration and characteristic basic mental symptoms were considered as senile dementia.

With the exception of Cases 6 and 36, all cases of this group can readily be classed in senile dementia.

The patient in Case 6 showed past history suggestive of dementia praecox. She was admitted to the hospital once before when she was about fifty-five years of age. She is said to be peculiar all the time, and has been always troublesome to the community. On second admission she did not show memory defect, was fully oriented, sharp, and sarcastic. In the last year she appeared slightly demented and became untidy. It is evident, from the history, that this patient was not senile dementia in the beginning of her mental trouble. Whether or not the symptoms of dementia and untidiness in the last year indicate evidence of senile dementia or are only manifestations of the terminal stage of her earlier psychosis is difficult to decide. Anatomically, cells showed only slight fatty pigmentous increase, and the finer structures were preserved fairly well. Miliary plaques were found one or two in one entire section from Ammon's horn. According to Sinchowicz, a dementia praecox patient at seventy years of age would present four to five plaques in one optic field of the section from the frontal lobe. Therefore the presence of plaques in limited number may not be against the diagnosis of dementia praecox. When the general pathological picture is taken into consideration, it appears

probable that this case was a late stage of an earlier psychosis, perhaps paranoid dementia praecox.

In Case 36 it is doubtful whether the diagnosis should be senile dementia or not. The loss of memory and mental failure dated back over twenty years. The patient is said to have earned but little since the age of thirty-six. On admission, however, she showed typical basic symptoms of senile dementia. She would forget the location of her bed. Memory was greatly impaired. She was poorly oriented and had poor grasp on her surroundings. On account of meager previous history, nothing definite can be said of her earlier condition. If she was senile dementia, it would seem reasonable to think that the later symptoms developed from an earlier psychotic basis. Microscopical examination showed marked fatty pigmentous degeneration of ganglion cells in diffuse manner. Miliary plaques were found only two in an entire section from Ammon's horn.

Cases 3, 12, 14, 15, 17, 18, 19, 25, 34, 37, 39, 43, and 47 were diagnosed clinically as arteriosclerotic dementia. All these showed marked diffuse parenchymatous degeneration and no evidence of arteriosclerotic focal degeneration. Mental symptoms correspond to those of senile rather than arteriosclerotic dementia. Cases 25 and 43 showed speech disturbances, the former a marked aphasia, the latter a thick and indistinct speech. The speech disturbances do not necessarily indicate an arteriosclerotic focal manifestation; it is not infrequent for senile dementia to show various grades of disturbances in speech.

Case 17 was considered at one time as Korsakoff's psychosis on account of the alcoholic history. However, the general histological picture suggested senile dementia rather than Korsakoff's psychosis of alcoholic nature. Mental symptoms in this case should, therefore, be regarded as Korsakoff's syndrome in presbyophrenic type of senile dementia.

Case 35 presented, in addition to the basic mental symptoms of senile dementia, a characteristic speech disturbance which should be called "Haften" and an indication of apraxia. An early onset of dementia (fifty-five years of age), speech disturbance, apraxia, etc., would favor the diagnosis of Alzheimer's disease. General atrophy of the brain, abundant appearance of Alzheimer's degeneration and numerous plaques agree with this diagnosis.

Case 4 was diagnosed as "senile dementia with arteriosclerosis." However, the histological study did not reveal any marked degree of arteriosclerotic changes. This case should therefore be classed as senile dementia.

GROUP 2

CASES IN WHICH PLAQUES ARE FOUND TOGETHER.
WITH ARTERIOSCLEROTIC CHANGES.

This group represents cases showing arteriosclerotic changes in addition to the pathological picture described in Group I. Brains of this group showed focal as well as diffuse atrophy. The weight of the brains varied from 1055 to 1450 grams; male average 1220 grams, female average 1210 grams. Cysts of softening, areas of hemorrhage, either fresh or old, were found practically in all cases of this group. Basal vessels presented more marked sclerosis than in the preceding group.

Microscopically, in addition to diffuse cell changes, numerous disease foci were found, especially along the path of the sclerotic vessels. In these areas nerve cells had disappeared and were replaced by neuroglia element,—granule cells, fat corpuscle cells and glia fibers. The neuroglia network of the cortical margin was extremely thickened, often showing a tendency toward wedge-shaped marginal gliosis. Tangential and radial fibers showed also focal degeneration when examined in myelin sheath preparations. Occasionally the marrow stalk and descending tracts presented a secondary degeneration.

Case 1. Clinical Number 22212, Necropsy Number 2176, Danvers State Hospital. *Arteriosclerosis.* Male, age sixty-eight. Four years previous to death he began to have severe headaches. Became forgetful, conversation rambling, and seemed to coin words. Thought that family was against him. Was very restless and confused. On admission he was completely disoriented, showed marked psychomotor unrest. Memory showed marked impairment without any retention. Mitral murmur of heart. Considerable sclerosis of peripheral arteries.

Brain: Weight 1400 grams. Sclerosis of basal arteries. Atrophy of temporal convolutions. Cyst of softening in the right superior gyrus. Microscopical examination: Moderate diffuse cell change. Focal softening. Perivascular gliosis. Marked arteriosclerosis. No Alzheimers. Four to five plaques in a field.

Case 2. Clinical Number 22436, Necropsy Number 2189, Danvers State Hospital. *Senile Dementia.* Female, age seventy-seven. Whole duration two years. Memory began to fail, became forgetful. Cried a great deal and restless day and night. Wandered away several times from home. No insight into present condition. Blood pressure 180–120. Died of acute enterocolitis.

Brain: Weight 1200 grams. Slight general atrophy of convolu-

tions. Chronic leptomeningitis. Cysts of softening in right post-central convolution. Sclerosis of basal arteries. Microscopical examination: Marked arteriosclerotic devastation. Wedge-shaped gliosis of the cortical margin. Cells fairly good except in focal areas. Two to three plaques in one field. No Alzheimers.

Case 3. Clinical Number 18231, Necropsy Number 2196, Danvers State Hospital. *Senile Dementia.* Female, age eighty-six. Six years previous to death became excited when she imagined that people were talking about her. Responded to voices. Was quite resistive. Became profane, threatened her husband. Would scream out of the window. Could not sleep at night. Had visual hallucinations; saw bugs two inches long on the wall. Memory greatly impaired. Swaying in Romberg's position. Died of general arteriosclerosis.

Brain: Weight 1190 grams. General atrophy of convolutions. A cyst of softening in left occipital lobe. Sclerosis of cerebral arteries. Microscopical examination: Sclerosis of arteries. Focal softening. General fatty and sclerotic cell degeneration. Few Alzheimer changes. Ca. one hundred plaques in one field.

Case 4. Clinical Number 22299, Necropsy Number 2198, Danvers State Hospital. *Arteriosclerosis.* Female, age seventy-two. Present trouble began five years before death when patient had a slight "shock". Speech was affected, her memory began to fail. Would mislay things and could not find them. Speech disturbance became gradually worse and she could not express herself. Deteriorated greatly in all spheres. Had auditory hallucinations. Died of arteriosclerosis and bronchopneumonia.

Brain: Weight 1090 grams. Softening of Broca's convolutions. Marked general atrophy. Sclerosis of basal arteries. Microscopical examination: Cells greatly destroyed, especially around sclerotic vessels. Relative increase of capillaries. Marked fibrillar gliosis. Few Alzheimers. Ca. two hundred plaques in one field.

Case 5. Clinical Number 22506, Necropsy Number 2225, Danvers State Hospital. *Arteriosclerosis.* Male, age seventy-two. Five years before death he had several "shocks". He gradually improved from those. Two years previous to death became quite noisy and restless, especially at night. Has shown some speech disturbances. Marked memory defect for recent events. Slight asymmetry of face. No delusions or hallucinations. Died of carcinoma of the prostate.

Brain: Weight 1210 grams. Focal atrophy of convolutions. Marked sclerosis of basal arteries. Microscopical examination: Focal softening of cortex. Tendency toward wedge-shaped marginal gliosis. Fairly marked general fatty degeneration. Few Alzheimers. Ca. fifty plaques.

Case 6. Clinical Number 16884, Necropsy Number 19-5, Boston State Hospital. *Arteriosclerosis.* Male, age sixty-one. Patient

considered as defective all his life. Two years ago he had a "shock" following which speech was affected without paralysis of the extremities. While in City Hospital showed convulsions followed by semi-comatose condition. He became markedly aphasic, was unable to appreciate what was said to him. Wandered about the ward at night, and was quite restless. Noticeable weakness of the motility of right side. Gait spastic. Marked Romberg sign.

Brain: Weight 1230 grams. Slight general atrophy of convolutions. Focal softenings of different parts of the brain. Sclerosis of basal arteries. Microscopical examination: Advanced fatty and sclerotic change of ganglion cells. Marked gliosis. One plaque in an entire section of the Ammon's horn. No Alzheimers.

Case 7. Clinical Number 16521, Necropsy Number 19-11, Boston State Hospital. *Arteriosclerosis.* Male, age sixty-nine. Memory very defective. Absolutely disoriented. Hallucinations of hearing. No delusions. Gravely demented. Retention very poor. Restless at night. Evidence of hemiplegia on right side.

Brain: Weight 1120 grams. Old hemorrhage of the left internal capsule. Sclerosis of cerebral arteries. Microscopical examination: Marked arteriosclerosis. Areas of softening and gliosis. Diffuse and focal cell degeneration. Alzheimer's degeneration abundant. Ca. one hundred plaques in one field.

Case 8. Clinical Number 18659, Necropsy Number 19-16, Boston State Hospital. *Arteriosclerosis.* Female, eighty-three years of age. Inmate of the poorhouse for a number of years. Two years previous to death became markedly confused with marked memory defect. Disoriented. Wandered about and could not find her way. Very untidy in habits. Marked sclerosis of peripheral arteries. No focal symptoms. Had organic heart lesion.

Brain: Weight 1075. General atrophy of convolutions. Focal softening in left inferior temporal convolution. Marked sclerosis of basal and cerebral arteries. Microscopical examination: Focal softening and perivascular gliosis. Marked general fatty degeneration of ganglion cells. Few Alzheimer's change. Ca. forty plaques in one field.

Case 9. Clinical Number 13881, Necropsy Number 19-19, Boston State Hospital. *Arteriosclerosis.* Male, age sixty-four. A vagrant. Mentally inferior all his life. Fairly well oriented. Memory fair for recent, good for remote. Had paranoid ideas against the U. S. Government for many years. While in hospital residence of over one year he became gradually deteriorated and disoriented, became very forgetful. Gait became unsteady. Extremely untidy in habits. Died of arteriosclerosis and pulmonary tuberculosis.

Brain: Weight 1150. General atrophy and focal softenings. Marked arteriosclerosis. Microscopical examination: Marked fatty

degeneration of the ganglion cells. Multiple small areas of softening. No Alzheimers. Three to four plaques in one field.

Case 10. Clinical Number 19591, Necropsy Number 19-24, Boston State Hospital. *Senile Dementia.* Male, age seventy-nine. Six or seven years before death patient had apoplectic shock in which his speech was affected. His left side became weak. One year before death patient began to act in a peculiar manner. Would go to a neighbor saying that everyone in the house was sick and needed a physician. Yelled out of the window and talked incessantly. Said that the food was poisoned. Patient was irritable, restless and apprehensive. Showed marked arteriosclerosis of the peripheral vessels. Died of general arteriosclerosis.

Brain: Weight 1375 grams. Cysts of softening in frontal lobe. Sclerosis of cerebral arteries. Microscopical examination: Marked arteriosclerosis, focal areas of softening. Marked thickening of the marginal neuroglia. Abundant amyloid bodies. Fairly marked general cellular degeneration. No Alzheimers. Ca. twenty plaques, mostly large form.

Case 11. Clinical Number 13763, Necropsy Number 19-25, Boston State Hospital. *Senile Dementia.* Female, age eighty-nine. Eighteen years ago she was depressed, complained of ill-treatment of children and worried over their actions. For the last ten years she has been depressed, dissatisfied and hypochondriacal. Had delusions of poisoning and several other somatic ideas. Died of general arteriosclerosis.

Brain: Weight 1120 grams. General atrophy of convolutions. Focal atrophy of the convolutions. Marked sclerosis of cerebral arteries. Microscopical examination: Focal areas of softening. Very marked perivascular gliosis. General cellular involvement. No Alzheimers. Ca. forty plaques in one field.

Case 12. Clinical Number 15641, Necropsy Number 19-35, Boston State Hospital. *Senile Dementia with Arteriosclerosis.* Female, age eighty-one. Fully oriented. Poor memory and retention. Somewhat confused. No insight. Worried a great deal. Disturbed at night. Died of chronic diarrhoea.

Brain: Chronic hemorrhagic internal pachymeningitis. Focal atrophy of brain. A cyst of softening in pons. Marked sclerosis of basal arteries. Brain weight 1150 grams. Microscopical examination: Perivascular devastation of arteriosclerotic nature. Wedge-shaped marginal gliosis. Ca. forty plaques. No Alzheimer degeneration. Diffuse cell change.

Case 13. Clinical Number 17293, Necropsy Number 19-38, Boston State Hospital. *Arteriosclerosis.* Female, age sixty-one. Two years before death patient began to do odd things; would go down cellar at night and sit there; at times refused food; apprehen-

sive; would wander out; afraid that people were going to steal things. Showed marked impairment of memory and retention. Could not find her way home. Left knee jerks increased. Aortic murmur. Died of general arteriosclerosis.

Brain: Weight 1155 grams. Cysts of softening in left parietal lobe. General and focal atrophy. Sclerosis of cerebral arteries. Microscopical examination: Marked marginal gliosis. Very abundant amyloid bodies. Marked neuroglia proliferation, especially around vessels. General and focal cellular degeneration. Few Alzheimers in neighborhood of plaques in Ammon's horn. Ca. forty plaques.

Case 14. Clinical Number 19141, Necropsy Number 19-52, Boston State Hospital. *Senile Dementia.* Female, age seventy-three. Grave impairment of recent memory and retention. Partially oriented. Auditory hallucinations. Thought that people were trying to steal from her. Irritable and restless. No focal symptoms. Died of arteriosclerosis and bronchopneumonia.

Brain: Weight 1340 grams. Marked basal arteriosclerosis. Microscopical examination: Focal areas of softening, especially perivascular. Marked arteriosclerosis. No Alzheimer. Two to three plaques in one field. Diffuse and focal cell change.

Case 15. Clinical Number 21034, Necropsy Number 20-27, Boston State Hospital. *Senile Dementia.* Male, age seventy. Two years previous to death patient would go out and could not find his way back. Was completely disoriented. Memory very poor. No grasp on his surroundings. Was contented and euphoric. No delusions or hallucinations. Cause of death coronary sclerosis with occlusion.

Brain: Weight 1055 grams. General atrophy of convolutions. Old hemorrhage in left frontal lobe. Sclerosis of cerebral arteries. Microscopical examination: Old hemorrhage and focal softening. Cells greatly degenerated in general. Few Alzheimers. Ca. forty plaques.

Case 16. Clinical Number 21709, Necropsy Number 20-64, Boston State Hospital. *Arteriosclerosis.* Female, age seventy-five. Two years previous to death she became unable to count change correctly. She started to go out on the street dressed in a bathrobe instead of her coat. At times she could not recognize her daughter. She has had headaches and dizzy spells for many years. She was disoriented. Had hallucinations of hearing. No apparent physical symptoms. Died of bronchopneumonia and general arteriosclerosis.

Brain: Weight 1345 grams. Anomaly of vertebrae. Chronic pachy- and leptomenigitis. Focal areas of softening. Marked cerebral arteriosclerosis. Microscopical examination: Areas of softening. Marked arteriosclerosis. General fatty degeneration of ganglion cells. Few Alzheimer's degenerations. Ca. fifty plaques.

Case 17. Clinical Number 22059, Necropsy Number 20-73, Boston State Hospital. *Senile Dementia.* Female, age sixty-nine. For seven years she has been wandering around all day from morning till late at night. Has been extremely forgetful for four years. Could not find her way home. Imagined that father and mother were living. Thought that her daughter-in-law was going to poison her. Marked facial asymmetry. Weakness of the right extremities.

Brain: Weight 1450 grams. Old hemorrhage in left internal capsule. Sclerosis of cerebral arteries. Microscopical examination: Marked perivascular and marginal gliosis. General fatty and sclerotic degeneration of ganglion cells. Few Alzheimers. Ca. sixty plaques in one field.

EPICRISIS

Cases of group 2 are the most difficult to interpret correctly. Anatomically these cases showed senile alterations and arteriosclerotic changes. Clinically they presented symptoms either characteristic for senile dementia or suggestive of arteriosclerotic dementia. In one group of cases symptoms of senile dementia predominated, while in other the arteriosclerotic manifestations were in the foreground. It is a great question how much the mental symptoms should be associated with the arteriosclerotic changes present. We know that a great many senile subjects at autopsy present very marked arteriosclerotic changes without showing any mental disturbances during life. In spite of the anatomical findings, some cases of this group might be simply senile dementia and the arteriosclerotic changes might not have played any part at all. On the other hand, it is impossible to know how much the senile changes found were responsible for the various mental symptoms presented.

Clinically 9 cases were diagnosed as arteriosclerotic psychosis and 7 cases as senile dementia, while 1 was considered as senile dementia with arteriosclerosis. The writer is unable to give any definite diagnosis for the cases of this group because of the reasons just mentioned and also because of the fact that the attempt to do so would possibly lead to false interpretation.

Case 6 presented three factors in regard to the clinico-anatomical diagnosis. First, the patient was considered as mentally defective all his life. Second, he was arteriosclerotic as proved by the autopsy findings. Third, the brain showed, in addition to the focal softening, well marked fatty and sclerotic changes of the ganglion cells throughout the cortex. Only one plaque was encountered in an entire section from Ammon's horn. Whether or not diffuse cell degeneration was due to congenital predisposition or to senile involution is

difficult to determine. However, considering age and previous history, it would seem more probable that the patient was an arteriosclerotic psychosis developed on the basis of mental deficiency.

GROUP 3. CASES IN WHICH ARTERIOSCLEROTIC CHANGES ARE MAIN FEATURE

Group 3 includes cases showing various arteriosclerotic changes described by different authors. Dura mater was thickened and was occasionally adherent to the calvarium. Pia mater was also thickened and frequently showed cloudiness over the vertex surface of the brain. Brains in this group were more or less atrophic, the weight of the brain varying from 960 grams to 1490 grams; male average 1330 grams; female average 1160 grams. Basal arteries were generally markedly sclerotic. It must be mentioned, however, that the vascular change of the cerebral cortex was not always parallel with that of basal arteries. Sometimes cortical vessels showed extensive sclerosis when basal arteries appeared only noticeably thickened. Blood vessels of the cortex showed, in addition to the usual arteriosclerotic changes, a tendency toward hyaline degeneration. All layers of the vessel walls, especially the adventitia, presented a rich amount of fatty substance.

Most of the cases of this group displayed macroscopical focal lesions, such as focal atrophy of convolutions, cysts of softening, hemorrhagic areas of different stages, etc.

Microscopically, nerve cells presented focal degenerations, mostly along the paths of the long arteries emerging from pia mater. In these areas cells had largely disappeared leaving the place for the proliferated glia cells and fibers (perivascular gliosis of Alzheimer). Cells remaining in or around the foci showed marked fatty pigmented degeneration and marked cell sclerosis. In perivascular spaces and in diseased foci granule cells and fat corpuscle cells were encountered in varying numbers. Except in focal areas cells of the cortex were in fairly good condition, either in their structure or in their stratographical arrangement.

Most cases showed wedge-shaped marginal gliosis (Buchholz) in addition to the irregular cellular and fibrillar gliosis. Some cases presented areas known as spongy-like cortex devastation (spongioeser Rindenschwund) caused by the arteriosclerotic processes (Alzheimer, Uyematsu). A few cases simulated a pathological picture called "encephalitis subcorticalis chronica" (Binswanger), a type of cerebral arteriosclerosis. In addition to the focal pallor, various grades

of myelin sheaths degeneration were found in marrow stalk and in pyramidal tracts.

Case 1. Clinical Number 22251, Necropsy Number 2182, Danvers State Hospital. *Arteriosclerosis.* Female, age sixty-two. Two years previous to her death she had an apoplectic shock, following which she could not walk for two months. Speech was markedly affected. Memory has failed, particularly for recent events. She became emotional and restless. On admission she was disoriented, dull and apathetic. Slight facial asymmetry, slight paresis of left side. Died of general arteriosclerosis.

Brain: Weight 960 grams. Focal atrophy. Hemorrhage in right internal capsule. Microscopical examination: Focal areas of softening. Old hemorrhage.

Case 2. Clinical Number 21705, Necropsy Number 2183, Danvers State Hospital. *Arteriosclerosis.* Male, age eighty-one. Two years before death developed an idea that his family was poisoning his food. His memory failed greatly and he became unable to retain new perceptions. Became unable to walk without a cane. Very restless at night. On admission he was entirely disoriented. Very forgetful. Left knee jerks exaggerated more than the right. Marked arteriosclerosis. Died of lobar pneumonia.

Brain: Weight 1450 grams. Focal areas of softening. Sclerosis of basal vessels. Microscopical examination: Perivascular and marginal gliosis. Areas of softening. Marked arteriosclerosis.

Case 3. Clinical Number 22384, Necropsy Number 2190, Danvers State Hospital. *Arteriosclerosis.* Female, age sixty-five. Three years previous to her death had an apoplectic shock. She became very emotional and depressed: Had explosions of irritability. Was fearful of fire and frequently made threats against other patients. Gait was impaired, slow and staggering. Died of cerebral hemorrhage.

Brain: Weight 1120 grams. Focal atrophy of convolutions. Recent hemorrhage near the internal capsule. Microscopical examination: Marked arteriosclerosis. Perivascular devastation. Fatty degeneration of adventitia.

Case 4. Clinical Number 21931, Necropsy Number 2199, Danvers State Hospital. *Arteriosclerosis.* Female, age sixty-five. Five years before death patient was found unconscious in bed. She remained in bed for a week and then gradually improved. She has had several fainting spells and drowsiness. Memory began to fail and walking became difficult. Emotion considerably dulled, quite apathetic. Became extremely forgetful. Was untidy. Occasionally tube fed. Died of general arteriosclerosis and bronchopneumonia.

Brain: Weight 1200 grams. Focal atrophy. A small old hemorrhage in left parietal lobe. Microscopical examination: Old hemorrhage. Focal fatty degeneration around the sclerotic arteries.

Case 5. Clinical Number 22501, Necropsy Number 2203, Danvers State Hospital. *Arteriosclerosis.* Male, age eighty-one. For the last eighteen years patient would have dizzy spells and sometimes fell out of his chair. Two years before death became restless, following an attack of pneumonia. Became untidy. Memory greatly impaired. Physically nothing abnormal was noticed except incidents due to old age. Died of general arteriosclerosis and bronchopneumonia.

Brain: Weight 1260 grams. Marked sclerosis of basal arteries. Microscopical examination: Perivascular gliosis. Tendency toward wedge-shaped marginal sclerosis. Focal fatty degeneration of ganglion cells.

Case 6. Clinical Number 22499, Necropsy Number 2204, Danvers State Hospital. *Arteriosclerosis.* Male, age seventy-four. Eight years previous to death patient had apoplectic shock which affected his speech. He could not talk well since. Five years before death he began to have difficulty in walking and with bladder. He became restless and irritable. Wandered about at night. Marked memory defect. Died of cardiorenal disease.

Brain: Weight 1150 grams. Focal atrophy of convolutions. Marked sclerosis of basal arteries. A small hemorrhage in right temporal lobe. Microscopical examination: Focal perivascular fatty degeneration of ganglion cells. Marked arteriosclerosis. Small areas of softening.

Case 7. Clinical Number 20627, Necropsy Number 2219, Danvers State Hospital. *Arteriosclerosis.* Male, age sixty-two. Two years previous to death patient had apoplectic shock which paralyzed his left side. Three months later had another seizure, at which time speech became very much impaired. He became irritable, suspicious, was afraid something might happen to him. Unable to sleep, would get up and roam about the house. On admission he was quite emotional, cried a great deal. At times very confused but another time fairly well oriented. Left knee jerk much accentuated. Indication of ankle clonus on left. Died of general arteriosclerosis.

Brain: Weight 1490 grams. Chronic leptomeningitis. Multiple small hemorrhages. Marked arteriosclerosis with aneurysmal dilations. Microscopical examination: Old hemorrhage. Small focal softening. Marked arteriosclerosis. Perivascular and marginal gliosis. Focal fatty degeneration.

Case 8. Clinical Number 22735, Necropsy Number 2233, Danvers State Hospital. *Arteriosclerosis.* Female, age sixty. Two years before death she had apoplectic shock, following which she showed right-sided facial paralysis. Following this she became dull during the day and restless at night. Showed some aphasia. She was fairly well oriented at times but at another time she was entirely confused. Died of cardiorenal disease.

Brain: Marked frontal and parietal atrophy. Brain weight 1310 grams. Marked arteriosclerosis. Microscopical examination: Focal fatty degeneration of ganglion cells. Focal softening. Perivascular and marginal gliosis.

Case 9. Clinical Number 16369, Necropsy Number 18-30, Boston State Hospital. *Senile Dementia.* Female, age seventy-four. Two years previous to death could not sleep well, complained of illness, threatened to jump into reservoir, talked in a peculiar manner of witches and fairies and imagined that she was in a house of ill-fame. On admission she was disoriented, talked constantly of religion, was self-accusatory, was often irritable and screamed. Marked arteriosclerosis, systolic murmur at apex. No apparent focal symptoms.

Brain: Weight 1150 grams. Marked sclerosis of basal arteries. Focal atrophy of the convolutions. Microscopical examination: Marked arteriosclerosis. Perivascular devastation. Wedge-shaped marginal sclerosis. Areas of small softening.

Case 10. Clinical Number 19082, Necropsy Number 19-14, Boston State Hospital. *Arteriosclerosis.* Male, age fifty-six. Two years ago he had an apoplectic shock, following which his right side was paralyzed. Memory failed a great deal. Became emotional, depressed and cried. Very restless at night. Sometimes fairly oriented. Other times completely disoriented. Slight speech defect. Died of general arteriosclerosis.

Brain: Weight 1345 grams. Focal atrophy. Hemorrhage in left parietal lobe. Marked cerebral arteriosclerosis. Microscopical examination: Fairly marked fatty degeneration of general ganglion cells. Marked arteriosclerosis. Focal areas of softening and an old hemorrhage.

Case 11. Clinical Number 6397, Necropsy Number 19-18, Boston State Hospital. *Arteriosclerosis.* Female, age sixty-five. Drank a great deal all her life. Two years previous to her death she became depressed and restless. Sometimes very excited, used vile and profane language. Careless about her personal appearance. Partially oriented. Showed marked defect of recent and remote memory. While in hospital had an apoplectic seizure with resulting paralysis of the right side of the face and left arm, partial paralysis of the left leg. Died of general arteriosclerosis.

Brain: Weight 1120 grams. Cyst of softening in cerebellum. Hemorrhage in pons. Marked sclerosis of basal arteries. Microscopical examination: Marked arteriosclerosis. Softening and hemorrhage. Wedge-shaped marginal gliosis.

Case 12. Clinical Number 15719, Necropsy Number 19-20, Boston State Hospital. *Arteriosclerosis.* Female, age seventy-three. Three years previous to death it was noticed that she was restless,

resistive, walked around in nude condition, disturbed the ward of the general hospital where she was admitted for the treatment of the hemorrhoid. Pupils were unequal, gait was unsteady. Memory impaired and no knowledge of current events. Was depressed but at times greatly excited. Died of chronic nephritis and arteriosclerosis.

Brain: Weight 1135 grams. Atrophy of convolutions, especially frontal. Marked sclerosis of basal arteries. Microscopical examination: Marked arteriosclerosis and perivascular devastation. Irregular fibrillar gliosis. Fairly marked general fatty degeneration of the ganglion cells.

Case 13. Clinical Number 15260, Necropsy Number 19-27, Boston State Hospital. *Arteriosclerosis.* Female, age sixty-nine. Two years previous to death the patient began to show memory loss. Restless and noisy. Screamed and yelled at night. On admission showed no orientation. Talkative, excitable in emotional tone, cried easily. Knee jerks exaggerated on left, none on right. Left grasp very weak. Apparently had hallucinations of hearing. Died of general arteriosclerosis.

Brain: Weight 1055 grams. Focal atrophy. Multiple small softenings. Marked arteriosclerosis. Microscopical examination: Fairly marked general fatty degeneration of ganglion cells. Multiple softening. Marked arteriosclerosis. Old hemorrhage in right internal capsule.

Case 14. Clinical Number 18544, Necropsy Number 19-47, Boston State Hospital. *Arteriosclerosis.* Female, age sixty. One year previous to her death patient became talkative, noisy and resistive. Showed marked loss of memory. On admission she was disoriented. Coarse tremor of head, lips and hand. Reflexes exaggerated on the left. Hallucinations of hearing and sight. At times negativistic and resistive. Died of general arteriosclerosis.

Brain: Weight 1175 grams. General and focal atrophy. Softening of part of the right striate and lenticular nuclei. Sclerosis of cerebral arteries. Microscopical examination: Areas of softening. Arteriosclerosis. Perivascular and marginal gliosis.

Case 15. Clinical Number 17545, Necropsy Number 19-51, Boston State Hospital. *Arteriosclerosis.* Female, age seventy-one. One year before her death she worried a great deal over the epithelioma she had on the nose. Afraid and suspicious of people. Imagined that there was poison in food. Became untidy in her habits. She was partially oriented, had numerous delusions of persecution and auditory hallucinations. While in hospital had mild convulsions with a short period of confusion following. Died of arteriosclerosis and bronchopneumonia.

Brain: Weight 1345 grams. Focal atrophy. Marked arteriosclerosis. Microscopical examination: Perivascular devastation.

Wedge-shaped marginal gliosis. Marked sclerosis of cerebral arteries. Focal degeneration of ganglion cells.

Case 16. Clinical Number 18186, Necropsy Number 19-58, Boston State Hospital. *Arteriosclerosis.* Male, age sixty. Two years previous to death had a slight apoplectic shock, lip being drawn to the right side for about five weeks. Committed to the institution because of restlessness and attempt to enter the ocean, believing that someone was drowning. Believed that his father was still living. There was marked loss of memory and retention. Had hallucinations of hearing. Died of arteriosclerosis.

Brain: Weight 1430 grams. Cyst of softening in right temporal lobe. Marked sclerosis of cerebral arteries. Microscopical examination: Focal areas of softening. Marked marginal gliosis. Marked arteriosclerosis. Cells fairly good.

Case 17. Clinical Number 16971, Necropsy Number 19-75, Boston State Hospital. *Senile Dementia.* Male, age eighty-three. Two years previous to death he became very disturbed at night, upset, noisy and talkative. Thought that people were after him and were going to kill him. Paralysis of right side. Marked loss of memory and defect of retention. No hallucinations. Died of cancer of penis.

Brain: Weight 1220 grams. Marked arteriosclerosis. Focal softenings. Marked fibrillar gliosis around the vessels and along the cell free border. Fairly marked general, more marked focal degeneration of ganglion cells.

Case 18. Clinical Number 20761, Necropsy Number 19-98, Boston State Hospital. *Senile Dementia.* Female, age ninety. Memory is very poor for all spheres. Very forgetful. Orientation much impaired. Markedly demented and deteriorated. Cheerful and pleasant. No hallucinations or delusions. No focal symptoms. Cause of death arteriosclerosis.

Brain: Weight 1050 grams. Cyst of softening in occipital lobe. General atrophy of convolutions. Marked arteriosclerosis. Marked general fatty degeneration of ganglion cells. Areas of softening. Marked perivascular and marginal gliosis.

Case 19. Clinical Number 9296, Necropsy Number 20-5, Boston State Hospital. *Arteriosclerosis.* Female, age seventy. For many years she had taken liquor. Four years previous to death she became violent, threw a club at her sister, destructive and noisy. Her memory was affected and she was restless at night. She had ideas of persecution and hallucinations of hearing. On admission the patient was disoriented, her speech was rather thick and inarticulate. She showed poor memory but denied hallucinations, was irritable and restless. While she was in the hospital she was noted as having a distinct drooping of the right side of the face and paralysis of the right hand and arm. Cause of death acute infective endocarditis.

Brain: Weight 1110 grams. General and focal atrophy. Focal softening in left precentral convolution. Marked cerebral arteriosclerosis. Microscopical examination: Areas of focal softening. Focal fatty degeneration of ganglion cells. Marked arteriosclerosis.

Case 20. Clinical Number 9801, Necropsy Number 20-17, Boston State Hospital. *Semile Dementia.* Female, age seventy-seven. Ten years previous to death she began to show mental and physical failure. She thought that her father and mother were alive, did not recognize friends. Hands, lips and tongue showed coarse tremors. Orientation and grasp much impaired. Memory markedly impaired both for recent and remote events. No definite evidence of hallucinations. Delusions dependent on memory failure. Since admission patient quiet, untidy in habits. One year previous to death examination showed some speech defect with explosive articulation. The patient had to make great effort to make herself understood. Later she became completely disoriented, unable to give her own name correctly. Died of general arteriosclerosis.

Brain: Weight 1100 grams. Marked cerebral arteriosclerosis. General focal atrophy. Areas of softening. Microscopical examination: Focal areas of softening. Marked arteriosclerosis with perivascular devastation. Fibrillar gliosis.

Case 21. Clinical Number 15665, Necropsy Number 20-14, Boston State Hospital. *Arteriosclerosis.* Male, age seventy-seven. About three years ago the patient either had an apoplectic shock or when under the influence of liquor fell on the sidewalk and was picked up by the police and taken to a jail. Orientation impaired for time, place and person. Memory showed marked impairment for both recent and remote events. Has had hallucinations. No apparent delusions. Emotional tone dull. Quiet and cheerful. He complained of pain in head.

Brain: Weight 1370 grams. Multiple cyst of softening. Atrophy frontal pole. Marked arteriosclerosis. Microscopical examination: Marked general fatty degeneration. Small areas of perivascular softening. Marked tendency toward wedge-shaped marginal gliosis.

Case 22. Clinical Number 21072, Necropsy Number 20-24, Boston State Hospital. *Arteriosclerosis.* Male, age sixty-eight. One year previous to death he became violent because he thought he had lost some money and accused his children of taking it. Was suspicious and depressed. On admission his memory was much impaired on many matters of remote and recent events. While in the hospital he had a shock followed by paralysis of the right side of the face and neck.

Brain: Weight 1100 grams. General and focal atrophy. Marked cerebral arteriosclerosis. Focal areas of softening. Microscopical examination: Focal softening, marked arteriosclerosis, marked perivascular and marginal gliosis.

(To be continued)

SOCIETY PROCEEDINGS

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MEETING, OCTOBER 19, 1922

Dr. F. H. PACKARD, President, in the Chair

A CASE OF TRAUMATIC ABSCESS OF THE ANTERIOR CEREBRAL FOSSA

Dr. J. W. Courtney demonstrated a very striking case of the scapulo-humeral type. The disorder made its debut on the right side, fifteen years ago. The patient was first seen at the Carney Hospital twelve years ago. He was then given a certain number of subcutaneous injections of strychnine. Since that time his treatment has been *nil*. The wasting of the right shoulder-girdle and arm is now practically complete. The forearm and hand are untouched.

The patient is a native of the West Indies, fifty-two years of age, married and the father of five children. From the beginning of his disorder, practically up to the present time, he has worked uninterruptedly as a cook, either in a private capacity or for railroad construction gangs. Only this autumn the left scapulo-humeral region began to show evidence of involvement, and the patient now, for the first time, finds his ability to maintain his family in jeopardy. Already the fibrillary twitching of the left shoulder-girdle groups is extreme. The left forearm and hand are intact. There is no atrophy elsewhere. Cases of this sort seldom continue attendance for long at any one clinic; hence, a definite knowledge of their ultimate history is rarely available.

DEMONSTRATION OF A CASE OF PROGRESSIVE MUSCULAR ATROPHY

Dr. J. W. Courtney demonstrated a second case illustrating the value of the temperature as a guide to the nature of the pathologic sequelæ of head injuries. A boy, age seven years, was hit in the face by an automobile August 10, 1922. Within half an hour of the receipt of his injuries, he was seen by several members of the staff of the hospital at Clinton, Mass. He was conscious. The physical findings were as follows: His face was swollen, both orbital regions were ecchymotic, there was an abrasion and hematoma over the left frontal bone, a small laceration on the chin, a fresh defect in the hard palate, a flattening of the bridge of the nose and a tearing away from the jaw of the upper lip and the nose, thereby exposing certain unerupted teeth. There was considerable hemorrhage. The wounds were immediately explored and carefully dressed, but nothing fur-

ther was done until the fourteenth when, under light anesthetization, the bridge of the nose was elevated. At this time firm pressure was insufficient to correct the defect in the hard palate, so no sutures were taken. The boy stood the operation well and continued to improve from that time on, showing no paralyses, no disturbance in the fundus oculi and no alterations in the reflexes. The temperature was the characteristic one of *contusio cerebri*—i.e., it alternated from normal to 101.5° F. or thereabouts during the nineteen days of the patient's stay in hospital. During this time an X-ray revealed a linear fracture extending from the region of the roof of the mouth upward in the median line to the ethmoid region where it deviated obliquely to the left, involving three inches of the left frontal bone.

After leaving the hospital, the boy ran a temperature of 99.5–100° F. for two weeks. From that time on he had no temperature until ten days prior to his second admission to the hospital on October 7. He had continued under a nurse's care, but was up and about and had no symptoms. Rather abruptly on the fourth or fifth of October he developed a temperature of 102° F. to 103° F., and on the sixth became drowsy and irritable and complained somewhat of headache. His white count was 16,000. Now, to retrace my steps a bit, there was noted on September 23 a mucopurulent, blood-streaked discharge from both nostrils; but examination of the nose and transillumination of the sinuses revealed nothing significant. Both fundi were at that time normal. On September 29 examination of the latter disclosed a slight engorgement of the blood vessels, and on October 6, the day before I saw the boy, there was a slight choking of the left disc, with moderate engorgement and tortuosity of the vessels of the right fundus.

My examination, made at the hospital on the seventh of October, revealed the following: The patient was well developed and nourished. He was perfectly conscious, but markedly flushed and inclined to somnolency. The pupils were widely dilated but equal and sluggish to light and accommodation. The fundus was in *statu quo*. There was no disfiguration of the face with the exception of a slight flattening above the left superciliary ridge. There was no paralysis of any degree. The reflexes were unaltered. The nose and ears disclosed nothing abnormal. The heart sounds were clear, but there was a distinct intermittence of the pulse, which had not before been noted.

In coming to a diagnosis I had clearly in mind the very favorable channel afforded by the fracture of the nose for the entry of pathogenic organisms. I was also much impressed by the sudden sharp rise of temperature, after a temperature-free period of many days. On these grounds I assumed the presence of an abscess in the anterior chamber of the skull, but from much discouraging previous experience, I was not enthusiastic about operation. However, I advised interference, if within the next few hours the boy's somnolence deepened. He did in fact not only grow more stuporous but developed a ptosis of the left upper eyelid, so the next day about

noon, under very light etherization, a transverse incision was made through the left eyebrow and the sinus opened. This contained a little mucopurulent material and showed a linear fracture in its floor. Its posterior wall was then cut away in an area about one-fourth of an inch in diameter. The frontal lobe pressed forward into the opening and did not pulsate. The dura was incised, and a probe carefully passed around under it. The probe was then passed along the floor of the skull for a short distance, whereupon there was a gush of thick, very foul-smelling pus to the amount of about four ounces. At this the frontal lobe was observed to pulsate. Irrigation was then done, a rubber dam drain inserted and the wound closed with catgut.

Following the operation, improvement in the patient's general condition was noted for a time, but within a few hours the temperature began to climb to the regions of 105 and 106, and clonic spasms appeared in the right face and arm. These phenomena continued until the *exitus*, about 10:30 the following day. At the moment of death the temperature was 108. A culture from the abscess showed no growth after twenty-four hours.

I have observed a number of cases of cerebral abscess of varied etiology. Several of these were evacuated with skill and dispatch. I have yet to see one survive the operation.

In the case of progressive muscular atrophy shown by me this evening, as well as in all others presenting chronic decay of the central nervous system, there is much food for reflection. They are tragic reminders of the utter futility of the necessarily empiric therapy we apply. How may we expect to be relieved of this embarrassing situation? In my own professional life I have followed the growth of the literature concerning their minute pathology to its present appalling proportions. It is an edifying testimonial to unremitting and meticulously painstaking industry and to inexhaustible patience. But, unfortunately, as it now stands, it is no more vital to the achievement of a scientific therapy than the tissues whence it was derived. To my way of thinking, the data contained in this enormous literature demand to be assayed, so to speak, by a genuinely scholarly mind of the Huxley order. By this I mean a mind which is utterly free from emotional bias; which possesses so truly the gift of sagacious discernment that it never by any chance confounds differences in kind with differences in degree; which is capable of observing and generalizing phenomena and of expressing with punctilious accuracy their order and sequences; and which, withal, is stimulated and, at the same time, nicely controlled by a sane and vigorous imagination. An assay made by such a mind is bound to yield a universally intelligible conception not only of the nature of the morbid agents which effect the decay of the nervous elements involved in the diseases in question, but also of their *modus operandi* at every stage of the process. When it is accomplished, but never before, the clinician may hope to come into possession of a scientific program of prophylaxis and treatment.

THE PHYSIOLOGY OF AUTOSUGGESTION

Dr. Donald Gregg read this paper. At this time he said when "autosuggestion" is receiving wide publicity, consideration of the subject may well be taken by the physician as well as by the layman. Although the doctor may attempt to laugh the matter out of court, the layman continues to say, "But there is something in it just the same."

Suggestion implies the passing of an idea from one to another. Without a "conscious" and an "unconscious" autosuggestion becomes impossible. Dr. Morton Prince, whose book on the Sub-conscious popularized the term, has said that there is no such thing as "the subconscious" as distinguished from "the conscious." Dr. Coué in his booklet supplies no proof. He refers to somnambulism, delirious conduct, unconscious memory, and control of the autonomic system, all of which phenomena can be explained without considering the unconscious. Most of Coué's thesis regarding Self-Mastery centers about the control of physical functions through conscious suggestions that are thought to be absorbed by the unconscious, which in turn controls the bodily functions, and produces health or disease. Such a thesis if tenable should be applicable in sickness and in health, in infancy and old age, and in the past as well as in the present development of man. What becomes of the unconscious in mental disease? At what age does it begin to develop, and when in man's development did he acquire an unconscious self? If we simply regard the body as a mechanism which automatically runs along healthily in the great majority of cases unless interfered with by noxious agents from without, or unless its activities are handicapped by malformations or maldevelopments, or its functions inhibited or disturbed by the emotions, have we not an unassailable thesis? Without recourse to the confused and disputed terms of conscious and unconscious, we have already in the intellect and the emotions a duality of functions that explains the situation. We recognize that the emotions modify our vegetative activities, often contrary to our intellect and will, which have little to do with these primitive functions. Here, then, is the physiological explanation of "autosuggestion," so-called. And he who in functional disease heals the sick or helps himself to health, does so not through the unconscious, but through the action of the emotions. By eliminating the inhibiting or disturbing actions of the emotions in their multifarious forms, functional health is often regained, and he who would heal himself or others needs to know the physiology of the emotions, and not the pseudopsychology of the unconscious.

Discussion: Dr. George A. Waterman: The matter is more complex than the division of these reactions on the basis of emotion and intellectual processes only would imply. It is difficult to explain many of the phenomena which are of everyday occurrence, and one is surprised at the number of phenomena that happen in nonpathological cases. In the everyday life of many of us, we find phenomena which, after lying latent in the subconscious, may rise to the con-

scious, as in the dream states, for instance. So frequently one will wake up and say he has not dreamed at all, when some sudden sound or seeing some object will cause the dream to flash into the mind. These things in the subconscious have an effect on the activities of the person though he is entirely unaware of their existence. (Illustrated by telling of a young woman who thought she had not dreamed, but whose dream was instantly recalled to her mind by seeing a black evening gown hanging in the closet. She had worn the gown to a ball at which she had seen the man of whom she dreamed.) Hypnotic suggestion given in the sleep state produces mental activity without the patient knowing the cause. That there are activities beneath the threshold of thinking that may produce activities in the intellect, I think there can be little doubt. The terminology should be more definitely settled.

RECENT DEVELOPMENTS IN ELECTRO-DIAGNOSIS

DR. PRECIVAL BAILEY

To be published later.

NEW YORK PSYCHIATRIC SOCIETY

ANNUAL MEETING, JANUARY, 1922, DR. SMITH ELY JELLIFFE,
PRESIDENT, IN CHAIR.

MANIC-DEPRESSIVE PSYCHOSES: A SYMPOSIUM

Most of the members of the Society contributed to the discussion. The following are here available:

Dr. Geo. H. Kirby pointed out the difficulty in estimating the value of any plan of treatment in a group of disorders such as are comprised under the designation of manic-depressive psychoses. This is especially true if one attempts to make generalizations or is expected to furnish statistical evidence. There is no consensus of opinion as to what may be included in this group. One may perhaps have in mind as a nucleus the simple benign affective disorders, but there are innumerable transitions from these types in regard to both formal symptoms and mechanisms to the psychoneuroses, the constitutional psychopathic reactions to the toxic infectious disorders and to dementia precox. Furthermore, among well recognized affective reactions we have a variety of clinical types which have their own special problems of treatment and apparently have their own special tendencies as to prognosis. For example, the manic excitements, the retarded depressions, the mixed states, the anxiety and involution types, the stupors, etc. One must at the present time be satisfied to study the results obtained in small groups clinically similar in type and offering approximately the same kinds of problems in treatment.

On account of the great tendency to recurrence of manic-depressive attacks, observations as to the results of treatment, to be of any

value, must extend over many years; in fact, the whole life cycle must be included. This fact makes it difficult to accept many claims as to the efficacy of this or that procedure or to accept as conclusive the results obtained by the extensive treatment of a large hospital group where the temporary results may be most encouraging. Particularly instructive will be the cases running a course with frequent recurrence, but where the treatment has apparently broken in on the repetition of the attacks so that the patient remains free from further recurrence. Dr. Kirby showed a chart based on figures compiled by Dr. Pollock, statistician for the New York State Hospital Commission. The tabulation covered the recurrence of attacks in 8438 cases admitted during a ten-year period. Of the total number it was found that 4816, or 57 per cent, were in their first attack. This left 43 per cent who had had previous attacks. As to the influence of general measures and environmental factors and the special attempts aimed to correct or cure accompanying physical disorders, the speaker did not feel that sufficient data were available on which to base a definite conclusion. Cases treated from a psychological standpoint showed a great variability of results. Some cases on which the most intensive work had been done had apparently not been influenced at all. On the other hand, in certain types of cases, especially the situation group where concrete external circumstances and relations of life seemed to precipitate the attack, and where these circumstances could be modified or avoided, very good results were often obtained. Where the constitutional tendency is marked, and the attack is mainly an exaggeration of fixed personality tendencies, psychological analysis (conscious level) has proved to be of little value.

Dr. L. Pierce Clark said that in a material embracing many cases I have been able to more or less completely analyze at least a dozen cases of the manic-depressive type and have also followed their subsequent histories very carefully. In none have relapses occurred. As illustrations, I may cite briefly some five or six cases.

Case 1 was that of a married woman who had passed the climacteric. She had attacks of simple retardation alternating with most marked depressed states for twenty-five years. The alternations were semi-annual. The depressions did not go so deep as to materially disturb the organic life nor did she more than vaguely contemplate suicide. She had no children. The precipitating cause was little in evidence, but there was a marked heredity to the disorder in temperamental make-up. After a fairly exhaustive treatment, lasting four or five months, she succeeded in reestablishing her home and social interests, and has almost uninterruptedly enjoyed good health since, now a period of eleven years.

Case 2 was that of a middle-aged widow with one grandson. She had just passed the climacteric. She had several slight depressive episodes and one very severe, attended by organic reactions of suicide, refusal to eat, lost visceral sensibility, etc. She has been

entirely well for seven years. Her attacks at the time of treatment were occurring every five or six months. She fully regained her previous social and economic capacity.

Case 3 was that of an unmarried man in the middle thirties who had attacks of simple mental retardation for thirteen years, the longest free period during that time being less than two years. There has been a steady improvement in his social and business conduct and elimination of previous alcoholic excesses.

Case 4 was that of a married woman who had passed the climacteric and who had her first attack of simple retardation at twenty years of age, accompanied by thoughts of suicide. She has had more or less severe attacks every few years until five years ago, when the state of depression was more or less persistent, with fluctuations of intensity in the depressive symptoms from time to time. Analytic treatment was carried on for a year, and its fruitful results are shown in her adaptation to home and community life, absence of vestigial symptoms of "blue spells," greater productive work, absence of irritability and fatigue, and less sensitiveness and inactivity. She takes a continuous interest in her household affairs and has been free from depressions for four years.

Case 5 was that of a woman now in the late twenties who has had several classic manic and depressive episodes since her seventeenth year. The analysis was undertaken at the beginning of the sixth depression, following a manic excitement, and continued for six months. The results were shown in the patient's complete readjustment to her mother, brothers, husband, and child. Four years ago the husband and mother reported that "for the first time in ten years she has been perfectly normal, without nervous and physical symptoms." She has resumed her social and household duties with content and is quite serene and happy.

Case 6 was that of an unmarried woman in middle life who had for five years a circular type of mild depression and excitement, each lasting six months, the condition developing gradually out of the "natural" fluctuation of her mood for ten years before definite depressions and excitements occurred. During the latter part of this five-year period of mental disorder, while in a hypomanic state, a type of paranoid ideas developed, and she undertook analytic treatment during the depression which followed this period. The treatment was continued for several months. The depression promptly ceased after the first month's treatment; in the ordinary course of previous attacks such change was not due for at least two months later. The patient was able to continue at her complicated intellectual and literary work, and at the time when the hypomanic period might have been expected it failed to appear. After three years' freedom from vestigial symptoms she returned for a short analysis of a mild depression, hoping to curtail it before deeper symptoms occurred; unfortunately her present state is sufficiently comfortable to make her unwilling to attempt further analysis. One may at least say

here that this patient has undergone great mental reconstruction, but she is probably the least satisfactory as a clinical showing of all the cases of my series.

In applying analysis to these individuals, several difficulties are encountered. First of all is the strong hereditary inheritance which gives a more or less distinctive constitutional make-up. As might be expected, these strong trait tendencies make intense the infantile fixations or defect of primary instincts for adult adaptations. Even when these hereditary evidences are not strongly in evidence, the very earliest distortions of the instinctive life make it doubly difficult to bring these primary faults to mind so that the individual may get an experiential knowledge of them. For upon the degree of lasting insight must the final good results largely depend. The transference in such individuals is fairly easy, for the patient to the analyst, and *vice versa*. The permanency and constancy of an enduring transference is, however, difficult. From the very nature of the make-up of the depressant one might easily expect this, hence they should be taken in hand at the very earliest age, as better results are forthcoming before they have become sophisticated or disillusioned, and moreover at a time when life itself holds its greatest reward. In the deepest condition of depression the state itself discourages analysis by the association method, and the patient bears up poorly under a strict manner of approach. Even though the dreams are fraught with death and despair, symbols which are common enough in such persons, one must persevere and adjust the analysis but not discontinue it. One may work upon less deep levels, in the conscious or foreconscious, having the patient keep in mind that such analysis is by no means final or conclusive. The best periods for analysis are when the patient is just entering, or just emerging from, a depressed state. Should the transference become too intense through faulty technique or otherwise, the work on the main problems should cease and the analysis of the transference itself should succeed for a time. Of course the general *bien-être* of even the slightest grades of elation disestablishes the transference and no real analysis can be pursued. I have never been able to proceed with the analysis in a negative transference which is so frequently encountered; the state of tediousness and boredom seems to forbid of a sufficiently constant negative transference. While it may sound unsympathetic, and also the facts may have been drawn from too few data, yet intense preoccupation with the manic-depressive group as a whole gives the impression that such individuals do not take a deep-rooted grasp upon the foundations of life, and though usually pleasing in personality have no great staying qualities. Just as the epileptic has many of these stabilizing qualities even to excess, the depressant is more superficial and possesses too little tough fiber for life's stress and storm. It is interesting and at the same time discomfiting to the analyst to review what the members of this group indicate afterward what really helped them most as the result of treatment. They all state it was the transference, and none are able to give any accurate or

precise statement of the main faults disclosed in the analysis. While this explanation may not be uncommon in even the simpler neuroses, I find the depressant's attempts at explanations are cruder than the average analytic cases. Whether the analysis is really so painful as to require being repressed or whether the piecing together of the personality faults is too difficult, one may not say. Perhaps the hypothesis is of sole value to the analyst who, through his insight and mastery of the problem, makes the patient's proper transference possible.

It is important to note that a whole series of accessory psychotic attitudes in the depressives were also remedied as in the neuroses. Those here specifically referred to are alcoholic excesses, jealousies, and character failures, including paranoid trends. The latter were so pronounced in two cases as to cause a diagnosis of true paranoia to be made, but the unsystematization of the trends of ideas and the general lack of retrospective falsification of memory, as well as the absence of the paranoid character previous to the onset of the psychosis, made no doubt the true nature of the syndrome. The fact that the state was entirely removed in both cases, though persistent long after the antecedent depression, was positive proof of the benign character of the paranoid trend in both.

Henry A. Cotton: The writer discussed the first fundamental principles concerned in the consideration of Kraepelin's classification whether or not dementia precox and manic-depressive insanity should be considered as distinct entities.

Further evidence is produced which would seem to place manic-depressive insanity and dementia precox in the organic rather than the functional group.

The relation of chronic infections in producing definite specific cerebral toxemia is discussed at length.

The fact that the so-called functional types harbor multiple foci of chronic infection cannot be denied by anyone who has made a search for such infections.

Clinical evidence would support the fact that there is definite relation between chronic infections and the psychosis.

As a result of eliminating these infections in the last four years the recovery rate has increased from 37 per cent (spontaneous recovery rate for a ten-year period prior to 1918) to an average of 85 per cent.

Chronic infections are located in the teeth, tonsils, gastrointestinal tract, and genitourinary system.

The writer concludes with the following questions:

Are we justified, in view of the above facts, in considering manic-depressive insanity and dementia precox as distinct and definite entities? The fundamental etiology in both groups is the same, differing only in the duration and extent of the infection.

Are we justified in continuing to classify these groups as functional, or would it not be more correct to place them in the toxic group?

Have the results obtained in the last three years, wherein the discharges in this group have increased from 37 per cent to 85 per cent, substantiated our viewpoint or not?

Have any other methods produced similar results?

Can we continue to ignore chronic infections as a factor in producing the so-called functional psychoses? If the clinical pathological evidence is not sufficient to establish this fact, what other facts are needed to convince those who are skeptical?

Dr. Smith Ely Jolliffe said that what had impressed him most in his review of the subject was the relative fruitlessness for further advance of the general historical method which reached its highest pinnacle in the Kraepelinian psychiatry. It would be greatly remiss on his part, he said, to minimize in any way the enormous strides taken by Kraepelin ahead of his forebears. The newer concepts of the manic-depressive psychoses; the value of lumping the broad group with the effort to get at more or less fundamental trends; this tendency to study general life reactions as expressions of the personality, *i.e.*, the organism as a whole, was so great a step beyond the prevailing conceptions before Kraepelin welded the older material into newer forms, that the impress left by him upon psychiatry would be enduring and constitute a definite contribution. The further advance, however, could not come, as he saw it, with the elaboration of the too static concepts of the descriptive psychiatry. Behaviorism from its descriptive aspects had reached a high grade of excellence, and although not by any means exhausted, something further, deeper, and more fundamental was required. This, Dr. Jelliffe believed, was met in the so-called newer psychiatry, the dynamic psychiatry, originally glimpsed in the ideas of Democritus, Heraclitus, Protagoras; seen somewhat in Hippocrates, growing dimmer in the works of Galen, and more or less eclipsed beneath the burden of ecclesiastical authority, until the coming forth of the renaissance in Galileo's ideas of dynamics, Bacon's revived emphasis, in the psychiatry of Reil, of Stahl, of Maudsley, and now in a more specific and definite mode of investigation the psychiatry of the unconscious founded upon the Freudian hypotheses. How prolific these newer ideas were could be seen in the work of Bleuler, particularly in Germany; of Schilder, Pötzl in Austria; of Hart, Stoddart, Jones, in England; of Flournoy and Claparede, in Switzerland, and as reflected largely in the work in this country by Meyer, Kempf, White, and many others. The entire list of contributors could not be given. Only certain adherents here and there could be mentioned in these extemporaneous remarks.

Dr. Jelliffe called attention to a remarkable pencil drawing of majestic oaks which had adorned the wall of their meeting room ever since the New York Psychiatric Society had been founded. He ventured to call attention to a fact reflected by the discussion, and repeated throughout the great mass of literature on the manic-depressive psychoses, that whereas we had detailed descriptions of this and that leaf, their variations in shapes, in sizes, in contours,

color, heaviness or smoothness; comparisons between clusters of leaves in the right-hand corner and the left-hand corner; groupings of branches here, contrasted with branches there; whereas, to further use the analogy of the drawing of the tree, that an integral calculus complexity of relations of the surface-bearing manifestations of the tree were lying all about us—these were the details of a descriptive psychiatry—what was now needed was to get inside the tree—go down the stems and branches and trunk and get at the real reasons why all the variations were made possible. This, Dr. Jelliffe maintained, was the contribution that the dynamic psychiatry hoped to offer.

He said that he had attempted to present before this society some formulations concerning what he had termed *Paleopsychology*. Certain ideas had been advanced founded not on purely *a priori* theoretical speculations, but on definitely studied material. This data had been derived not alone from the narrower field of so-called peculiar conduct, termed psychoses, but had embraced psychoanalytic investigation of many hundred individuals. He had little patience, he said, with the concepts of normal and abnormal, statically and socially pragmatic though they might be; dynamically they were to be rejected, as interfering with the capacity of analyzing data. They were arbitrary and usually highly prejudiced preconceptions, almost universally reducible to mirror reflections of individual predilections. The material had all been studied with the view of obtaining some fundamental principles of a pure science of conduct on biological foundations. It was of little moment whether variations in conduct were shown as physical disease through metabolic disequilibrium, or in disturbed social behavior. Any formulations which claimed to be fundamental would have to offer a comprehending look into the individual, whether it showed up at a physicochemical level, evidenced by metabolic anomalies, limped at a sensorimotor level in modified capacity to place the organisms' receptors in contact with useful stimuli or avoid harmful stimuli, biologically so valued, or whether by a process now conceived of, as dissociation, the organisms parted company with reality in varying degrees and sought the realms of antistatic, or primitive, or phantasy thinking.

Dr. Jelliffe feels that unless a formulation could be reached, which was just as valuable in its application to an understanding of certain types of chronic or periodic nephritis, as of the periodic types of a manic-depressive psychosis, we were as far away from understanding the one as the other. He feels that the formulations of a *Paleopsychology* really offered a partial look into a reconciliation of these two widely separated situations.

He said that this symposium had been arranged rather rapidly, since he had hoped to have presented some work which interested Dr. White and himself and which was being carried out by Dr. Lewis, who was to have been the speaker, at St. Elizabeths Hospital. This work presented the pathological aspects of the problem and brought out the point of view that the speaker had spoken of in

season and out of season, namely, that function, as revealed in the personality wishes (largely to be found out by study of the unconscious) produced definite and registerable effects not only in social conduct but on organ structures. Hence his thesis this evening that it was necessary to get below the leaves of the tree, *i.e.*, purely descriptive levels, whether in pathology or psychiatry, down to the roots of the problem.

These roots lie in the *unconscious*. Dr. Jelliffe said he had once before attempted to construct a rough scale of stages in psychosexual evolution on geological horizon notions. In this rough diagrammatic idea of the unconscious inheritance of functional adaptation to reality which was constantly being structuralized through organs, and whose present-day integrations were largely observable through the psychological tool of symbolization, he had followed Freud's general outline and spoken of Archaic, Organ Erotic, Narcissistic, and Social Stages. He would not attempt to go over the psychological fossils which were conceived to be characteristic of the various horizons and their subdivisions. Nor was there time to discuss the significance of these symbols in terms of dynamic energy content. Several years ago he had spoken of the symbol as an energy container, and he wanted only to call attention to the general formulation that maladaptation in specific bodily function, no matter at what level it shows itself, can be correlated with the presence in the material obtained by the psychoanalytic investigation of symbolizations belonging to older levels of psychosexual evolution. It is immaterial at this point whether these are to be phrased as "fixations" due to repression in the strict Freudian terminology. We are here more concerned with the problem of the functional dynamism of symbols. The general doctrinal implication is that the earlier the symbol, the greater its bound energy content. Better, *i.e.*, psychosexually more advanced symbolizations deliver over the energy in better biological adaptation. When the organism has to get itself over, symbolically, by older tools, it has to work harder.

As a Ford tractor plow can manage a Dakota farm infinitely better than an old Egyptian tool, so a later evolved symbolization does better work in the release of available energy than an older structuralization.

Applying this thesis to the problem of the manic-depressive psychoses, Dr. Jelliffe postulated the root difficulties seen to lie in the strata situated between the upper narcissistic and lower social levels. He did not propose to discuss the question of periodicity at this time; it was too complicated. He could only say that the attack was, in his experience, invariably conditioned by a graduated loss of the libido object. In his general experience that had nearly always possessed narcissistic traits. The ego was usually wounded at the homosexual level. In the analysis of this he wished to present a general scheme to offer some light on the possibilities in the unconscious symbolizations. At the upper narcissistic levels, in terms of object choice, he would formulate four stages: Thus, assume the

object choice to be homosexual, M to M or F to F. Each individual, psychosexually speaking, is bisexual. Thus, each has a male and female component. Libido attachment therefor can be represented in four different ways, all of which present their characteristic symbolizations in the psychoanalytic technic. One might even say they are more or less inferable by direct observation of structure, but this is being worked out by such students as Kretschmer in his *Körperbau and Temperament*, and by the studies of Lewis to which reference is made. The "Pyknische" type of Kretschmer has a number of organ correlates, and, as the speaker maintains, their symbolic correlations. The last are the most specific; the structural end products still belong in the difficult field of descriptive material. *That the two must be welded* is the dynamic contention. *Structure and function are correlates*, but the dynamic psychology believes in laying accent on *function as determinant of structure*, rather than the reverse.

These four general trends then show two as masochistic and two as sadistic. The lowest is the masochistic (female component) desire to be overcome by the female component of the object (mother imago). The next is the masochistic component that desire to be overcome by the male component in the object (father imago). A third is the sadistic (male) desire to overcome the male component in the object, and that which lies closest to finding a dynamically unopposed preponderance to the heterosexual object is the sadistic component overcoming the female component in the homosexual object.

These homosexual matings can be seen with the naked eye, and when overt, *i.e.*, inversion is objectified, the conflict is released enough at least to save the physical structures, sometimes the mental, but nearly always the spiritual values suffer. Just what is here meant as spiritual we have not the time to discuss.

In nearly all of my material the manic-depressive patients have been married. One may infer, from conscious criteria, that the heterosexual goal has been reached, but study of the unconscious has revealed the presence of otherwise interpretable data. Here again a rather schematic separation of stages may be seen, quite analogous to the homosexual stages. Here M and F as structures are object choice libido expressions. But in the same terms as before. Each male and each female are psychologically bisexual. Hence the same masochistic and sadistic components activities may be posited, thus: the psychoanalytic technic may show the prevailing symbolizations to comport to the masochistic desire to be overcome by the female component (mother imago). These, in general terms, are the men who get depressed because their wives or sweethearts do not mother them enough. They do not cuddle and kiss and sympathize with them in their sorrows. One half of my material of male patients, now some ten or twelve in number, analyzed, show this mechanism in the depressed phase of the attack. Then there is the masochistic component that seeks satisfaction in the male aspect of the female

(father imago). In conscious observation these are the husbands who are looking to be directed. Their wives manage them by force rather than by sympathy. The women wear the pants in the family combination. Here more often the attack is precipitated when the wife gets busy managing somebody, or something else. The object has become vitiated, and regression, introversion, and depression follow out the loss of this libido to be directed. Very frequently money losses come in here as unconsciously intermingled with the female component. Passive, pederastic symbolizations appear in the unconscious and are run away from.

More nearly approaching the upper levels of adult psychosexual evolution are the sadistic overcomers of the male component in the female. In a manner of speaking such individuals fight their father imago behind the backs of their women folk. The wives are usually vigorous ones, sometimes husky. The attacks are frequently manic, and the unconscious is chasing the male in the psychoanalytic material.

Finally the milder types comport more to the ideal formulation, the sadistic overcoming of the female (mother imago) component. Here, although in a sense the healthiest formula is found, the mother imago stage lacks proper evolution.

I am unable at the present time to present any statistical material bearing on the relative importance of these eight stages, according to the general symbolizations of which nearly all of my patients have been arrangeable. The general scheme I have presented is a one dimensional scheme. Life is four dimensional and a host of complex integrations need to be discussed before we are even in search of the haven sought. This overschematization even tends to defeat its own purposes, but at all events it is here brought as a contribution to the discussion.

At the present time the number of cases of manic-depressive psychoses whose analyses have been reported in sufficient detail to be integrated into the general formulation here rapidly sketched are very few. It may be at some future time I can take those of Dooley, Binswanger, and others, and present them in the light of the present scheme. At any rate, my own material, when so arranged, offers me considerable interpretative satisfaction, and again at times some very great assistance in my therapeutic efforts.

CURRENT LITERATURE

I. VISCERAL OR VEGETATIVE NEUROLOGY.

1. VEGETATIVE NEUROLOGY.

Hildebrand. NEUROPATHIC JOINT AFFECTIONS. [Archiv für klinische Chirurgie, March, 1921, CXV, No. 3.]

In the study here given Hildebrand says he has been unable to find joint lesions such as are present in tabes and syringomyelia from lesions in the cerebral levels.¹ Injury of peripheral nerves, however, entails identical changes. These were present in an extreme type in two cases described. One of the cases was an actual neuromatous elephantiasis of one leg, for which spina bifida was responsible. The patient was a man of thirty-three; talipes developed at the age of three, and paralysis of that leg at twenty-five. Healing after an operation on a neuropathic joint affection is liable to be defective; in tabes the bones show but scant tendency to repair. The author's hypotheses to explain the anomalies are interesting but not sufficiently informed.

Rice, L. PROGRESSIVE MUSCULAR DYSTROPHY. [Tex. State Jour. of Med., May, 1921, XVII, No. 1.]

This interesting case report is of a patient who had been under irregular observation for eighteen years. The initial symptoms were inability to skate. In the next ten years five entries were made in his health record in the United States Navy, and in each of them mention was made of an apparent atrophy of the calf muscles. The patient suffered no discomfort, and performed his duties as an electrician during this period with no difficulty, but he noticed that he worked more slowly, and toward the end of the period he sometimes stumbled while walking over decks at night. A year later, he noticed that his toes would drag while walking. He had to lift his feet higher than usual to prevent this stumbling. A diagnosis of "progressive muscular dystrophy" was recorded. Four years ago the patient was given shore duty because his footing became insecure, and he often fell during rough weather at sea. June, 1917, he was sent to the electrical school at New York as an instructor. The physical examination in September, 1918, revealed a marked atrophy of all skeletal muscles. The arms and legs were small and were weak. Double foot drop was present, and the anterior and peroneal muscles had atrophied markedly. The abdominal muscles were thin and the shoulder girdle was very loose. The trapezius on each side was prominent by comparison, and had suffered much less than the other muscles of

¹ See Petró and Brahme, original article, this issue, for bony changes due to midbrain disease.

the upper chest. The platysma was well developed and there was no atrophy of this muscle. The patient had lost 27 pounds during the past six years, and this loss had reached 33 pounds by June, 1920. The superficial and deep reflexes, though diminished, were all present, the sphincters were not affected, and no sensory disturbances of any kind could be found. R. D. absent. The Romberg was negative and the pupils were equal and normal. The fundi were uninvolved. The spinal fluid was clear, under no pressure, and contained four cells per cubic-millimeter. The Wassermann was negative, Fehling's positive, and globulin was not increased. The patient was active mentally and no tremors were present. The blood Wassermann was negative. No abnormality could be seen in roentgenograms of the head. Further investigation became impossible as the patient left in 1920.

Giorgi, E. OSTEOPSATHYROSIS AND THE ENDOCRINE GLANDS. [*Clinica Pediatrica*, April, 1921, XXXI, No. 4.]

In this case there was a remarkable fragility of the bones in a ten months infant, of tuberculous and syphilitic ancestry, which was present in association with a chronic diffuse interstitial inflammation of the hypophysis and a hypoplasia of the gonads. She later had hemorrhages in the suprarenals which were evidently a late acute process. The child seemed healthy until the first fracture appeared. This was followed by profound and continuous (autointoxication) from the cytolysis.

Cohn, S. GOUT IN RELATION TO THE NERVOUS SYSTEM. [*Deutsche Med. Woch.*, April 28, 1921, XLVII, No. 17.]

The author by a roundabout method comes to the conclusion that a precondition for the genesis of gout is an increase in the sodium salts found in the organism. As the axis-cylinder is the only organ of the body that contains free sodium salt as well as sodium salts combined with albumin, as Lydenham many years ago insisted upon, clinical observations lead him to believe that the nervous system is an important factor in the production of gouty deposits.

Banus. MUSCULAR TONUS. [*Arch. de med., cir. y esp.*, November 15, 1921.]

The author says that it has been definitely established by a number of independent investigators that there are two perfectly distinct elements in muscular activity. This physiological duality has a corresponding anatomical basis, and the organs and nervous system which regulate both are perfectly distinct. Voluntary muscular contraction represents the kinetic element of muscular action. Its organ is the muscular fiber and its nervous system the general sensori-motor system or pyramidal tract. Tonus, on the other hand, represents the static elements of muscular contraction. Its organ is the sarcoplasm and its nervous system a complex structure known as the extra-pyramidal system. All

forms of voluntary kinetic activity have their equivalent in static involuntary activity. While in the physiological condition both forms of muscular activity go hand in hand, certain pathological changes may dissociate them and give rise to syndromes characterized by disturbance of muscular action.

Wassink, W. A. TREATMENT OF ARTHRITIS DEFORMANS. [Nederlandsch Tijdschrift v. Geneeskunde, May, 1921, I, No. 21.]

A distressing case of deforming arthritis of the knee in a woman of sixty is here reported upon in which excellent results followed clear analysis of the situation. He became convinced that the pains were from neuritis, and the temporary relief from transient blocking of the nerve encouraged him finally to sever the nerve fibers innervating the capsule. He describes his technic for this and the benefit therefrom. There has been no return of the pains during the year since, and even if they should return later this year of relief justifies this symptomatic intervention. It restored practically the use of the knee.

Boeke, J. STRIPED MUSCLE FIBERS AND LANGLEY'S RECEPTIVE SUBSTANCE. [Brain, April, 1921.]

The author here gives a summary of the later studies on the histological details of the muscular structures. He states that the old conception that each cell is a single organism, is undergoing revision. Even such a structure as a single adult involuntary muscle cell, such as is found in the small intestine, is probably derived from more than one cell of the embryonic syncytium from which it develops. Again, in the case of the cross-striated voluntary muscle fibers, it has been shown, not only that they are built up by the end-to-end junction of a number of cells of the muscle plate syncytium, but also that more than one muscle plate or myomere may contribute to the formation of a single muscle fiber. He next emphasizes the exquisite harmony which exists between the different tissue elements and the domination of the individual over those elements which compose it, viz., the cells. He next describes the intraprotoplasmic ending of nerve fibers in muscle fibers, voluntary or involuntary, and emphasizes the fact that in regeneration of nerve fibers, the neurofibril is conducted to its termination within the protoplasm of the bridging cells. Hitherto it has been thought that in all vertebrates but *Amphioxus* there lies a stretch of undifferentiated granular sarcoplasm between the terminal ramification of the neurofibrillæ and the contractile substance, the moyofibrillæ. All will maintain that this is correct, if ordinary staining methods are used. But, as the author has shown, with carefully stained Bielschowsky preparations, a different picture is seen. A delicate reticular formation is revealed, the "periterminal network," between the neurofibrillæ and the sarcoplasm of the muscle. Traces of this network have been seen by previous observers.

He believes it is of sarcoplasmic origin and not neurofibrillar in nature. It disappears more slowly than the neurofibrillæ in cases of degeneration following experimental nerve section. These and other facts suggested to the author that in the periterminal network there exists a morphological basis for Langley's receptive substances and that such a "periterminal network" is demonstrable, not only in the case of motor nerve endings, but also in several of the various types of sensory corpuscles, such as those to be found in the pig's snout.

Lereboullet, Izard, and Mouzon. MYASTHENIA GRAVIS WITH OSSEOUS CHANGES. [Bull. et Mem. Soc. Méd. des Hôp. de Paris, December 30, 1920.]

The authors here record the case of a woman, aged thirty-three, who had suffered from myasthenia gravis for thirteen years, the diagnosis having been made by Goldflam himself. The outstanding features in her case were, (a) the slow course of the disease, (b) the occurrence of changes in the bones of the face; and the association of obesity and amenorrhœa. The bony changes consisted of a deformity of the superior maxilla, giving rise to a deviation of the central and lateral incisors, which were projected almost directly forwards and upwards, with wide gaps between each. X-ray examination showed that the lesions were due to well marked decalcification of the jaw.

Högler. DIAGNOSIS OF NEUROMYOSITIS. [Wien. Arch. f. inn. Med., December 15, 1920.]

Högler who records an illustrative case in a woman aged thirty, the following conditions must be excluded in the diagnosis of neuromyositis: (1) Trichinosis. In typical cases the masseters, temporal muscles and laryngeal musculature are chiefly affected. Severe gastrointestinal disturbances are also invariably present. Persistent eosinophilia is generally regarded as characteristic of trichinosis, but transient eosinophilia, which may range from 7 to 16 per cent, may occur in neuromyositis. (2) Polymyositis. In this condition inflammatory swelling of the muscles, oedema of the skin, and violent muscular pains are the principal symptoms. Neuritic symptoms are absent. (3) Polyneuritis, especially alcoholic neuritis. In most of these cases the neuritis affects definite areas and leads to neuritic atrophy. Histological examination in polyneuritis shows simple muscular atrophy, apart from the nerve changes. (4) Typical progressive neural muscular atrophy. This disease usually begins in the small muscles of the foot, more rarely in those of the hand. Usually it gives rise later to muscular atrophies and contractures. Unlike typical polyneuromyositis, it is almost always hereditary and familial. The other myopathies, such as myositis ossificans and progressive and regressive interstitial calcinosis, are not likely to cause difficulty, and can be distinguished by X-ray examination. [B. M. J.]

Maas, O., and Zondek, H. FINDINGS IN A CASE OF DYSTROPHIA MYOTONICA. [Zschr. f. d. ges. Neur., Vol. LIX, p. 322.]

The writers find in the case reported some atypical symptoms. Sexual libido was diminished though the only sign of testicular atrophy was that the consistency was somewhat softer than normal. Disturbances of inner secretion were manifested in strong pigmentation of the nipple areola and also polyuria. The nose was strikingly large while protuberant lips also pointed to disorder of the hyphophysis. Markedly low blood pressure (60 mm. Hg) and blood sugar content 0.04 per cent suggested involvement of adrenals. There were evident excessive elimination of sodium chlorid by the urine, probably related to the patient's polyphagia, normal calcium and phosphoric acid metabolism, albumin metabolism lowered as usual in the myxedematous, with tendency to nitrogen deposit. Basic metabolism during bodily rest (consumption of oxygen) strikingly low, 2.6 ccm. per kg. of body weight as over against 3.4 ccm. as normal while with the body at work the consumption of oxygen was increased perhaps three times that of normal, probably on account of the tendency to fatigue and the inefficient method of using the muscles. Strong dilatation of both halves of the heart, bradycardia, very soft tones, with the electrocardiogram lengthened A-V interval, apparently not due to length of period of transmission, but to heightening of stimulus threshold of the ventricular muscles. The muscles of the upper arm were atrophied which is not true of the most of these cases. Weak faradic stimuli to the nerves brought a slowly increasing contraction only after a minute long stimulus which also is a so far unobserved a reaction at least in such a degree. Argyll-Robertson pupil was present and retardation of convergence, although the blood repeatedly showed negative Wassermann and there was no other indication of syphilis.

Fischer, L. CLINICAL, PSYCHOPATHOLOGICAL AND ANATOMICAL CONTRIBUTIONS TO DYSTROPHIA MYOTONICA. [Zschr. f. d. ges. Neur., Vol. LVIII, p. 254.]

Fischer lays emphasis upon the psychic symptoms that in general accompany myotonic dystrophy and adds the description of a patient who developed also a true psychosis in the thirty-third year. The typical symptoms are deficient mental development without gross intellectual disturbances, a certain lack of interest and stupidity, a distrustful nature, emotional coldness, lack of ordinary friendliness, distaste for work and lack of trustworthiness. In the actual psychosis there was excitement with anxiety with ideas of persecution and hallucinations of hearing alternating with symptoms of stupor, stereotypy, negativism, but with interest retained in the environment and in the events of the day, complete presence of mind and absence of intellectual disturbance. There was a periodic rise and fall in these two groups of symptoms perhaps every three months, although externally there was no occasion for this.

Fischer believes that such a psychosis as well as the general psychic symptoms are associated in origin with the endocrinous situation and are not to be attributed to hysteria, epilepsy, syphilis or alcoholism, but that these rather all have a common origin with the symptoms mentioned. For in other diseases of endocrinous origin actual psychoses may develop. He cites an anatomically investigated case, clinically reported earlier by Ochs, in which there was no evidence of affection of the endocrinous glands or of the central nervous system, but he still maintains the position that myotonia dystrophy has a central neurogenous origin.

Haushalter, P. AMYOTONIA CONGENITA. [Arch. de Méd. des Enfants, Paris, March, 1920.]

The author here adds three more cases of Oppenheim's disease to the list of 155 cases collected some time ago by Comby. In Case 1 the infant's respiration was almost entirely diaphragmatic owing to the atony of the inspiratory muscles; also the mother while pregnant with this, her eighth child, rarely noted any movements of the fetus. In Case 2 the child up to four years of age had remained flabby and inert, keeping whatever position he was placed in and then underwent a rapid transformation. He gradually learned to walk, to carry things to his mouth, to get up from the floor, and even to dress himself. At five he could talk very little, but after five he rapidly learned. He started school at seven, wrote at eight, and at eleven he was in classes with boys of his age and did not seem to be their inferior mentally. There was no disturbance of digestive, respiratory, urinary or circulatory functions. His body was well proportioned. There was, however, a diffuse, generalized, muscular atrophy, in spite of which he could walk and run like other boys, without becoming overfatigued. Owing to the suppleness of his joints he could execute many contortionist tricks. In Case 3 the amyotonia, predominating in the lower extremities, accompanied by diffuse muscular atrophy, continued to progress until death at twelve from bronchopneumonia. The habitual posture assumed by the child, together with the looseness of the joints and the muscular atrophy, had finally brought about a strange, doubled-up condition of the body, the left side of the thorax resting on the anterior wall of the abdomen, the left hip joint on a level with the axilla, with excessive scoliosis similar to that sometimes seen in myopathies.

Bouttier, Marie, and Bertrand. ERB-GOLDFLAM'S MYSTHENIA. [Annal. de Méd., September, 1921.]

This present study attempts a correlation between the clinical and post-mortem findings of a case of progressive bulbospinal myasthenia. A woman of forty suffered from this disease in a severe form. She had marked dyspnoea, due to paralysis of the respiratory and bronchial muscles. Phonation and deglutition were impossible, and cardiac failure

had set in. Adrenalin was of no value. They then treated her by injections of the whole suprarenal gland. This had a marked effect for the patient was able in a few days not only to swallow well, but to get up and go for short walks. Five months later, however, the symptoms returned, the remissions became shorter, and she died rapidly of pulmonary edema. Postmortem revealed acute nephritis and pulmonary edema as direct causes of her death. Histological examination revealed the suprarenal bodies to be extremely thin and in a condition of hypoplasia. The zona reticularis and the medulla were separated by a layer of enormously dilated capillaries; there was advanced cytolysis and an infiltration with lymphoid elements. The muscles of the body were studded with lymphoid nodules, while the thyroid gland showed a diffuse intervesicular infiltration with leucocytes. The fibers of the heart muscle were separated by edematous fluid, together with large numbers of lymphocytes, mononuclears, and macrophages. The central nervous system appeared to be unaffected. In consideration of these findings they are led to the hypothesis that this type of myasthenia is probably connected with lesions of the adrenomuscular vegetative nervous system.

Gibson and Martin. CREATIN FORMATION IN PROGRESSIVE MUSCULAR DYSTROPHY. [Jour. of Biol. Chem., Dec., 1921, XLIX, No. 2. J. A. M. A.]

Ingested creatin was promptly and completely eliminated chiefly as creatin, in part as creatinin, in an advanced progressive pseudohypertrophic muscular dystrophy case described by Gibson and Martin. The creatin and to a lesser extent the creatinin excretion was increased as the result of a greater protein intake. This increase is obtained only from the protein that catabolized, including gelatin, and not from that retained for growth purposes. Preformed creatin in the diet was not an important factor to be considered in interpreting the results. The substitution of the arginin-rich protein edestin for 0.8 of the protein of the diet failed to increase the creatin excretion. Hordein added to the diet increased the total nitrogen and urea elimination, but probably was without effect on the creatin; this observation is indicative only. Ingested sarcosin and asparagin did not lead to an increase in the creatin excretion. Glycocyamin was converted in part (at least 36 per cent) into creatin. It is probably not a stage in ordinary creatin formation. Experiments with cystin have been negative.

Zuccola. MYASTHENIA GRAVIS. [Policlinico, Oct., 1921, XXVIII, No. 4.]

This case report is of a boy of seven years who developed headache, strabismus, vomiting and weakness of muscles. After two months the myasthenia was so extreme that the boy could not hold up his head. It was the second similar case of the kind during a small epidemic of

poliomyelitis in a small locality. The other patient died with bulbar symptoms, and pneumonia from aspiration. The condition in the boy has persisted stationary to date, with slight ups and downs. The onset had resembled that of poliomyelitis and the problem of the relation of certain myasthenia cases to encephalitic lesions is raised.

2. ENDOCRINOPATHIES

Blankinsop, R. C. INCIDENCE OF GOITER IN WISCONSIN. [Wis. Med. Journ., April, 1921, XIX, No. 11, J. A. M. A.]

In the examination of 13,706 entering students at the University of Wisconsin, simple unclassified thyroid enlargement was found in 28 per cent and exophthalmic goiter in 6 per cent. The proportion of males to females was approximately 1 to 2 in both simple and exophthalmic goiter. Blankinsop believes that this is a fair index of the incidence of goiter in Wisconsin.

Castillo, Nájera. ENDEMIC GOITER IN MEXICO. [Rev. Mexicana de Biología, Mex. D. F., November, 1920.]

The author shows that goiter is prevalent in certain parts of Mexico. In parts of the state of Guerrero its incidence rising to 25 per cent of the population. It does not seem to be endemic in the central states, nor in the federal district nor in the peninsula of Lower California. The province of Mexico has a few endemic foci, as also the states on the west coast, and Vera Cruz has certain zones of high 10 per cent incidence. Two cases are reported in which 50 cg. of thymol twice a day for three months, with intervals of five to ten days each fortnight, was followed by reduction of the goiter.

Kjölstad. THE INCIDENCE OF GOITER IN DIFFERENT SOCIAL STRATA. [Norsk Mag. for Laegevidenskaben, October, 1921.]

Goiter among school children in Telemarken, the district in Norway in which goiter is most common, is investigated. A thyroid which was palpable but not visible was regarded as the average finding, and only when a swelling of the thyroid could be seen while the patient sat upright was it regarded as pathological. This distinction between normal and pathological is rather arbitrary, but when in doubt as to the line of demarcation between the two, he regarded the condition as normal. The gland was enlarged in 309 out of 537 girls (57.5 per cent), and in 285 out of 510 boys (55.8 per cent). When he classified these school children according to their social status he found that the lower this status the higher was the incidence of goiter. Thus among the boys belonging to the professional classes the incidence of goiter was only 33.3 per cent; it was 55.7 per cent among boys of the farmer class, and 61.3 per cent among the sons of laborers. A similar state of affairs was found among the girls belonging to the above three social strata, and the author there-

fore concludes that hygienic factors determined by the social status of the child play a considerable part in the appearance or nonappearance of goiter. He admits, however, that other factors, such as the character of the drinking water, may also play an important part.

Monge, C. ENDEMIC GOITER. [*Cronica Méd.*, Lima, January, 1921.]

This paper deals with a partial survey of goitrous conditions in Peru with some illustrations showing the unusually large size of the goiters encountered in the Urubamba district. He investigated in detail fifty of the hundred cases he records, and comments on the frequent tendency to the exophthalmic goiter type. About 2 per cent of the inhabitants were cretins in certain districts, and a cretinoid condition was still more common. Large studies of the population are difficult to carry on.

II. SENSORI-MOTOR NEUROLOGY.

1. PERIPHERAL NERVES

Redfield, E. S., Redfield, A. C., Forbes, A. B-RAYS AND ELECTRICAL CONDUCTIVITY. [*Am. Jl. Physiol.*, 1922, LIX, 203.]

Observations upon the sciatic in frogs shows that peripheral nerves are very resistant to the effect of radiation. After intense radiation with B-rays there is loss of function which affects both conductivity and excitability. There may be a marked latent period between the termination of radiation and loss of function. Correlated with this loss of function there is an obvious physical change in the radiated nerve, which becomes stiff. Microscopic examination after treatment with the Marchi method shows, according to the authors, "fatty degeneration of the myelin sheath."

Gerber, R. ARTHRITIC MUSCULAR ATROPHY WITH REPORT OF A CASE SIMULATING ANTERIOR CRURAL AND OBTURATOR NEURITIS. [*Neurol. Bull.*, 1921, III, 338.]

The author gives the history of clinical observation on arthritic muscular atrophy from the time of Hippocrates to recent times. Brown-Séguard appears to have been the first to ascribe it to reflex irritation, acting through the vasomotor system. Vulpian believed it to be due to reflex influence acting on trophic centers in the cord. The first experimented investigations were by Valtat and Dide (1877), while Raymond, in 1890, found that experimentally produced acute arthritis in dogs was followed by muscular atrophy on the side with intact nerve-roots, but was much less, or absent, on the side on which the corresponding dorsal nerve-roots had previously been cut. These results were confirmed by Hoffa in 1892. None of these observers discovered any spinal cord lesion, but Mignot and Mally (1900), in similar experimental studies, reported finding a diminution of anterior horn cells in the lumbar cord after experimental arthritis of the knee-joints. Allen (1911)

repeated Raymond's experiments and found that, as soon as the inflammatory reaction in the joint subsided, there was wasting of the extensor muscles of the joint. The fibers showed simple reduction in size on microscopical examination, but showed absolutely no other pathological change. The peripheral nerves showed no degenerative changes. On the side on which the dorsal nerve-roots had been cut the atrophy was less marked. Nathan (1916), in a discussion on this subject, is quoted as saying that although some nervous symptoms may be reflex in origin in cases of arthritis, yet others are not so. In the case of polyarthritis he believes that the spinal joints may also be involved, with the production of both spinal cord and spinal root symptoms. It is not clear, however, from the references made to this paper how its writer explains the wasting following a monoarthritis. Gerber describes a case of arthritis of the left hip where the nervous symptoms resembled those of a lesion of the anterior crural and obturator nerves. There was hypotonus and weakness of ilio-psoas, sartorius, and quadriceps, and wasting of the latter group of muscles. Electrical examination revealed simple diminution of excitability in the affected muscles. The adductor group of muscles were similarly affected, but to a less degree. The tendon-jerks were all normal in the left leg. No very definite sensory change was found objectively, but the patient complained of severe pain in the groin, left hip region, and on the front of the left thigh. This last was the initial symptom and the pain was shooting in character and ran down to below the knee on the inner side of the leg. X-ray examination revealed hypertrophic osteoarthritis of the left hip. Gerber postulates several possible factors in such a case of arthritic atrophy; disuse from fixation, loss of the normal flow of afferent impulses from joint and muscle, direct action of toxins in the adjacent joint on the muscles, and finally, an essential factor must be a reflex action from the inflamed joints, via the ventral horn cells. [F. M. R. Walshe, Med. Sc.]

Babinski. DEFENSIVE REFLEXES. [Lancet, June 3, 1922.]

Babinski said that the term "defensive reflexes," chosen as title of his lecture, had been employed for a considerable time and was useful since it did not imply any definite hypothesis as to the mechanism of the motor reactions described under this category. He then proceeded to describe these motor reactions, discussing first those which are produced in the stimulated lower limb, excluding reflex movements of the toes. He discussed the resemblance between pathological and physiological reactions, giving as criterion of pathological defensive reflexes the *reflex flexion of the foot* elicited by stimulation of the foot or leg, *exclusive of the plantar region*. The importance of this sign in neurology is that it is easy to demonstrate, is frequently present, and reveals a lesion of the pyramidal path. The close connection between this sign and the Babinski toe phenomenon (reflex extension of the toes, especially the hallux, together with reflex abduction of the toes) is clear, the one completes the other.

As regards their mode of production, they would seem to have a common pathogenic origin though one may be present without the other. In certain cases, admittedly rare, the presence of a pyramidal lesion may be revealed by the presence of reflex flexion of the foot, even when the extensor toe phenomenon is absent.

Babinski traced the connection between the foregoing phenomena and the exaggeration of the tendon reflexes, which also constitutes a sign of disturbance of the pyramidal path. In cerebral hemiplegia, exaggeration of the tendon reflexes may coexist with feebly marked defensive reflexes; sometimes the converse occurs at the onset of a hemiplegia. In spasmodic tabes dorsalis (Erb-Charcot type), where the tendon reflexes are very brisk, reflex flexion of the foot may be feeble or absent. On the other hand, in Friedreich's ataxia the abolition of the tendon reflexes is in marked contrast to the intensity of the defensive reflexes which is often noticeable. The same contrast occurs in ordinary tabes when associated with a pyramidal lesion. In sclerotic lesions of the spinal cord it is common to observe the Babinski toe phenomenon and the defensive reflex of the foot coexisting with tendon reflexes of moderate intensity. In spastic paraplegia "en flexion," where the defensive reflexes attain their maximum intensity, the tendon reflexes are sometimes exaggerated, but may also be normal or even much diminished. The reflexogenous zone may be more or less widespread, and may extend to the abdomen and thorax. In certain cases its upper limit corresponds to the lower level of a spinal compression. This fact affords us information which, taken together with the level of the anesthesia, may be of diagnostic value in localizing the position of an intraspinal tumor.

Another problem discussed by Babinski was the difficult question whether the intensity of the defensive reflexes is proportional to the intensity of the lesions. Does it depend on their situation, or on their nature? Generally speaking, the defensive reflexes are more marked in spinal than in cerebral lesions, perhaps because the former are ordinarily bilateral, whereas the latter are usually unilateral. Following total transection of the spinal cord, after a period of shock, more or less prolonged, the defensive reflexes may become very marked, at least for a short time; but, in Babinski's experience, spasmodic paraplegia "en flexion" (termed by certain authors paraplegia of the Babinski type—where the defensive reflexes, extremely marked and persistent, are associated with a fairly obstinate contracture) appears to be associated with lesions which are not accompanied by marked secondary descending degenerations, or even show no secondary degenerations whatever. Defensive reflexes, even when well-marked and associated with severe motor disabilities, do not necessarily signify that the malady is incurable. Thus in some cases of tumor a cure is obtained, with return of the reflexes to normal. In some cases diminution of the defensive reflexes may be taken as a favorable prognostic sign. But in other cases (of total transverse

lesion) their diminution after a previous exaggeration may presage the intensification of the malady and may be a terminal phenomenon.

Speaking of the study of total transverse lesions of the spinal cord, Babinski referred to crossed reactions, and discussed the question whether there are any characteristics indicating that the spinal cord is completely severed. The study of the defensive reflexes during artificial sleep had yielded interesting results. He compared spastic paraplegia "en extension" with spastic paraplegia "en flexion," and the two varieties of contracture termed by him "tendinreflex" and "cutaneoreflex" respectively. In discussing the views of English neurologists in certain vexed questions, he quoted the words "pas toujours du même avis, mais toujours bons amis!"

A few words on defensive reflexes in the upper limb, and a brief rapid summary of certain motor reactions studied by Jarkowski and the lectures under the name of hyperalgesic reflexes (automatergie), which they differentiate from the defensive reflexes, concluded an admirable address, the main points of which were clearly brought out by lantern slides and demonstrations on patients.

Thélin, C. OBSTETRIC PARALYSIS OF THE ARM. [Rev. Méd. de la Suisse Romande, September, 1920.]

Effort had been necessary to liberate the shoulders and trunk after the head had been born. In this case in three months the paralysis had passed.

Langbein, H. NEW TYPE OF OBSTETRICAL PARALYSIS. [Zschr. f. d. ges. Neur., Vol. LIX, 294.]

The author reports a rare case of obstetrical paralysis to which no parallel can be found in the 77 cases reported in the literature. Its occurrence in a spasmodic birth is in itself unusual while in degree and manifestation it conforms to none of the usual types. These affect the upper arm, the lower arm or the plexus in its totality. Only rarely in the first and last types are the true scapular and breast muscles affected. In the case reported the serratus, the rhomboidei, the trapezius inferior were completely paralyzed with no response to electric stimulus. The deltoïd was partly affected with partial degenerative reaction. The biceps, the triceps, the pectoralis major and the latissimus dorsi were weakened and were slightly atrophic but with normal electric reaction. The true Erb's group of muscles, it is seen, were only incompletely involved while those muscles were most seriously affected which usually escape upper plexus paralysis. Anatomically the paralysis must be explained on the basis of a severe injury, perhaps a destruction of the fifth and sixth cervical roots before the departure of the short nerve of the plexus, that is, before its union with the primary plexus trunk and before its exit from the scaleni.

Stefano, S. de. PARROT'S PSEUDOPARALYSIS. [*La Pediatria*, February 15, 1920.]

Thirty-five cases of Parrot's pseudoparalysis; 18 in males and 17 in females are recorded in this statistical summary. The ages at which the condition began ranged from birth to two and one half months, 34.3 per cent being found in the second half of the second month. In 9 cases the onset had not been determined as regards the family history; in 20 cases syphilitic infection of the parents was more or less certain; in 7 cases there had been one or more abortions, and in 7 cases only there was nothing suggestive of syphilis in the family history. Both upper limbs were affected in 15 cases, the right upper limb in 6, the left upper limb in 6, both lower limbs in 3, the upper and lower limbs in 4, and the left upper and lower limb in 1. In all but 7 cases other signs of congenital syphilis were present, especially rhinitis, enlargement of the spleen, and condylomata. The Wassermann reaction, which was tested in 23 cases, was positive in 16 and negative in 6, but in two of the latter the luetin test was positive. As regards the issue of the cases, 17 were lost sight of; of the remaining 18, 4 showed considerable improvement and 14 made a complete recovery. [Br. M. J.]

3. SPINAL CORD.

Galbraith, J. B. D. ACUTE PELLAGRA IN CHILDHOOD. [*Glasgow Med. Jour.*, October, 1921, Vol. XCVI, No. 4. J. A. M. A.]

Galbraith's patient was aged three years and nine months, with the history that for the past month he had been "nervous," easily frightened and upset, and that for fourteen days he had complained of attacks of "drunkenness" when he had to hold on to the table to keep himself from falling. These giddy turns occurred every day, usually three or four, each lasting for about a quarter of an hour. There was no complaint of pain, no vomiting, no eye trouble, no lethargy, and no night restlessness. Previous health had always been good. Mentally he had always been bright and intelligent. The case was thought to be one of cerebellar tumor, but the clinical picture changed completely. The boy became dull and apathetic; ultimately he would not speak even to his parents. Unsteadiness of the gait developed; spasticity of the left side; Babinski's sign on both sides; diarrhea; marked stomatitis. The rash, the stomatitis, enteritis, vertigo, and mental symptoms suggested pellagra. The boy emaciated very rapidly, and became semicomatose. The stomatitis and diarrhea quickly progressed. The skin lesions became more brick-red in color and sunburnt looking, and were traversed by a network of very finely marked fissures. Convulsions appeared on the fifteenth day. Death occurred on the nineteenth day. The brain was markedly edematous. Careful examination failed to reveal any tumor. The choroid plexuses were normal. The spinal cord was congested

and very pulpy, especially in the lower dorsal regions, where the gray matter showed degeneration (perhaps postmortem). Examination of sections of the cord revealed swelling and degeneration of many of the pyramidal cells in the anterior cornua, but nothing to suggest an acute myelitis. There was no definite evidence of tract degeneration, and the myelin sheaths appeared to be normal. The case has special interest because of the controversy regarding the etiology of the disease. The commonly accepted view is that protein deficiency in the food is the main factor in the production of pellagra. In this example the child had been given the diet of a working class family, which presents no gross deficiency of protein.

Plaut. SEDIMENTATION OF ERYTHROCYTES IN CITRATED BLOOD IN NERVOUS AND MENTAL DISEASE. [Münch. med. Woch., March 5, 1920.]

A new technical diagnostic method is here described by Plaut. The rate of sedimentation of erythrocytes in the citrated plasma of 220 cases of nervous and mental disease are reported on. The rate is found to be distinctly different in the majority of cases of general paralysis, neurosyphilis, and arteriosclerosis on the one hand, and the majority of cases of psychopathia, dementia precox, melancholia, and epilepsy on the other. Sedimentation in the former group takes place more quickly; in general paralysis the time is usually one-sixth of that required in dementia precox.

Guillain and Libert. BOVERI TEST OF SPINAL FLUID. [Annales de Médecine, April, 1921, Vol. IX, No. 4. J. A. M. A.]

Guillain and Libert found a positive response to the Boveri test in every one of their forty subjects with various diseases whenever the albumin content of the cerebrospinal fluid was above the normal. It throws no light on the cause of the hyperalbuminosis. The test is made by pouring 1 c.c. of a 0.1 per thousand solution of potassium permanganate on the walls of a tube containing 1 c.c. of the cerebrospinal fluid. With normal fluid there is no change in tint; in pathologic conditions a yellow line appears at the junction of the two fluids, and on agitating the tube, the fluid turns a clear yellow.

Leschke, E. XANTHOCHROMIA IN THE CEREBROSPINAL FLUID. [Deutsche med. Wochenschrift, April, 1921, Vol. XLVII, No. 14.]

Xanthochromia of the spinal fluid, according to Leschke, is caused by the decomposition of hemoglobin. Bilirubin is formed by means of a ferment arising from an action of the red corpuscles on the cells of the spinal membranes. The diazo reaction following the method of Heijmans van den Bergh is the best test. Three hundred ten cases of this condition are collected from the literature. It is found associated with pressure on the cord, hemorrhagic inflammations, and hemorrhage

in the cord and its membranes. It always occurs when red blood corpuscles find their way into the spinal fluid. The Froin syndrome: xanthochromia and coagulation (spontaneously or after addition of fresh serum) is found in only about a fifth of the cases of xanthochromia, and is usually associated with processes which cause the spinal canal to become narrowed.

Loeper and Forestier. LESIONS OF NERVES WITH GASTRIC CANCER. [Arch. des Maladies de l'Appareil Digestif, October, 1921, Vol. XI, No. 5.]

This is a short clinical report of a case of cancer of the lesser curvature with recurring spasm of the cardia. A neuritic lesion found in the vagus is given as the cause.

Guillain, Laroche and Lechelle. THE COLLOIDAL BENZOIN REACTION. [Presse Médicale, September, 1921, Vol. XXIX, No. 78. J. A. M. A.]

Guillain, Laroche and Lechelle state that further experience has confirmed the advantages of their colloidal benzoïn technic as simpler than the colloidal gold test, while the findings are dependable and constant. They parallel the Wassermann reaction in neurosyphilis, as a rule, and seem to be particularly instructive in the acute and subacute cases. When the findings varied from those with the Wassermann test in nonsyphilitic diseases, if there was any discrepancy it was always the Wassermann that was at fault. The reagent is a suspension of 1 gm. of benzoïn resin in 10 c.c. of alcohol, set aside for two days, using only the decanted fluid. They bring the whole subject of colloidal hemolytic tests down to date.

Guillain, G., and Gardin, Ch. WEICHBRODT'S REACTION IN THE CEREBROSPINAL FLUID. [Compt. Rend. Soc. de Biol., June 25, 1921, Vol. LXXXV, p. 143.]

Weichbrodt's reaction is obtained by mixing three parts of 1 : 1000 sublimate solution with seven of spinal fluid. A normal fluid remains clear (negative reaction); a pathological becomes thick immediately if the reaction be strongly positive, or after two or three minutes if feebly. Weichbrodt found a positive reaction especially in syphilis of the central nervous system. The writers submitted fifty spinal fluids to Weichbrodt's test, as also to the albumen test, Nonne phase 1, Pandy's reaction, leucocyte enumeration, Wassermann reaction, and the benzoïn colloidal reaction. They found negative Weichbrodt in amyotrophic lateral sclerosis, polyneuritis, lethargic encephalitis, post-encephalitic Parkinsonism, alcoholic and traumatic epilepsies, and dementia precox. It was slowly and weakly positive in many cases of tuberculous meningitis. It was strongly and early positive in paralytic dementia, tabes, and cerebrospinal syphilis; the strongest reaction was in G. P. I. In all cases showing positive Wassermann and benzoïn

reaction, Weichbrodt's was also positive; it always corresponded with the benzoin reaction, being absent if that were absent, present if present. An isolated positive Weichbrodt does not of itself prove existence of a syphilitic affection; it must be obtained and compared with the other reactions (Nonne, Pandy, Wassermann, benzoin, cellular reactions, etc.). But the coexistence of a strongly positive Weichbrodt (in a few seconds) with ditto benzoin reaction proves the syphilitic nature of an affection of the nervous axis, even Wassermann be negative. [Leonard J. Kidd, London, England.]

Schleissner. HEMOLYSINS IN SPINAL FLUID. [Med. Klinik., October, 1921, Vol. XVII, No. 40.]

Hemolysins in the cerebrospinal fluid, according to this study, afford a reliable index of the presence of purulent and cerebrospinal meningitis as well as affording indications of the progress of the producing process. Before the clinical manifestations showed any improvement, the reduction in the proportion of hemolysins enabled a more favorable prognosis, and this was confirmed by the course. On the other hand, the negative findings with serous meningitis and with convulsions from spasmophilia were always dependable, as also in hydrocephalus, chorea, epilepsy and spastic diplegia. He urges greater use of this Weil-Kafka method by pediatricists; all that is necessary is to add 0.5 c.c. of the sheep blood solution to 5 c.c. of the cerebrospinal fluid. The hemolysins normally in human blood do not get into the spinal fluid in normal conditions.

Stern, L. CEREBROSPINAL FLUID. [Schweiz. Archiv. f. Neurol. u. Psychiatrie, 1921, Vol. VIII, No. 2.]

An article reflecting the views of v. Monakow relative to the circulation of the cerebrospinal fluid, its formation by the plexuses and its relations to the nutrition of the nerve elements of the brain and cerebrospinal axis.

Barker, L. F. NEUTROPHILIC MYELOCYTES IN CEREBROSPINAL FLUID OF A PATIENT SUFFERING FROM MYELOID LEUKEMIA AND THEIR SIGNIFICANCE FOR DIAGNOSIS OF MYELOLEUKEMIC INFILTRATION OF LEPTOMENINGES. [Southern Medical Journal, June, 1921, Vol. XIV, No. 6. J. A. M. A.]

In a single case Barker says it has been possible during life to demonstrate in the cerebrospinal fluid the presence of cells of leukemic origin (myelocytes and, perhaps, myeloblasts). In no other case thus far reported has the presence of leukemic cells in the cerebrospinal fluid during life been described. In the few instances in which lumbar puncture has been done in leukemia, the cerebrospinal fluid has been negative, or has merely shown a trace of blood or an increase of globulin. The presence of cells of leukemic origin in the cerebrospinal fluid probably indicates a leukemic infiltration of the leptomeninges. The

majority of nervous complications in leukemia are not due to a leukemic leptomeningopathy, but to epidural infiltration, to infiltration of the nerve roots or of nerve ganglia, to infiltration of the nervous axis itself or to hemorrhages, degenerations or inflammations.

Baar. INCREASE OF GLOBULINS IN SPINAL FLUID. [Wien. klin. Woch., December 22, 1921, Vol. XXXIV, No. 51. J. A. M. A.]

Baar made examinations in a number of organic and functional affections of the nervous system in childhood with respect to the behavior of globulins in the cerebrospinal fluid. He found an increase of the globulin content in many different cases. In uremic and eclamptic attacks, and especially in repeated spasmophilic convulsions, the globulin content of the cerebrospinal fluid attains the same degree as in tuberculous meningitis. In convulsions due to disturbances of functioning, the globulin content of the spinal fluid is greatest during the convulsive stage and drops after the convulsions cease, whereas in the case of tuberculous meningitis the globulin content increases from the beginning of the irritation stage until the fatal outcome. In a number of organic affections of the central nervous system which are of moment in the differential diagnosis of tuberculous meningitis, there was just as marked an increase in the globulin content as in the latter disease. However, the Pandy reaction, if conservatively interpreted, will render valuable service in differentiating tuberculous meningitis from clinically similar functional affections; particularly, a negative reaction is of importance. For the differential diagnosis as against organic diseases presenting a similar clinical picture to tuberculous meningitis, the value of the phenol reaction is only limited, and, in case of a positive reaction, only the continuous increase of the intensity of the reaction is significant.

III. SYMBOLIC NEUROLOGY.

1. NEUROSES—PSYCHONEUROSES—PSYCHOLOGY.

Abraham, K. STUDY OF THE EARLIEST DEVELOPMENTAL STAGES OF THE LIBIDO. [Int. Zeit. f. Psychoan., Vol. IV, No. 2.]

The author cites various observations on children and neurotics confirmatory of Freud's view expressed in the "Three Contributions to the Theory of Sex," that before the differentiation which takes place at puberty having as result the centralization of the libidinous feelings in the genital region, there are various regions in the body which are erogenously sensitive. Even before Freud's time Lindner (1876) directed attention to the fact that sucking in children is of libidinous character and that preceding puberty the anal zone also possesses erotic value. Abraham adduces cases presenting positive and unmistakable evidences of a continuation of this infantile erotic instinctive life with preservation of the undifferentiated somatic condition into the life of the adult. He also seeks to give a foundation for emotional disturbances

(depressions) in accordance with the psychoanalytic theory, regarding these states as results of the undue persistence of infantile sexuality and finds in varying phases of these same infantile conditions the factors which determine the particular forms taken by the neuroses in individual cases.

The first case described by Abraham is one of so-called dementia precox simplex. This form of dementia precox is characterized by the same changes in emotion and instinctive life as the other forms but the patients are more accessible as the disturbances of psychic life are less profound. The patient in question, a youth, had succeeded in completing the high school, but on beginning his academic course his conduct was so obviously abnormal that he was brought to the author for treatment. His behavior resembled that of a shy child; all efforts to interest him in the external world were unavailing, his attention being exclusively centered on the processes in his own body. He had formed the habit of anal masturbation and the buccal erogenous zone played a very important part in his affection. He had never abandoned the infantile habit of drinking milk. It afforded him a curious pleasure. He always wanted it lukewarm, and had devised a way of drinking it by curving the tongue, which resembled sucking. During the night when he could not sleep drinking milk gave him the same satisfaction as masturbation. The author states that in this case there could be no doubt of the sensitiveness of the mouth as an erogenous zone; the patient himself spoke of the fact as though it were one well recognized by all the world, even referring to "mouth pollutions." Abraham further cites instances illustrating the effect of late weaning on psychic life. Many children from economic or other reasons are not weaned until they are from four to six years of age, with the result that the earlier erogenous zones preserve extraordinary sensitiveness, which may in those who are predisposed lead to various neurotic manifestations revealing imperfect centralization of the libido in the genital regions. Strong libidinous excitement, against the undisguised recognition of which consciousness vigorously strives, may be hidden behind the feeling of rabid hunger—as result of the persistence of the erogenous quality of the buccal region. The patient himself is far from suspecting the source from which the neurotic symptom receives its overpowering force. Those neurotics whose sexual life is more or less dependent on the sensation associated with the reception of food into the body or with the sucking of objects of food, show, as adults, little inclination to suck their fingers. On the other hand, neurotics who are inclined to suck their thumbs as a rule manifest no special libidinous exaggeration of the desire to take food. This latter class of patients present a higher stage of development of the libido than the former; the oral zone has in so far attained a certain independence that the libidinous satisfaction is no longer connected with the taking of food without, however, having found an external object. The intensity with which neurotics cling to the stimulation of the mucous of the lips finds an exact

parallel in the behavior of children. From the earliest period of life the infant becomes deeply absorbed in sucking the "comforter," sucking the hands and grasping the fingers with the mouth. This tendency is outgrown in normal adult life, and the only trace left of it is where stimulation of the oral zone serves as a normal expression of love of the object. In neurotics the mouth sometimes serves to such a degree as an erogenous zone that it loses its proper function and the patients become unable to speak or eat. Many persons who are able to sublimate some of their erotic tendencies still find it impossible to devote themselves to their interests in life unless their infantile tendencies are granted a share of satisfaction. For example, many persons cannot think with concentration without sucking their fingers, biting their pencil, or smoking incessantly.

It is impossible to draw a sharp boundary line between instances of this sort which may be considered normal and those which must be regarded as pathological. There is no doubt that the satisfaction of sexual demands have strong influence on emotional conditions. Healthy persons, however, are able, within certain limits, to dispense with habitual satisfactions and may attain to substitute sublimations. For neurotics all such measures are unavailing; their libido demands constant satisfaction and, failing this, the result is strong emotional reaction. The author is of the opinion that sufficient attention is not given to these sources of emotional unbalance in neurotics. That excitements and depressions are often due to infantile fixations and unsatisfied oral erotic cravings is shown by the measures found effective in relieving these conditions—receiving soft food from nurses while resting in bed, administration of medicines with no curative virtues, etc.

Finally, the author explains the refusal of food by neurotics and the fear of starving to death, which are the most marked features of depressed conditions, as due to the same infantile cravings. It might at first glance seem that the refusal of food originates in suicidal tendencies, but the question arises why is such a slow and tedious process chosen, and whence, then, comes the fear of starvation? This latter trait is especially frequent in the depressions of the involuntional period, and is clearly connected with the reduction of sexual activity, being a return to infantile interests connected with the oral and anal regions. The mechanism of the refusal of food in depressed conditions is closely related to the very earliest cravings which prompt to the incorporation of substances in the body—to the primitive cannibalistic tendencies. In the effort to repress this cannibalistic tendency from consciousness a condition arises akin to the cannibalistic taboo in primitive man. This idea being clearly understood the explanation of the fear of starving to death follows naturally. The cannibalistic instinct, like all primitive cravings, may undergo transformation; it is changed into anxiety, and the patient is harassed by the fear that his oral zone will never receive the satisfaction craved by the unconscious, that is, by the fear of starving to death. There is a fundamental resemblance between the compulsory neuroses

and depressions; both are sadistic; in both there is an effort to annihilate the object. The person suffering from compulsive neurosis seeks to use harmful force on the object; the depressed person to consume the object. [J.]

Brown, W. REVIVAL OF EMOTIONAL MEMORIES AND ITS THERAPEUTIC VALUE. [Brit. Journ. of Psych., October, 1920, Vol. I, Part 1. J. A. M. A.]

Brown is convinced of the great therapeutic effect produced by the intellect in the analytic review of past memories, especially in the analytic treatment of what has been called anxiety states where the patient is helped and encouraged to look at past events from a more impersonal point of view and so to obtain a deeper insight into their mutual relations and intrinsic values. The method, for which Brown suggests the term "autognosis," produces a readjustment of emotional values among the patient's past memories and they are scrutinized from the point of view of the patient's developed personality—or rather of his ideal of personality so far as it becomes revealed in the course of the analysis—and the relative autonomy which some of them enjoyed previously by virtue of their emotional overemphasis is withdrawn from them.

Putnam, J. J. ON SOME OF THE BROADER ISSUES OF THE PSYCHOANALYTIC MOVEMENT. [Int. Ztsch. f. a. Psychoanalyse., Vol. IV, No. 1.]

The author believes that the psychoanalytic movement marks one of the most important advances in modern medicine. It is based on the recognition of emotional conflicts and their possible ill effects in the life of the individual. The results of the conflicts of childhood do not die and disappear. On the contrary they live forever, in an active form, and continue to produce effects as integral factors interwoven with the living fabric of temperament and character. The final purpose of psychoanalytic treatment is to conduct the patient's memory and insight back to the distant period of childhood when he began slipping, half unwittingly, under the domination of some strong craving which continues to make its power felt in mature life by virtue of assuming ever new disguises. The patient—every person—must assume later the moral responsibility for the deeds and thoughts of the period of childhood, but if he is fortunate he may do so under the guidance of knowledge and reason and in doing this he may often work off his cravings by stripping them of their disguises, one by one, until it becomes clear just what it was that led him astray. As for the assumed usefulness of "repression" it should be remembered, the author emphasizes, that this is a word of double meaning; it is a good thing to repress on rational or moral grounds and in the interest of sublimation, the desire to yield to a temptation which one clearly sees; it is a poor thing to close one's eyes to a temptation to which one really yields. Describing the difficulties of the psychoanalyst in his attitude toward his patient, and the value of trans-

ference Putnam states that the patient should be brought to rely on himself and that certainly the only logical stopping place of the treatment is complete "sublimation." Referring to the foundation of those relaxations of conscience and will involved in pathological cases admitting of psychoanalytic treatment, he says that in these patients the longings hark back to the less strenuous and more immature and infantile interests and the emotions which come to the front are necessarily those which it is proper to denominate as sexual, since it is around the—biologically and socially—enormously significant sex instinct that these interests and emotions cluster, and from it they gain their color, and their emotional tone. Having learned all these, and many other kindred facts, Freud's dictum can no longer arouse wonder—the dictum, namely, that no psychoneurotic (emotional) illness can possibly occur without a concomitant, and partly causal, ruffling of the vast waters of the sex life. No one can make the best use of his powers, either for his personal happiness and guidance or in the interest of the community, who is the victim of his own immature passions, prejudices and superstitions and who continues through adult life the childish practice of using his imagination for inventing an unreal world of which he is the center and the hero. Such persons should be aided to destroy this great structure of a misguided fancy and self-love, by learning to see that that to form its foundations upward, it misrepresents his best desires. What every person wants is happiness and content. But these are to be gained, not by the cultivation of pleasures of the kind that exist in and for themselves, but rather through disregarding them in the interests of a broader life. How can a treatment through which the patient is enabled to see what is going on and to unmask the "confidence game" played by his lower nature on his higher nature, fail to commend itself as worthy of support, asks the author. The aim of the method which attempts this is, in general terms, to help toward the solution of the external problems of human beings, by helping them, in specific ways, to solve their internal problems. [J.]

Ruge, Carl, Jr. SEXUAL INTERCOURSE DURING PREGNANCY. [Münchener med. Woch., August, 1921, Vol. LXVIII, No. 34. J. A. M. A.]

Ruge reports the results of his inquiry into the sexual habits of married couples during the pregnancy of the wife. Seemingly reliable information was secured from 410 puerperants in the Universitäts-Frauenklinik, Berlin. Among many peoples of antiquity, sexual intercourse with pregnant women was absolutely prohibited by religious laws, and violations were severely punished. Among many "uncivilized" tribes of to-day the same is true. In civilized nations of the present, however, there is great diversity of opinion on the subject. Even physicians entertain widely different views. While some (Bumm, for example) prohibit all intercourse throughout the entire period of pregnancy, others, and probably the majority, regard moderate intercourse during the first half of pregnancy as harmless, but demand total con-

tinence for the later months—some insisting on four months, some on two months, some on only from two to four weeks' rest for the wife before term.

The results secured by Ruge's inquiry were surprising. Complete continence during pregnancy was not found even once in the 410 cases. Not less than 322 women (78.5 per cent) had sexual relations during the last two months before confinement, and 53.9 per cent during the last four weeks; during the last week, 31 per cent; during the last three days, 20 per cent, and on the day of delivery, 39 (9.5 per cent). The frequency of cohabitation was also startling, 60 per cent having had intercourse two or more times a week, and 24.6 per cent three and more times weekly. More startling still was the confession of 24 women (5.9 per cent) that intercourse occurred daily, while 6 even admitted that it occurred several times a day and stated that they rarely ever felt other than well. Nevertheless, Ruge was able to discover evidence of injury to the mother or the child from cohabitation during the last months of pregnancy; for instance, premature rupture of the fetal membranes, hemorrhages, premature births, and fever during and after birth. Of the 82 women who had had intercourse during the last three days before delivery, 17 per cent had high temperatures lasting from several days to several weeks. In fact, one woman had to undergo cesarian section and for a long time was in a very critical condition, though she was able to leave the hospital cured at the end of three months. Ruge recommends, incidentally, a vegetable diet, in the main, during the last half of pregnancy, saying that it lessens materially the danger of eclampsia.

Fraenkel, M. TRAUMATIC NEUROSES. [Med. Klinik, October 30, 1921, Vol. XVII, No. 44. J. A. M. A.]

Fraenkel remarks that of the more than 2000 cases of war neuroses that he encountered, scarcely one is left now. All such cases vanished like dew before the sun when the war was over, and this experience has taught how to treat the traumatic neuroses of peace. By applying the measures found so effectual for the war neuroses, he cured two cases of disabling traumatic neuroses of eighteen and eleven years' standing.

Casamajor, A. NEUROSES IN BUSINESS LIFE. [Neurological Bulletin, July, 1921, Vol. III, No. 7.]

Casamajor presents illustrative cases which fall into three groups: (1) the inadequate; (2) the dissatisfied; (3) the generally maladjusted. The dissatisfied group is the largest, for it includes the great majority of the neuroses of business life. The neurosis arises in the individual who likes the remuneration he gets from his work but dislikes the work itself and the type of life it forces him to lead. The symptoms are not usually severe and most of these patients struggle on without applying for medical aid. However, should the patient suffer an accident for which the employer could be held responsible, a typical traumatic, litiga-

tion neurosis might easily appear. The difficulties of the generally maladjusted in business life are only a part of their general maladjustment. The maladjustment to the home life is of much greater importance, and the work is a means of escape from the home. The similarity between the neuroses of business life and the war neuroses is quite obvious. Dissatisfaction is ever rife throughout industrial life and the neurosis is a way out of a difficult problem. [J. A. M. A.]

Schelven, T. van. TRAUMATIC NEUROSES. [Neder. Tijdschrift, March 27, 1920, Vol. I, No. 13. J. A. M. A.]

Van Schelven's article is the outcome of study of 4000 cases of traumatic neurosis in Austro-Hungarian soldiers. He protests against the term as misleading, as the neurosis is not the result of the physical trauma but of the mental reaction to it. The subject is well posted in regard to his sufferings, and they always subside sooner or later when the matter of compensation is finally adjusted. The best form of compensation for a traumatic neurosis, he says, is a pension, not too large, progressively declining and automatically stopping at the end of the second year, without appeal.

Brown, William. SOME FACTORS IN PSYCHOTHERAPY. [Journ. of Neurol. and Psychopath., August, 1920.]

In this paper the author says there is no panacea for the treatment of the psychoneuroses. Different schools of thought may emphasize one or other factor of cure, but there can be little doubt that these factors are many and a rational psychotherapy should take account of all. In his opinion, hypnotism and suggestion do not coincide. All men are more or less susceptible to suggestion, but hypnotism is something more definite than this. It is a "second state," corresponding to the condition of the hysterical. One can artificially increase the suggestibility of most normal people by appropriate means and this is not *eo ipso* hypnosis. The writer emphasizes the factor of suggestion as a *vera causa* in psychotherapy. In the case, especially, of bad habits, such as enuresis and masturbation in children, analysis and persuasion often fail where repeated suggestion produces a complete cure. In his method, he asks the patient to relax his muscles as completely as possible while lying on a comfortable couch and to think of sleep and he continues this treatment for an hour at a time, giving appropriate suggestions every ten minutes. Every case of enuresis he has treated by this method has cleared up completely. In selected cases suggestion is all that is needed for complete and permanent cure. It is, of course, assumed that a thorough neurological and psychological investigation is first carried out. Freudian adherents find a difficulty here, because of their identification of suggestion with transference. The training of children into good habits, even in the first few days after birth, illustrates the enormous potency of suggestion and its relative independence of transference.

Ross, T. A. PSYCHOTHERAPY. [Brit. Med. Jourl., July 10, 1920.]

This author grouped his material under three headings: (1) The method of persuasion and explanation, (2) psychoanalysis proper, and (3) methods in which both are employed under different conditions. Much of the animosity evident at the present time in the medical profession in regard to the treatment of functional nervous disease was, he said, the direct result of limited experience. Difference of opinion was healthy, but bitterness and the imputation of unworthy motives succeeded only in clogging progress. For one group of workers psychoanalysis was the only rational method of treating all psychoneurotics, while for another this practice was not only useless but actually so dangerous that it should never be employed. But if the problems concerned with the treatment of functional nervous disease were approached in a non-partisan spirit it became evident that for certain groups of cases mental analysis formed the only method by which the essential cause of the trouble could be revealed and dealt with, and for other groups simpler methods, such as persuasion, were all that was required to bring about successful results. It must be remembered, however, that in the past persuasionists had been too easily satisfied with their results, and had tended to think that when others cured a manifestation *they* cured the whole disorder. Analysis, Dr. Ross continued, was not synonymous with anamnesis, for it always implied the bringing of a repressed and unconscious constellation of ideas into consciousness. The main difference of opinion between the middle school and the rigid analysts was based on the extent of the procedure which was necessary in the majority of neurotic subjects. The followers of Freud invariably delved deeply into the unconscious because they attributed any early improvement that might occur to unstable conditions such as transference of affect from patient to physician. They were led to a scepticism of this kind by their belief that psychic energy was always kinetic. Dr. Ross considered such a hypothesis fallacious. Psychic energy might be potential or latent, as physical energy was known to be. From this premise he argued that analysis need not necessarily be complete in order to help the patient to a mental readjustment to ordinary affairs of life. Indeed, attempts at complete analysis might increase the maladjustment and so do harm.

BOOK REVIEWS

Urstein, M. KATATONIE UNTER DEM BILDE DER HYSTERIE UND PSYCHOPATHIE. [S. Karger, Berlin.]

The author here presents us with a monograph of 450 pages. It has all the evidences of a very detailed and exhaustive study. Over 300 pages are devoted to minute clinical histories of twenty cases.

We are acquainted with Urstein's clinical studies of neuroses and psychoses encountered during the Russian-Japanese war. Also his monograph on dementia precox and its relations to the manic-depressive psychoses. His Kraepelinian study period brought forth the first of his studies on katatonia as a form of manic-depressive psychosis, a thesis which has doubtful value and now this large effort to show an essential relationship between katatonia and hysteria and the psychopathies.

Urstein has sedulously cultivated the art of collecting case history material. He has gone to different clinics and laboriously read and compared the voluminous clinical records which have accumulated over many years. These he has utilized to maintain his main thesis. This may be boiled down to the belief that "katatonia" is a fairly well defined entity. It is not only to be recognized behind the mask of dementia precox (1909 thesis) in which group Kraepelin has more or less confined it, but it also masquerades as a manic-depressive psychosis (1912 thesis). It is recognizable as a late katatonic disorder (1913 thesis) and here he finds it running under the guise of degenerative hysteria, and some psychopathies. Thus for Urstein, katatonia has become a "Proteus," the chief features of which he has painstakingly endeavored to construct now after ten years persistent laborious effort.

In many respects one can sympathize with Urstein's point of view. One can at least give him credit for his persistence in following up his cases as they have been moved here and there and gathered in this or that institution where he has followed them through voluminous records and often personally investigated them. At the same time one can not help but feel that the methods of descriptive psychiatry itself lend themselves to constructions which can be proven by zealous adherents according to their own *a priori* viewpoints. If these methods are entirely valid then Urstein has a perfect right to claim his point proven. He has studied his case histories from the standpoint of "lebenlauf" in greater detail than Kraepelin himself. Whether his critical acumen is to be trusted, that is the question. At all events the present volume is of value to the "katatonia" problem.

Krisch, Hans. EPILEPSIE UND MANISCH-DEPRESSIVES IRRESEIN. [S. Karger, Berlin, 1922. 36 mk.]

For the dogmatist who more or less rigidly thinks in terms of "disease entities" there are few problems in neuropsychiatry. Classical definitions are enough as tags to diagnose this or that disease. Why bother? Economy of effort, and of time, and "common sense" dispose of all "problems" and in good old Roman fashion "classification" does away with Greek "subtleties."

Scientific curiosity, however, seems more enamored of Greek subtleties with their dynamic correlates than with the Roman habit of static efforts at classifying and hence, in a sense, this study.

The "epilepsy problem" is far from being solved. The symptomatic epilepsies with their apparent organic substratum offer few difficulties, but the "real," the "essential," the "psychogenic" epilepsies—or call them what one will—still offer much for study and discussion. And this exceedingly well done monograph of 100 pages not only shows it but shows it to advantage.

One of the bits which may be gleaned from its pages is that certain individuals who show phenomena which on cursory examination would be considered as "epileptic" from the standpoint of descriptive psychiatry are suffering from a manic-depressive psychosis. This thesis is here ably discussed and the whole field of modern descriptive psychiatry most interestingly reviewed.

Goldenweiser, Alexander A. EARLY CIVILIZATION. [New York: Alfred A. Knopf, 1922.]

This is the best book that has been written on anthropology, according to the author, A. A. Goldenweiser. Any who may take exception to his eclectic, iconoclastic, sarcastic, at times bombastic and highly irregular, in regard to values, system will find ample refutation to any other point of view in almost any part of this most tiresome book. Frazer, Lang, Tyler, Wundt, Durkheim, Lévy-Bruhl, Freud, and many others, are carefully dissected and generally cast into limbo. Only the choicest morsels are kept after a most rigid scrutiny by our most fastidious author. He takes a cocky stand, reinforced by the dogmatic clique of the so-called American school, and with many reiterations of that magic word "culture" builds his hollow shell.

Some of Goldenweiser's biological assumptions, which he states are accepted beyond doubt, are as shaky as his ideas on psychology and his formulations on early mentality. What would be most gratifying would be the presentation of a more fundamental concept of primitive man's unconscious motives and the all important rôle they played in the formation of many if not most of his ideas and institutions. Primitive man is accused of an inability to keep reality apart from fantasy; the thing apart from the idea. A reading of books of the type of this one would tend to make us believe that anthropology was following closely in the psychic wake of this same primitive man. Primitive man in his early teachings had one vital

advantage over this brand of anthropology, his doctrine was fertility while the foundations of this science as here taught lead only to sterility. [STRAGNELL.]

Scholz, L. ANORMALE KINDER-Dritte umgearbeitete Auflage, von Prof. A. Gregor. [S. Karger, Berlin.]

We have had occasion to commend the first edition of this very readable book on "abnormal children" which appeared in 1911. The author was killed during the war, and the second edition was issued by Prof. Gregor, then in Leipzig. This third edition has been prepared by the same author, now director of an institution in Baden for the care of this type of social misfits.

Whereas most of the material is well worth study, particular attention is called to the author's very valuable discussion of psychopathic children. Here the indolent, the depressed, the excitable, the circular types, the emotional, the anxious, the moody, the belligerents, the don't cares, the impulsive, the glowery, the phantastic liars, the compulsive, the ethically backward, and the erotically perverse types are very well detailed, even though perhaps a trifle too short.

Unfortunately the book remains at the level of a purely descriptive psychiatry. Concerning the dynamic psychiatry of Freud, and its particular applications so richly contributed by Pfister, Hug-Hellmuth and others on children—there is made but brief mention and these quite trivial. In this respect the book remains quite unstimulating, even though practically valuable at old-fashioned levels.

Meyer, E. KRANKHEITEN DES GEHIRNS UND DES VERLÄNGERTEN MARKS. [Georg Thieme, Leipzig.]

The twelfth volume of Schwalbe's series of short practical monographs on Diagnostic and Therapeutic Mistakes and their Avoidance consists of this work of E. Meyer's of Königsberg on the Diseases of the Brain and Medulla.

Forty-four of its 128 pages are devoted to symptoms, their significance and the fallacies to be avoided in their interpretation. These are grouped as general signs, such as headache, vertigo, nausea and vomiting, bradycardia, respiratory and temperature changes, skull percussion and psychic anomalies. Among the special signs discussed are those of motility, sensation, visual, speech, and reflex disturbances. A special section is devoted to errors concerning localization diagnoses of brain lesions.

The special portion of the book takes up more or less systematically, Inflammations of the Meninges, Disorders of Circulation, Encephalitis, Neurosyphilis, Brain Tumors, Hydrocephalus, Congenital Defect States and a short chapter on diseases of the Medulla and Pons.

The difficulties of accurate comprehension of disorders occurring in nervous tissues and their consequent results are recognized to be very great. More so, perhaps, than in any other field of medicine. To give a short, compact review of these has been the author's aim.

He has presented a very meritorious short volume which, while not in any sense as comprehensive as many others, nevertheless will serve a very useful purpose.

Flügel, J. C. THE PSYCHOANALYTIC STUDY OF THE FAMILY.
[The International Psycho-Analytical Library, No. 3, London, Vienna, New York.]

The author is a senior lecturer in the department of philosophy and psychology, University College, London, and sometime John Locke scholar in mental philosophy in the University of Oxford. Hence it may be inferred he comes as no mere novice into the field of psychology, and it may be seen that the practical applications of psychoanalysis to the most pressing of behavior problems have enlisted his intelligent interest.

The study of the home life offers the starting point for an understanding of the development of human character and behavior, and the author has frankly espoused the value of the "unconscious" in the appraisal of family influences. Certain main principles have clearly emerged from this investigation of the unconscious, which justify, even demand the serious attention of all those who, at this critical period of human history—infancy and childhood—have to deal directly or indirectly with questions affecting family life in one or more of its numerous aspects.

"The sociologist, the moralist, the spiritual adviser, the teacher, the family physician, and the parent are all intimately concerned with such questions, and it is primarily with the needs of such as these in view that the present brief exposition of the subject has been undertaken. Our aim is to produce a more widespread realization of the immense and far-reaching significance of the psychological problems connected with family life; to indicate some of the ways in which psychological knowledge has thrown light upon the solution of these problems; and perhaps by these means to be of some assistance to that very large class of persons who, at one time or another during their lives, find themselves compelled to deal with such problems."

These are but partial forewords of the author's desires. He has most adequately set forth the needs and most amply justified the writing of this book. Whereas he modestly calls it a compilation and not containing much original material, we find it strikingly original in its apt stressing of the issues in a most practical and yet profound manner.

No one can come away from its reading without acknowledging a deep sense of gratitude to the writer for having afforded so clear and able a statement of the implications of the Freudian hypotheses in their application to the problems of everyday living.

OBITUARY

OSCAR HERTWIG

Oscar Hertwig, biologist, who for many years was director of the Anatomicobiologic Institute of the University of Berlin, died October 27 at the age of seventy-three. He was a pupil of Gegenbaur, Haeckel, and Max Schultze, and became Schultze's assistant in Bonn. In 1875, he established the nature of the impregnation process in the ovum of the sea urchin as a purely morphologic process. This discovery overthrew all the conceptions that had been advanced up to that time, and it remains to this day uncontested. Virchow's dictum "*omnis cellula e cellula*" was thus extended, and we could say "*omnis nucleus e nucleo*." Hertwig's second great contribution was his textbook on embryology, published in Jena in 1855, the first to expound clearly, from a strictly chronological standpoint and with a thorough consideration of the developmental phases, the processes of maturation of the ovum, fecundation or impregnation, segmentation, formation of germinal layers, and the development of the various organs.

In 1888, he was called to the University of Berlin as the director of the newly founded Anatomicobiologic Institute. Here he published a large number of articles and monographs, and was a frequent contributor to the *Archiv für mikroskopische Anatomie und Entwicklungsgeschichte*. The results of many of his researches are published in the "Handbuch der vergleichenden Entwicklungsgeschichte der Wirbeltiere." His "Elements of Embryology" is also well known as a textbook. In his book "Allgemeine Biologie," he combined the fundamental principles of cellular transmission of hereditary characteristics with the theory of evolution. He was also the publisher of "Zeit- und Streitfragen der Biologie" (mooted questions of biology). It seems almost tragic that, during the last years of his life, he felt compelled, as a strictly objective investigator, to take a stand against Darwinism, in opposition to his teacher Haeckel. His works devoted to this polemic question, "Das Werden der Organismen" and "Abwehr des ethischen, sozialen und politischen Darwinismus," passed through several editions in a short time. Only a

few weeks ago, Hertwig had a clearly worked-out article in No. 37 of the *Deutsche medizinische Wochenschrift* on "The Theory of Heredity: Its History and Significance for the Present." It was doubtless the last article from the pen of this great scientist. [J. A. M. A.]

DR. EMIL HOLMGREN

Dr. Emil Holmgren, professor of histology at the Karolinska Institut at Stockholm, author of nearly 100 works on this specialty and other scientific subjects and of the large "Manual of Histology" published in 1920, aged fifty-six.

DR. CHRISTIAN SIBELIUS

Dr. Christian Sibelius, professor of psychiatry at Helsingfors, who has published much on mental disturbances from poisonings, spinal cord tumors, etc. The *Finska Handlingar* calls him the leading psychiatrist of Finland; aged fifty-six.

NOTES AND NEWS

BENVENUTO CELLINI AND NEUROPSYCHIATRY

Closely allied to the psychological interest aroused by the history and trials of detected criminals is that derived from the candid confessions and diaries of J. J. Rousseau, Samuel Pepys and Benvenuto Cellini. The last, though a thorough-paced rogue, has long had a fascination for the general reader and has been fortunate in his English biographers—John Addington Symonds and Augustin Birrell. Cellini (1500-1571) lived in eventful and lawless times, and as a highly artistic designer of jewelry and metal work played a prominent part in the Renaissance. During this period of the Reformation and the revival of learning, medical practice was still hand-in-hand with quackery and superstition; the great epidemic of syphilis extended to Italy by 1494, and poisoning was a fine art in that country. It is therefore interesting to glance at Benvenuto Cellini's impressions and experiences of medicine as recently set forth by Dr. Jacob Rosenbloom,¹ of New York, and to compare and supplement them with Sir D'Arcy Power's² paper on the same subject written in 1898. Cellini had plague at the age of twenty-three, malaria more than once, and on one of these occasions drank freely of water against medical advice and promptly improved; he describes an illness lasting two months, and ascribed to the bad air of Pisa, which may have been enteric fever; he was the victim of gout in his later years, and had several surgical accidents, such as fracture of the leg and a splinter of steel in the eye. But perhaps the most interesting of his remarks are on the subject of his attack of syphilis—or as it was then called in Italy, the French disease—which remained dormant for four months and then suddenly broke out all over his body. After following for some time medical advice without any benefit, he took guaiac (introduced from America about the year 1508) against the orders of the first physicians in Rome, and after fifty days was "cured and as sound as a fish in water." But from exposure he fell into a slow (? syphilitic) fever, and in spite of the medical dictum that if he took guaiac with fever on him he would be dead in a week, he disobeyed and was well in four days' time. Later on he had a painful inflammation of the eyes, cured by a simple eye-wash prescribed by the Pope; this is considered by Rosenbloom to have been a functional affection, whereas Sir D'Arcy Power thinks it was iritis. The practice of mercurial fumigation and inunction

1 J. Rosenbloom, *Ann. Med. History*, New York, 1919, ii, 348-366. (Published 1920.)

2 D'Arcy Power, *Quart. Med. Journ.*, Sheffield, 1898, 199-218.

carried out by Giacomo da Carpi, who amassed a large fortune thereby, is mentioned by Cellini, with the sneer that the so-called French disease is very partial to priests and especially to the richest of them. He alleges that at least three attempts were made to poison him; in one pounded diamond was to be administered in his food, with the object of setting up acute enteritis in the way that pounded glass acts, but the man entrusted with the grinding substituted a soft stone—a greenish beryl—so enriching himself and incidentally, as Cellini believed, saving him from a painful death. When he was forty-eight, corrosive sublimate, or as Power suggests, arsenic, was put in his sauce and caused acute colitis, but, to quote his own words, “the poison worked so well that whereas, before I took it, I had but perhaps three or four years to live, I verily now believe that it has helped me more than twenty years by bettering my constitution.” It would indeed be an irony of fate if an attempted criminal poisoning really benefited the intended victim by curing an existing disease, but Cellini’s conclusions are often based on very insecure grounds. His comments on his numerous medical advisers are, as a rule, highly critical.

MAUDSLEY HOSPITAL

Sir Frederick Mott, Director of the Pathological Laboratory of the Maudsley Hospital of the London County Council, is retiring under the age rule, but the Council has arranged to retain his services until October next. He has held the appointment with great distinction since the hospital was erected, combining with its duties those of pathologist to the Council’s asylums. The County Council is taking steps to appoint a medical superintendent to the hospital at a salary of £900 a year, with temporary additions on the Civil Service scale, and the right to engage in private practice as a consultant, subject to certain conditions, one of which will probably be that he shall reside in the neighborhood of the hospital. So far as our information goes, no steps have yet been taken to decide on the staff which will be needed, but it is obvious that the objects with which the hospital was founded cannot be attained through the work of any single individual acting as medical superintendent.

We remember how in 1908, in a report on the arrangements made with Dr. Maudsley, the Chairman of the Asylums Committee spoke of the hope that the hospital would prove of great value in the dissemination of knowledge of mental disease, and in the provision of systematic instruction in methods of treatment. This hope has, indeed, partly been realized by the institution of courses for the diploma in psychological medicine, in the conduct of which Sir Frederick Mott has gathered about him some of the most distinguished exponents of the subject. The courses have been extremely well attended; but two things have somewhat militated against their complete success. The first is that, as there were no patients in the hospital, clinical instruction had to be given elsewhere; and the second, that the University of London has not shown the faintest interest in the matter. The chairman, in the report from which we

have already quoted, referred to the advantages which would flow from the hospital being in close touch with the university, the general hospitals, and the medical schools. It was not, he truly said, to the advantage of the profession or the public that the study of insanity should to so great an extent remain an isolated branch of medical research. The belief was expressed that were this defect remedied, a closer acquaintance with the peculiarities of mental and nervous diseases would become more common, and many cases of incipient insanity which now find their way ultimately to the workhouse or to the asylum would by suitable treatment in the earlier and more hopeful stages recover without needing confinement in an institution. The need for a central pathological laboratory was also mentioned.

These are admirable sentiments, and a pathological laboratory exists, but the story of its dealings with the gift made to it some fourteen years ago by the late Dr. Henry Maudsley is not altogether creditable to the London County Council. There was, in the first place, an unexplained and most regrettable delay in finding a site and building the hospital. Its erection proceeded by slow degrees, and it was barely complete when early in the war it was taken over by the War Office for soldiers suffering from mental and nervous disorders. Though the hospital was given up by the military authorities some fifteen months ago, it is, we find, still unoccupied, yet the demand for the accommodation and treatment it could afford to civilian patients is pressing—so pressing, indeed, that we can hardly believe the suggestion, which nevertheless is being made, that it is being kept empty to save expense. No doubt sooner or later it will be taken into use, and the decision to appoint a medical superintendent is an indication of this intention.

But the purpose Dr. Henry Maudsley had in view was not to establish another asylum. His purpose was to set up an acute mental hospital which would serve as a model to other localities, and be a center of investigation in both functional and organic diseases of the brain and spinal cord. To this end it is necessary to have a suitable hospital in a convenient locality, with a laboratory well equipped and of adequate size attached to it. These have now been provided. But for the intensive study of acute mental disorder, and for pathological routine work, to say nothing of research, a large staff is necessary. If we look abroad we find that the institute at Zurich has a medical staff of eleven—the Director, Professor Bleuler, two senior medical officers, five assistant medical officers, two voluntary physicians, and one pathologist. It has 400 beds; the number of admissions is about 750 annually. Of the beds, 250 are occupied by chronic patients, for whom two medical officers, in addition to the Director, would probably suffice. But it has 150 beds for acute cases, and these have a rapidly changing population; it is with them that the remaining officers are fully occupied—so fully indeed, that in practice the pathologist has had to be taken away for clinical work, and in fact does no pathology. At Utrecht there is a mental hospital of about the same size under the direction of Professor Winkler, one of the most distinguished neu-

rologists in Europe. He has a salary of £1,000 a year, a good house and the right to private practice. Under him are a staff of five medical officers, and eight assistants in the laboratory. At the Psychiatric Clinic at Munich the Director, Professor Kraepelin, has working with him two senior physicians, four senior assistant physicians, four junior assistant physicians, five voluntary physicians and three others officers recently qualified, whose duties are similar to those discharged by the clinical assistants working in the departments of general hospitals in England. The Munich clinic has 160 beds; the number of patients admitted annually is about 2,000. Again, at Cologne, Professor Aschaffenburg, the Director of the Psychiatric Clinic, has under him one senior physician, two assistant physicians and a fluctuating number of voluntary physicians and newly qualified men.

The Maudsley Hospital, as we have said, possesses good laboratories, and it is in the direction of them that Sir Frederick Mott has been chiefly occupied. But we have shown how large a staff is considered necessary for the clinical study and treatment of acute mental cases. We still hope that the London County Council will rise to the height of its responsibilities, and organize the staff of the Maudsley Hospital on a liberal basis, both as to the number of the staff and their salaries. We are quite certain that its reward would be great, and that in the long run, even from the financial point of view, the ratepayers' pockets would be saved. [B. M. J.]

MENTAL HYGIENE BUREAU

The new division of mental hygiene, the first government bureau of its kind, it is said, was recently opened in Boston, under the direction of Dr. Douglas A. Thom. Plans have been outlined which will include state-wide research and the establishment of clinics on mental hygiene in eight or ten of the largest cities, where a survey will be made previously to ascertain the needs, the facilities available and prospects for coöperation. This division was established in the department of mental disease by the legislature of 1922. Dr. Thom has already associated with him, Dr. Harry C. Solomon, research investigator; Dr. Stanley Cobb, professor of neuropathology, Harvard Medical School; Dr. A. Warren Stearns, assistant professor of psychiatry, Tufts Medical School; Dr. Abraham Myerson, professor of neurology, Tufts Medical School, and Dr. George K. Pratt, Boston.

CASSEL HOSPITAL FOR PSYCHOGENIC DISORDERS

In connection with the establishment of a National Council for Mental Hygiene at the preliminary meeting held on May 4th, the unobtrusive activities of the Cassel Hospital for Functional Nervous Disease, founded and endowed last year by the late Sir Ernest Cassel, naturally occur to mind. Its object, as pointed out in B. M. J. (1921, i, 680), is to provide for members of the educated classes who cannot

afford the expense of professional care in nursing homes, and are not certifiable, the most efficient treatment for the conditions commonly known as neurasthenia, nervous breakdown, and loss of power not associated with definite structural change. The provisions made for the care of such patients at the Cassel Hospital, Swaylands, close to Penhurst, are ideal; the hospital is a fine mansion in quiet and beautiful surroundings with extensive grounds containing a wonderful rock garden, tennis courts, and a golf course. The medical director (Dr. T. A. Ross) and two other medical officers have charge of the sixty patients, whose treatment consists in sympathetic consultations conducted with tact and without any suspicion of hurry. By the appointment of Major H. Hume to manage the business side of the hospital Dr. T. A. Ross has been wisely relieved of responsibilities and distractions which so often prevent medical superintendents from devoting a wholeminded attention to the purely professional supervision of the patients. There is in addition a strong medical committee, the members of which, when occasion arises, willingly provide individual assistance in the exceptional cases requiring special consultation.

New Endocrinology Journal. Prof. G. Viola of Bologna and Prof. N. Pende of Messina have begun the publication of a new magazine devoted to Endocrinology. It is entitled *Endocrinologia é Patologia Constituzionale*. The issue is to be quarterly. The subscription price is 50 lire per year. Via Ludovisi 46. Rome is the office of the editor and managing editor. We wish the new venture a hearty success.

Spirit Photographs. There is a society or club known as the Magic Circle which consists of professional conjurers, but admits a few approved amateurs, to the kindness of one of whom, a distinguished member of the medical profession, we are indebted for a copy of a report, dated May 31, issued by the Occult Committee of the Circle. This committee, which consists of expert conjurers, has been appointed to investigate what are called "spiritualistic phenomena," and at the suggestion of Sir Arthur Conan Doyle appears to have turned its attention first to spirit photographs. The report deals with the inquiries made by the committee into the claims of two people—a man and a woman—who it was alleged were producing spirit photographs of a remarkable nature in unopened packets of photographic plates. Neither of the mediums came out of the ordeal unscathed. When a fraud-proof packet was sent to the male operator he obtained no results. He stated that the packet had twice been "held," but that the "usual sensation" had not been felt. As soon, however, as a packet that could be tampered with was submitted, a "psychic extra," as it appears to be called, was obtained on one of the plates. Unfortunately for the performer the conjurers had tampered with the packet first. In addition to other tests, a straight

line of red varnish (invisible in the red light of the dark room) had been painted across the top left side of the edge of the stack of six plates. On the return of the packet by the medium three of the red marks were found at the bottom, showing that these plates had been reversed. When the operator was asked for an assurance that the packet had really been returned unopened, he replied in the affirmative. He said that it was quite usual to get adverse remarks from persons who did not understand, and that such remarks were not worthy of notice. Shall we admire the power of spirits, or deplore the frailty of human nature? The lady medium was vouched for by Mr. and Mrs. Hewat McKenzie, who conduct an institution known as the British College of Psychic Science. Three sittings were held with this medium. First, two members of the committee secured a private sitting. It was required that the plates, enclosed in a sealed packet, should be sent for "magnetization" some days in advance, and at the sitting these plates were exposed, and on development "extras" were on most of them. On one a face was visible in the midst of a cotton-wool effect; the others had crude markings, ascribed by the medium to unformed "ectoplasm" or to "spirit lights." As will be observed, she had acquired some of the latest spiritualistic terminology. At the second sitting, arranged by Mrs. McKenzie, a sealed box of six plates, forwarded in accordance with instructions, was produced by the medium. The box was opened and the plates transferred to metal dark slides; a service was then held, hymns being sung, and the Lord's Prayer recited. The plates were then exposed and an "extra" appeared on one of them—on No. 1 plate—which the investigators satisfied themselves had been substituted for the first plate of the original package. The medium had by this time become suspicious and nervous, and in fact she was not equal to holding her own with professional conjurers. She, however, consented to a third sitting, and for this an unopened box of unprepared plates was sent. It therefore became necessary that the plates should be secretly marked before being placed in the dark slides. One of the investigators, having placed the open stack of plates before the medium under the ruby light, secretly attached a small pad of pink material, chemically prepared, to the ball of his right thumb, and in handing the plates one by one to the medium an invisible mark was impressed on each. The medium gathered up the slides, and going into the studio took them to a small table on which her handbag was standing. The ostensible object was to obtain the hymn-books for the service, but the move being anticipated, the members of the deputation placed themselves in convenient positions to observe her actions. The hand holding the slides was seen to be placed inside the bag; one slide was dropped into a side pocket and a duplicate slide picked up with the hymn-books. Four plates were developed, and on one which did not show the mark a "spirit extra" appeared. All this may be amusing to the cynic, but the conclusions the committee of the Magic Circle draw are that although spirit photographers, like

conjurers, meet changing conditions by the adoption of new methods, there are at present at least two methods in general use by some, at least, of the mediums who devote themselves to obtaining photographic "extras." In the one case, when the plates are accessible before the sitting, the spirit form is impressed, in advance, by contact with a selected transparency. In the other, when the packet is not available beforehand, the exchange for a prepared plate is made by a subtle move after the original plates have been loaded into the dark slides. The committee assert that they have never imposed a test which would not have served to demonstrate the straightforwardness and honesty of the medium, and conclude with a promise to extend to any honest medium fair, impartial and courteous treatment, and to give him a free hand to carry out the experiment in his own way.—*British Medical Journal*.

Dr. Alois Hrdlicka of Washington is giving a course of lectures on anthropology, with special reference to Czechoslovakia, at the Prague medical faculty, on invitation from the Czech university. Dr. Hrdlicka was born in Humpolec, a small town in Bohemia, in 1869. At the age of thirteen he emigrated to America with his father. Following his graduation in medicine, he returned to Europe for the first time, in 1896, when he began to study anthropology in Paris. He also visited his native country. His career is well known in the United States, his position in the Washington National Museum making him one of the leading Czechs in America. Dr. Hrdlicka has always maintained warm relations with Czech scientists, having become a member of the Czech Academy of Sciences in Prague. He has also created a foundation for the study of anthropology at Prague university, which has conferred on him the honorary degree of doctor of philosophy. During the war, he took an active part in the movement for the liberation of his native land, and he has greatly aided the political leaders of the Czechoslovak revolution through his acquaintances in American scientific circles. The course of lectures which he is delivering now in Prague has been made an occasion for an ovation to this famous American scientist for his promotion of interest in a science which, up to to-day, has not received the attention which it deserves. Dr. Hrdlicka has also visited the new medical faculties at Brno and Bratislava, where his addresses have aroused similar enthusiasm.

Professor Willy Hellpach of Karlsruhe, who was for many years editor of the *Aerztliche Mitteilungen*, the official organ of the so-called Leipzig League (a league of German physicians for the protection of their economic interests), has been chosen *Kultusminister* (of public instruction, etc.) of Baden. Hellpach has been politically active for many years, and is one of the leaders of the democratic *Landespartei*. He is forty-four years old. In 1906 he became an instructor in the polytechnical school in Karlsruhe, where, after the

war, he accepted the chair of applied psychology and pedagogics. He has been devoting himself of late to the problems of technical industrial education, and has been collecting material for a large work on the scope of the educational task of secondary schools, viewed from a critical and technical standpoint. He was a member of the *Landeschulkonferenz* of Baden and the *Schulkonferenz* of the German empire.

Schmidt's Jahrbücher der in- und ausländischen gesamten Medizin, after 90 years of useful service, is compelled to cease publication with the December, 1922, issue.

N. B.—All business communications should be made to Journal of Nervous and Mental Disease, 64 West 56th St., New York.

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ORIGINAL ARTICLES

SENSORY DISSOCIATION IN PERIPHERAL NERVE INJURIES

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The occurrence of dissociated sensibility after nerve injuries has long been a vexed question among psychologists and clinicians. Rivers and Head (1) found that after section and suture of a superficial sensory nerve the rate of recovery of function was more rapid in the affective (protopathic) system of fibers than in the critical system, such inequality in the rate of recovery of the two systems being the immediate cause of the marked protopathic dissociation described by these observers.

In a recent contribution (2) the author rejected the terms "epicritic" and "protopathic" as indicating separate forms of sensibility but accepted, with certain modifications, the occurrence of dissociated sensibility. Rivers and Head (1) maintain that each of the "epicritic and protopathic forms" is a separate entity mediated by a special set of nerve fibers. The cases reported in the present paper show that in the peripheral nerves two separate fundamental systems of afferent fibers, viz., the critical and affective, normally function side by side and that during the regeneration period after peripheral nerve injury the fibers of one system, usually but not always those of the affective system, recover function earlier than the fibers of the other system. The form of sensibility which is first to return gives its name to the type of dissociation which obtains. Thus where the affective (protopathic) or hurt element returns in advance of the critical elements or greatly overshadows them, the

dissociation is of the protopathic type, whereas in the opposite condition, *i.e.*, where the critical elements return in advance of the affective or hurt element, the dissociation is of the critical type.

The occurrence of each of these types of dissociation after peripheral nerve injury establishes beyond question the existence of separate systems of fibers for the transmission of impulses representing the affective or hurt element on the one hand and the critical elements on the other. In one of the cases there is evidence pointing to a further differentiation within the critical system for paths mediating warmth and the specific element of "cold." Each of these elements in addition to touch is mediated by a separate subsystem of critical paths which functions either alone in mediating touch, warmth or cold or in conjunction with the affective system by a "coöperation of antagonism" in mediating the sensation resulting from one or other of the complex superficial affective stimuli, *viz.*, pricking, heat (about 45° C.), or cold (below 22° C.).

PROTOPATHIC DISSOCIATION

Case I. J. B. Forty-nine years, male. Bitten by a large cat at noon, October 22, 1919, near the base of the distal phalanx of the right thumb, one canine tooth entering the dorsal aspect one-fourth of an inch from the mesial (ulnar) border, its opposing fellow entering at a corresponding point on the palmar aspect. Other teeth seized the tip of the thumb but merely made insignificant scratches. In the main wound the animal's teeth were checked by the bone upon which the jaws were powerfully closed two or three times before final release. During the actual infliction of the injury little or no pain was felt, presumably owing to diversion of attention. After the bite the wound bled freely but no pain was felt except a slight stinging at the puncture sites. During the afternoon the joint was slightly swollen and stiff but no pain was felt except on movement or pressure.

Sensory examination, October 23 (twenty-four hours after injury):

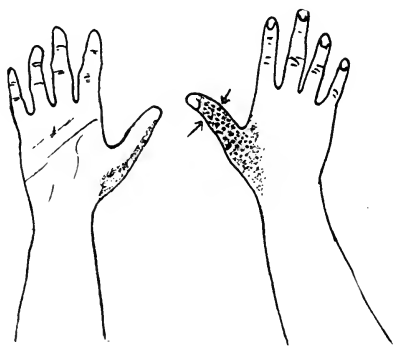
A. *Spontaneous.* Feeling of stiffness and unnaturalness in the injured thumb; no spontaneous pain; "hurts only when moved or pressed."

B. *Elicited.* (1) *Superficial critical.* (a) *Light touch.* Sensibility for cotton and the von Frey hair* bending at a pressure of 0.085 grammes, absent on the mesial (ulnar) half of the dorsum of the thumb over the proximal phalanx. (2) *Superficial affective.* (a) *Pricking.* For single pricks, with the algesimeter at a pressure of 3.0 grammes, sensibility was preserved with slightly raised threshold

* As the same von Frey hair was used in practically all the tests it was not considered necessary to represent the stimulus strengths in gm/mm² *i. e.* energy units.

for the "hurt" element, this latter when felt being intensely disagreeable and spreading all over the thumb. Sensibility for the critical element (pointedness) of this stimulus was markedly impaired. (b) For the *dragged pin point* an outlying area of hyperalgesia on the back of the hand could be mapped out in the first interosseous space. This area was continuous with the area of hyperalgesia to pricking on the dorsum of the thumb.

Sensory examination, October 24 (forty-eight hours after injury). *Chart A*.



A. Case 1.—Oct. 24th, 1921. The arrows indicate the sites of entrance of the canine teeth.

A. *Spontaneous*. Nothing. No pain; the parts feel unnatural to the touch. Not so sore on movement or pressure as on October 23.

B. *Elicited*. (1) *Superficial critical*. (a) *Light touch*. For the 0.085 gramme von Frey hair lost sensibility represented by shaded area of fine dots. For the dragged camel's hair brush an introspective difference was appreciated over an area slightly larger than that representing the loss for the von Frey hair. (b) *Warmth*. For 38° C. in a silver test tube with a contact surface of three square millimeters, sensibility was lost for the specific element (warmth) over area shaded with light dots. The comparative evaluation for the elements of this stimulus stood:

	Corresponding normal area	Affected area
Touch	+++	+
Warmth	+++	o
Hurt	o	o

(c) *Cold*. For 26° C. sensibility was lost for the specific element (cold) over area shaded with light dots. Comparative evaluation for the elements of this stimulus stood:

	Corresponding normal area	Affected area
Touch	+++	+
Cold	+++	o
Hurt or unpleasantness	o	o

(2) *Superficial affective.* (a) *Pricking.* For single pricks, with the algometer at 3.0 grammes pressure, sensibility was preserved, with slightly raised threshold, for the hurt element upon the area shaded with heavy dots, where it exhibited typical protopathic characteristics, viz., sudden entry into consciousness, radiation, reference, persistence, and over-reaction (subjective and objective). Patient was unable to consistently tell the head from the point of a pin. Introspectively the chief features were: (1) When the stimulus was applied nothing was felt at first, then the dull, aching, burning hurt appeared within which there subsequently appeared a sharp, clear sting. (2) The persistence, radiation, reference (from the first interosseous space to the interphalangeal joint of the thumb) and inability to name the stimulus. The comparative evaluation for the elements of this stimulus stood:

	Corresponding normal area	Affected area
Touch	+++	o
Pointedness	+++	+ or o
Hurt	+	+++
Over-reaction subjective (ex- clamation)	o	+
Over-reaction objective (with- drawal)	o	+
Localization	+++	o
Radiation	o	+
Reference	o	+
Persistence	o	+
Ability to name the stimulus....	+	o or ψ *

* ψ Signifies impairment, $\psi\psi$ marked impairment.

(b) *Heat.* For 44° C. only contact was felt at first upon the heavily dotted area but soon the element of stinging appeared. The comparative evaluation for the elements of this stimulus stood:

	Corresponding normal area	Affected area
Touch	+++	+
Warmth	+++	o
Hurt (stinging, burning, etc.).....	o	+

For 46° C. the sting element was felt as pricking. It appeared after the touch element and spread considerably. The comparative evaluation stood:

	Corresponding normal area	Affected area
Touch	++	+
Warmth	++	+
Hurt (stinging, burning, etc.)....	+	++
Radiation	o	+

For 47° C. the element of burning-sting appeared early and was very disagreeable. The stimulus effects spread. The comparative evaluation stood:

	Corresponding normal area	Affected area
Touch	+	+ ψ
Warmth	+	+
Hurt (stinging, etc.).....	+	+++
Radiation, etc.	o	+
Over-reaction (subjective).....	o	+
Over-reaction (objective).....	o	+
Ability to name stimulus.....	+	+ ψ

For 50° C. the sting element overshadowed the touch element and was attended by "protopathic" characteristics. The comparative evaluation stood:

	Corresponding normal area	Affected area
Touch	+ ψ	o or ψψ
Warmth	+ ψ	o or ψψ
Hurt (stinging, etc.).....	+	+++
Radiation, etc.	o	+
Over-reaction (subjective).....	o	+
Over-reaction (objective).....	o	+
Ability to name stimulus.....	+	+ ψ

(c) Cold. For 20° C. the hurt or unpleasant element appeared at once upon the heavily dotted area, with spreading, over-reaction, etc., and overshadowed everything else. It was felt as burning and disagreeable just like the stinging felt in heat above 45° C. It was somewhat like the sensation of normal pricking but dull, that is, minus the element of sharp, bright sting. An element of cold appeared late as did an element of sharp sting. The comparative evaluation stood:

	Corresponding normal area	Affected area
Touch	o or ψψ	o or ψψ
Cold (specific element).....	+++	+
Hurt or unpleasantness.....	o	+++
Radiation, etc.	o	+
Over-reaction (subjective).....	o	+
Over-reaction (objective).....	o	+
Ability to name stimulus.....	+	+ ψψ

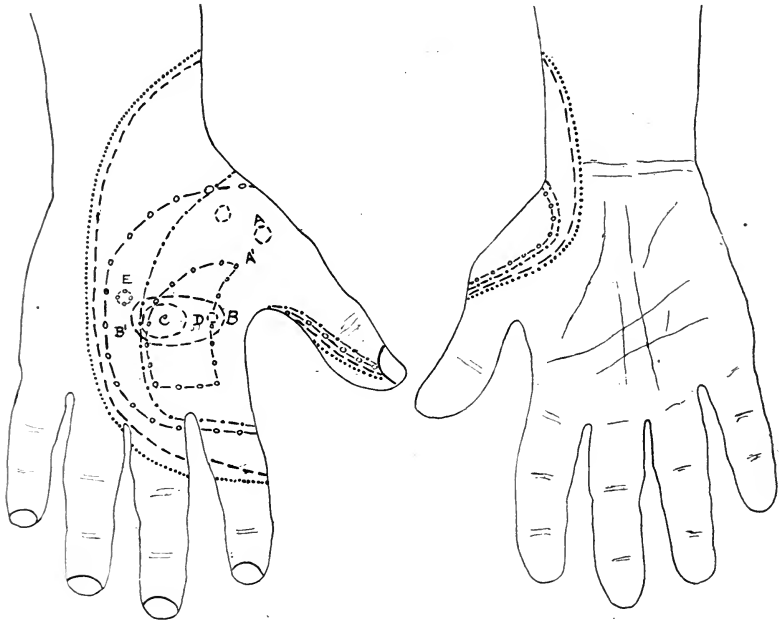
October 24 to October 29. No pain.

October 29. Spontaneous pain on awaking. After flexing and extending the joint a few times the pain passed away.

October 30 to November 6. Short lived pains were felt at intervals, especially on awaking in the morning. About the fifteenth day after the injury the spontaneous pains disappeared and for two or three weeks subsequently there was some tenderness on deep pressure which died out gradually. After the first ten days there was a gradual restoration of critical sensibility. With this there proceeded, *pari passu*, suppression of the protopathic features associated with superficial affective stimulation until sensibility for both critical and affective stimuli had become normal after the lapse of about eight weeks.

CRITICAL DISSOCIATION

Case II. L. S. M. Thirty-four years, male, fractured the shaft of the humerus on October 27, 1914. The bone was plated on November 10 and after this operation radial nerve paralysis was first noticed. On March 29, 1915, the late Dr. Robert H. M. Dawbarn performed a neuroplastic operation after finding the "radial nerve completely divided, the ends being three inches apart." On April 15, 1915, the patient was first seen by me and showed all the sensory and motor (including electrical) signs of radial nerve paralysis. Sensory examinations were made once or twice a week from April to the end of August when the patient passed from observation for one year. All forms of critical and affective sensibility, superficial and deep, were tested by quantitative methods and the results charted or otherwise recorded. Suitable intervals separated each stimulus application to obviate as far as possible the summation which necessarily attends a "moving" stimulus.



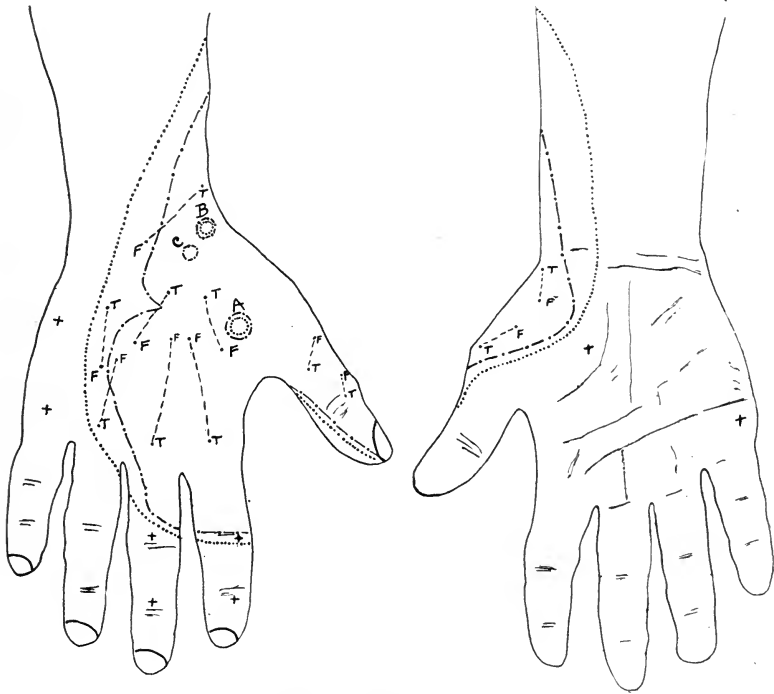
B. Case 2.—April 15th, 1915.

Sensory examination April 15, 1915. *Chart B.*

A. *Spontaneous.* Occasional pain in operative scar.

B. *Elicited.* (1) *Superficial critical.* (a) *Light touch.* For the von Frey hair bending at 0.085 gramme pressure, sensibility lost upon area bounded by line of dashes. On islands A, C, D, bounded by dashes, sensibility present for the 0.085 gramme von Frey hair. On the large oval area B which includes islands C and D, sensibility present for the 1.20 gramme von Frey hair.

(b) *Hair sensibility.* The hairs on the radial area of the right hand were fine and delicate and stood erect. On the left hand the hairs were coarser and had a tendency to lie down in a smooth, regular way. On the ulnar side of the right hand the hair presented the same regular, smooth appearance as the corresponding hair on the left hand. Hair sensibility was tested before shaving by gently stroking the hair with cotton wool. Over the anaesthetic area on the right hand this procedure evoked no sensation, whereas on the sound limb a gentle tickling was felt.



C. Case 2.—April 19th, 1915.

(2) *Superficial affective.* (a) For *pricking*, with the algometer at 3.0 grammes pressure, sensibility was absent over area bounded by the outer line of dashes and circles but present upon a small island E, near the middle of the dorsum of the hand. For pricking at 27.2 grammes pressure, lost sensibility bounded by the inner line of dashes and circles. Slight trace of subjective over-reaction along the upper and lower bounds of this area. Well marked over-reaction along the boundary of lost sensibility for pricking at 3.0 grammes pressure. (b) For 60° C. in a silver test tube with a contact area of three square millimeters, lost sensibility bounded by line of dots. (c) For ice in a silver test tube lost sensibility bounded by line of dots and dashes. No over-reaction for ice or 60° C.

(3) *Deep critical.* (a) For *pressure-touch*, with the aesthesiometer at 2.3 grammes pressure, sensibility was preserved all over the hand except upon an oblong area $2 \times \frac{3}{4}$ inches overlying the first interosseous space. For 4.18 grammes pressure, sensibility was present over this latter area.

(4) *Deep affective.* (a) For *pressure-pain* the thresholds obtained with the algometer averaged: 3.5 kilos at A' as compared with 5.5 kilos on the sound side; 2.5 kilos at B' as compared with 7.0 kilos on the sound side. Marked subjective and objective over-reaction on the right hand with sudden entry and other protopathic characteristics.

Sensory examination April 19, 1915. *Chart C.*

A. *Spontaneous.* Nothing.

B. *Elicited.* (1) *Superficial critical.* (a) *Compass points* simultaneously applied at a separation of 1 cm. Marked impairment on several areas tested within the touch loss area B in Chart B as compared with similar areas on the sound limb.

(2) *Superficial affective.* (a) *Warmth.* Loss for 49° C. bounded by line of dots. (b) *Cold.* Loss for 14° C. bounded by line of dots and dashes. Sensibility preserved for both of these stimuli on islands A and B and for 14° C. on island C, but neither stimulus evoked pain or unpleasantness on islands A, B or C. No over-reaction, subjective or objective.

(3) *Deep critical.* (a) *Localization.* Tests gave results as indicated on Chart C where T represents the point actually touched and F the point at which the patient felt it. Where T and F coincided is indicated by a cross (+). (b) *Passive movement.* Impaired recognition in the fingers especially for flexion movements which were not appreciated until an arc of 80° had been traversed.

Sensory examination April 24, 1915. *Chart D.*

A. *Spontaneous.* Back of right hand near the thumb feels "sensitive and raw." Slightest touch in places seems to "shoot all through the hand."

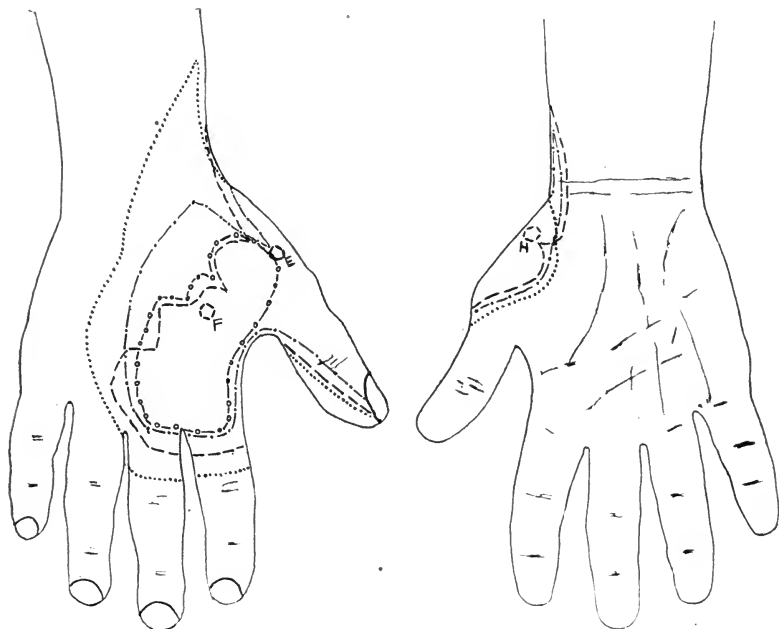
B. *Elicited.* (1) *Superficial critical. Light touch.* Loss for the 0.085 gramme von Frey hair bounded by line of dashes. The islands of restored sensibility E and F presumably represent the islands A and D of Chart B, C and the greater portion of B having joined the mainland of returned sensibility. A new island H has appeared on the thenar eminence.

(2) *Superficial affective.* (a) For *pricking* at 3.0 grammes, loss bounded by line of dots and circles. The island E in Chart B has been taken up into the general area of returned sensibility. Subjective over-reaction present along the radial and distal boundary of lost sensibility but absent along the proximal two-thirds of the ulnar boundary. (b) For 60° C. loss bounded by line of dots. Momentary contact evokes a sense of pricking but no marked over-reaction. (c) For ice, loss bounded by line of dots and dashes. The islands A, B, C in Chart C have disappeared. Two of them, B and C, have

manifestly been taken up into the general area of returned sensibility for ice whilst the third, A, and the portion of B representing returned sensibility for 60° C., have simply disappeared. No over-reaction subjective or objective.

(3) *Deep critical.* For the aesthesiometer at 2.3 grammes pressure, sensibility was present all over the hand.

(4) *Deep affective.* The algometer thresholds averaged, in the first and second interosseous space respectively within the area of



D. Case 2.—April 24th, 1915.

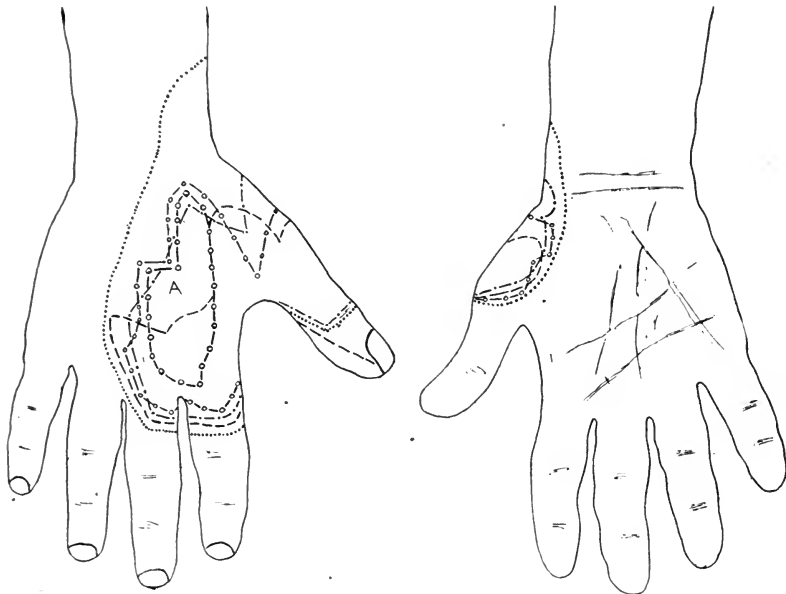
preserved sensibility for pricking, 4.0 and 2.5 kilos as compared with 7.0 and 7.5 kilos on the sound hand. Over-reaction subjective and objective on right hand.

Sensory examination May 29, 1915. *Chart E.*

A. *Spontaneous.* At times sudden sharp pains felt in the back of the right hand.

B. *Elicited.* (1) *Superficial critical.* (a) For the 0.085 von Frey hair, loss bounded by line of dashes. The islands E, F, H in Chart D have been taken up into the general area of returned sensibility. (b) For the *compass points*, simultaneously applied at a separation of 1.5 cm. upon the main dissociation area A, the answers were, in 30 trials, 18 wrong for ones and 6 wrong for twos. In control tests on the sound side the answers were 15 wrong for ones and 3 wrong for twos.

(2) *Superficial affective.* (a) For pricking at 8.6 grammes pressure, loss bounded by inner line of circles and dashes. Marked over-reaction, subjective and objective, over the proximal phalanx of the thumb. Some over-reaction over the distal portion of the general boundary but none elsewhere. For pricking at 3.0 grammes pressure, loss bounded by outer line of circles and dashes. Two hairs had grown on the back of the hand, one within area A and another to the ulnar side of the line bounding loss for pricking at 3.0 grammes. Pulling the hair on A evoked a sensation similar to that evoked by pulling a hair on the sound limb but with less of the hurt element. Pulling the outer hair evoked a sensation identical in kind and degree with that evoked on the sound limb. For pricking at 27.2 grammes pressure, sensibility had returned all over the hand excepting an area



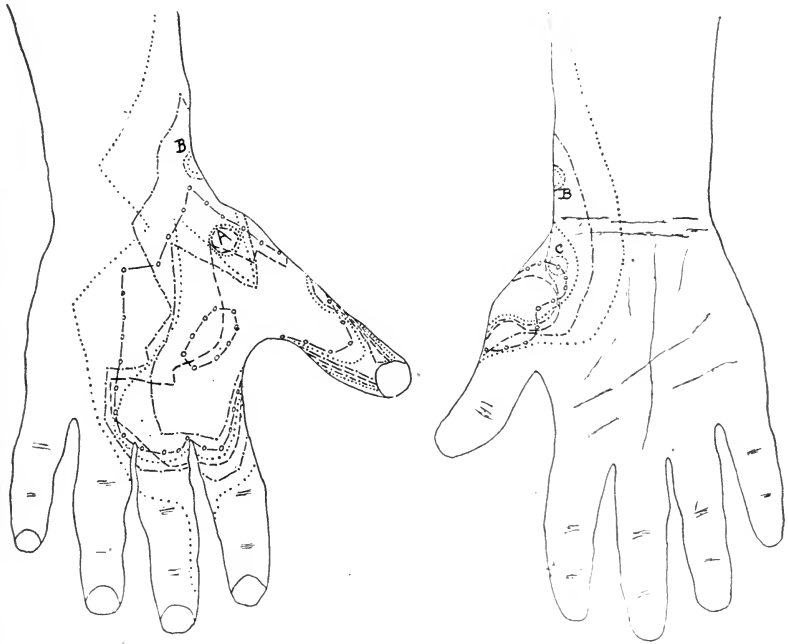
E. Case 2.—May 29th, 1915.

three-fourths inch in diameter, the ulnar half of which overlay the lower outermost (radial) portion of the area of returned sensibility for the 0.085 gramme von Frey hair. Compare Chart F. Subjective and objective over-reaction for pricking at 27.2 grammes present all over radial area of dorsum of hand but much less in evidence toward the ulnar as compared with the radial and distal portions. (b) For 60° C. loss bounded by line of dots. Slight over-reaction subjective and objective. (c) For ice, loss bounded by line of dots and dashes. No over-reaction.

(3) *Deep critical. Pressure-touch.* For the aesthesiometer at 2.3 grammes pressure, sensibility present all over the radial area.

(4) *Deep affective.* (a) *Pressure-pain.* The algometer

thresholds averaged: In the second interosseous space, within the area of critical dissociation A, 4.0 kilos as compared with 5.5 kilos on the sound side. (b) *Vibration*. No difference in quality or rate could be detected with the tuning fork on the affected side as compared with the sound side.



F. Case 2.—June 10th, 1915.

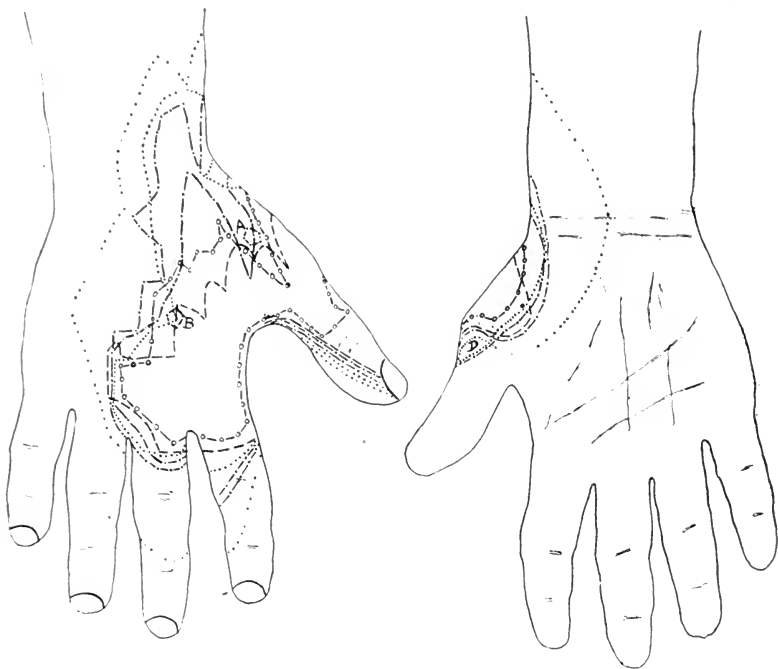
Sensory examination June 10, 1915. *Chart F.*

A. *Spontaneous*. Pains over thumb with change of weather.

B. *Elicited*. (1) *Superficial critical*. (a) For the 0.085 gramme von Frey hair, loss bounded by line of dashes. (b) For 38° to 40° C. loss bounded by outer line of dots. Islands of returned sensibility at B and A. (c) For 25° to 27° C. loss bounded by outer line of dots and dashes. Islands of returned sensibility at C on the thenar eminence, at B on the radial border of the wrist, and at A.

(2) *Superficial affective*. (a) For pricking at 3.0 grammes, loss bounded by outer line of circles and dashes. No over-reaction towards the boundary line for the dragged pin point before sensibility had been tested for pricking at 27.2 grammes. After these tests over-reaction, subjective and objective, was present over the thumb and knuckles but not toward the ulnar boundary. For pricking at 27.2 grammes, loss bounded by inner line of circles and dashes. Over-reaction, subjective and objective, present over the thumb and knuckles but absent over the rest of the area of returned sensibility for pricking at 3.0 grammes. (b) For 60° C. loss bounded by inner

line of dots and dashes. No over-reaction for momentary contact. (c) For ice, loss bounded by inner line of dots and dashes. No over-reaction.



G. Case 2.—June 24th, 1915.

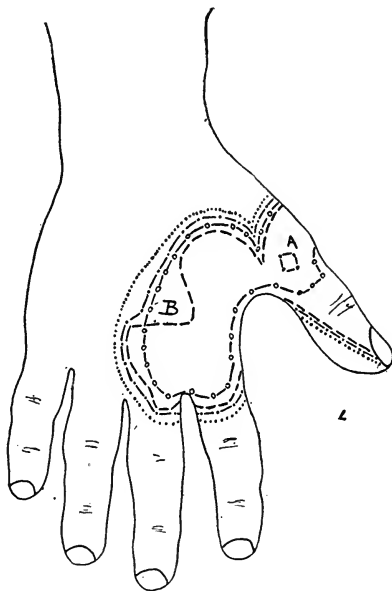
Sensory examination June 24, 1915. Chart G.

A. *Spontaneous*. At times pain about the thumb.

B. *Elicited*. (1) *Superficial critical*. (a) For the 0.085 gramme von Frey hair, loss bounded by line of dashes. (b) For 38° to 40° C. loss bounded by outer line of dots and dashes. The island B in Chart F has been taken up into the general area of returned sensibility for 25° to 27° C. At the wrist the boundary of loss for 25° to 27° C. has advanced inward whereas that for 60° C. has withdrawn considerably. On the outer portion of island A sensibility was present for 25° C. but only after testing the radial half of the island with ice where sensibility for this stimulus and for 25° C. was always present at this day's sitting. After such rousing of the neurones sensibility was present for 20° to 25° C. whilst it was apparently absent for ice. Occasionally 60° to 65° C. evoked a sensation of warmth on island A but in general these ranges and 38° to 40° C. evoked no sensation whatever. On island D sensibility was also similarly present for 25° and 38° C. and apparently absent for ice and 60° C. (c) For 25° to 27° C., loss bounded by outer line of dots.

(2) *Superficial affective*. (a) For pricking at 3.0 grammes, loss

bounded by line of circles and dashes. (b) For 60° C., loss bounded by inner line of dots. On the wrist and upper portion of the hand this boundary has receded, the island A in Chart F having disappeared. (c) For *ice*, loss bounded by inner line of dots and dashes. This line so closely approaches the boundary of loss for 25° to 27° C. along the midaxial line of the ring finger that one line of dots and dashes represents both boundaries for a short distance in Chart F. Note island B in which sensibility for the 0.085 gramme von Frey hair, ice and 60° C. has returned on the ulnar half whilst on the radial half sensibility was absent for all these stimuli except ice.



H. Case 2.—August 23rd, 1915.

Sensory examination August 23, 1915. *Chart H.*

A. *Spontaneous.* Occasional pain in operative scar.

B. *Elicited.* (1) *Superficial critical.* (a) For the 0.085 gramme von Frey hair, loss bounded by line of dashes. (b) For 38° to 40° C., loss bounded by line of dots. (c) For 25° to 27° C., loss bounded by line of dots and dashes. Island of returned sensibility at A. (d) For *compass points*, applied simultaneously at a separation of 1 cm. over area of dissociation B, the answers in twenty trials showed: for ones 5 wrong; for twos 3 wrong as against 5 wrong for ones and 9 wrong for twos on the sound hand.

(2) *Superficial affective.* (a) For *pricking*, at 3.0 grammes, loss bounded by the line of circles and dashes. (b) For *pricking* at 27.2 grammes, and for 60° C., sensibility was present all over the hand.

Motor function began to return toward the middle of July and in the latter part of August the patient returned to work and was not seen again until July, 1916, when it was found that sensibility for the 0.085 gramme von Frey hair and for pricking at 3.0 grammes had returned all over the hand. Sensibility on the right hand was at this time as good as on the left, the only appreciable difference being an introspective one favoring the left hand.

DISCUSSION AND SUMMARY

Besides the protopathic dissociation which it so clearly illustrates case 1 presents other interesting features. The upward and lateral extension of the sensory disturbances can hardly be fully explained by the mechanical nerve trauma alone. In the author's opinion a mild infection supervened. To this perhaps, as much as to the direct nerve trauma, are to be attributed the extension of the sensory signs and the spontaneous pains which appeared on the seventh and disappeared on the fifteenth day. Similar cases of widespread sensory disturbances caused by small suppurative foci have been studied by the author (3). Compare the effects of toothache and similar infections as seen in the neuralgias, etc. The case well illustrates the author's simple method for introspective evaluation of the various elements represented in what are apparently the very simplest forms of stimulus.

Case 2 furnishes evidence of critical dissociation in which touch, which may be regarded as the basic representative of critical skin sensibility, became restored far in advance of the hurt or unpleasant element in pricking, heat and cold. The order of restoration of sensibility clearly shows that separate and distinct systems of nerve fibers mediate the two fundamental forms and that these systems function antagonistically—the critical system within certain limits inhibiting and restricting the affective system in the interests of cognitive (avoidance without contact) as opposed to reflex methods (withdrawal after contact) of protection (3). The absence, along the ulnar boundary, of over-reaction for such affective stimuli as pricking, etc. and its presence in marked degree along the remainder of the boundary well shows the control exercised by the critical over the affective system. Compare Charts B, D, E, F. In Chart B pricking at 27.2 grammes evoked no over-reaction in the vicinity of B, an area representing returned sensibility for the 0.085 gramme von Frey hair. Antagonists of the dissociation hypothesis who hold that all forms of sensibility return at an equal rate after nerve injuries will find it difficult to explain the presence of sensibility for

such a stimulus as the 0.085 gramme von Frey hair on area B of Chart B and absence of sensibility for the hurt element in pricking at such a heavy pressure as 27.2 grammes. Nor will invocation of over-lap in sensory distribution, or irregularity in the mode of regeneration, alter matters. The presence of sensibility for the critical elements and its absence for the affective element, as found in the main dissociation area of all the Charts from B to H, proves conclusively that separate anatomical systems mediate the critical as opposed to the affective elements. This is merely the obverse of the picture shown in Case 1.

The question so long in dispute among psychologists as to whether pain may not be the result of excessive stimulation of the touch mechanisms must be regarded as definitely decided in the negative. It is true that what is originally a mere tactile stimulus may, by increase in the force of application, be converted into a painful one. The mechanism here, however, does not consist of overstimulation of the touch mechanisms but of activation of the hurt or pure affective mechanisms which in reality tends to inhibit the touch mechanisms. Compare conditions of cutaneous hyperalgesia in which the author found that the 0.085 von Frey hair which, under ordinary conditions evoked merely the sensation of touch, elicited the sensation of pin-prick. Compare further the warmth and hurt elements in temperatures above 45° C. Here, as the higher temperatures are applied, the warmth mechanisms do not become overstimulated and so give rise to hurt but rather become reciprocally inhibited as the hurt mechanisms become activated. In the main area of critical dissociation shown in Charts B to H it is evident that touch, and the hurt element of pricking, of heat, and of cold, are mediated by two systems of nerve fibers that have nothing in common except an antagonism of function, the latter clearly shown by the absence of over-reaction for all forms of superficial affective stimulation towards the ulnar boundary. The islands shown in the various Charts indicate further that sensibility for the critical elements in such complex stimuli as pricking, heat and cold is mediated by separate subsystems of critical paths. Compare Chart F in which sensibility for pricking with the algometer at 3.0 grammes pressure, was absent on island A but present on island B; whereas sensibility for 40° C. and 25° C. was present on islands A and B, sensibility for 40° C. being absent on island C though present for 25°. Variability was a feature of some of these islands, sensibility for one or two elements being occasionally present on one day and absent on the next. The mechanism of this

variability undoubtedly consists of a throw back in the condition of the proximal portions of the actively regenerating neurones including the neurone bodies in the dorsal root ganglia. Compare the author's observations on a similar phenomenon in animals subjected to experimental nerve lesions (5).

Throughout these studies the author paid particular attention to ascertain whether sensibility for ranges of temperature just above and below the skin temperature ever became restored in the absence of sensibility for higher and lower ranges respectively. On occasions, as on island D in Chart G, sensibility was apparently present for 38° C. and 25° C. and absent for 55° to 60° C. and ice respectively. Repeated investigation, however, showed that wherever such conditions were found they were not constant and when one attempted to verify the findings it was often found that sensibility was present for both the weaker and the stronger forms of stimuli or that it had disappeared for both forms. Thus on the upper ulnar portion of island A in Chart F sensibility for 25° C. was present only after applying ice to the lower portion of the island. The mechanism here consists of arousing the sluggish quasidormant regenerating neurones to activity. To the author it seems to be an established law, and one of fundamental significance in the mechanism of neural functioning, that the *primary sensory neurones of the affective system when slightly injured or overstimulated continue to hyperfunction for some time after the withdrawal of the stimulus*. Newly regenerating affective neurones, although they often exhibit a raised initial threshold, are peculiarly subject to this law and show, besides, a marked tendency to function on the "All or nothing" principle. This latter property of the newly regenerating primary affective neurones is one of the main factors in the mechanism of over-reaction—subjective and objective—the other factor being the absence of the controlling influence of the critical system. The sluggishness of the regenerating affective neurones and the effect of "rousing" them was further seen in the examination of June 10, 1915 (Chart F), when it was found that the dragged pin point was attended by no over-reaction, subjective or objective, until the tests for pricking at 27.2 grammes had been made and then over-reaction about the thumb and knuckles was a marked feature.

Head's division of sensibility for "heat" and "cold" into epicritic and protopathic forms is arbitrary and unwarranted since "heat" and cold of all ranges form a continuum in so far as the specific element warmth and cold are concerned. Compare the author's

findings in a case of syringomyelia where sensibility for the element warmth in 55° to 60° C. was preserved, the hurt element having been totally suppressed. Head records two instances in which the element warmth was retained for the lower degree of the heat scale but absent for the higher degrees. In the Horsley case (4) 43° C. was felt as warm whereas 55° C. appeared to be neither hot (warm) nor cold. On the triangular area of Rivers and Head (1) light touch was preserved and 42° to 49° C. was felt as warm whereas higher temperatures were not felt. These are merely instances of critical dissociation in which the affective element was suppressed the critical elements being retained. The cases by no means justify the arbitrary "epicritic range" which Head based upon them. The failure of higher degrees of temperature to elicit warmth in Head's cases merely indicates that in these instances the higher temperatures reciprocally inhibited the critical element. As we shall presently see the critical and affective systems function together in mediating sensations evoked by such affective stimuli as pricking, heat and cold. It is a commonplace to find instances in which heat about 60° C. and ice evoke the sensation of cold and "burning" respectively. Compare the author's case (3) in which ice evoked the sensation of heat and burning and contrast it with the condition known as paradoxical cold in which heat (above 45° C.) may evoke the sensation of cold.

The critical and affective systems though separate anatomical entities have, however, such intimate functional relations that it is practically impossible under ordinary conditions for any given stimulus to activate the mechanisms of one system without at the same time influencing to some extent the mechanisms of the antagonistic system. Upon this "coöperation of antagonism"—to borrow a phrase used by Hughlings Jackson to describe the functional inter-relations of the cerebrum and cerebellum—rests the development of those composite forms of sensibility known as pricking, heat (above 45° C.) and cold (below 22° C.). Thus in pricking with a pin the contact may be so slight that the sensation evoked may be that of touch upon an extremely small surface. This constitutes touch-point or pointedness, a purely critical form. When the pin point is applied with somewhat greater force an element of hurt or unpleasantness is added. This form which is a composite of appreciably distinct critical and affective elements is called "sharpness" by the average subject. The term is a poor one and misleading in introspective evaluations. A better term from the examiner's standpoint would be point-hurt. When the pin point is

applied with still greater force the pure affective element inhibits the critical element and only the hurt element is felt with a minimum of qualifying critical element. The compositeness of the sensations of pricking, of heat, and of cold is well set forth in the author's method for introspective evaluations described in a previous paper (2) and illustrated by case 1 in the present paper.

In testing sensibility for temperatures above that of the skin as ordinarily done *i.e.*, with water in metallic test tubes, the temperature may be so low that only the sensation of touch is experienced. With slightly higher temperatures another element is added *viz.*, *warmth* which is the *specific critical element for all degrees of temperature above the neutral point (skin temperature)*. As higher temperatures are used a point is reached usually about 45° C. depending upon the temperature, moisture, etc., of the atmosphere and of the patient's body, etc., when the affective element (hurt or unpleasantness) appears. This element is variously described by subjects as stinging, burning or "hot" all of which are misleading. The better term for introspective analysis would be warm-hurt. With a further increase of temperature the critical elements of touch and warmth are inhibited until, at about 55° to 60° C. only the pure affective or hurt element is immediately felt. In making introspective evaluations for this stimulus due regard must be given to the order of appearance of each element in consciousness more especially where "areal" as opposed to punctiform stimuli are used. In testing sensibility for temperatures below the skin temperature, with water in metallic test tubes, the temperature used may be so little below that of the neutral point that only the sensation of touch is experienced. With a lower temperature the critical element cold appears. As lower and lower temperatures are used the affective element unpleasantness or hurt appears, and with extremely low temperatures even the critical element cold may be inhibited the subject experiencing the "sensation of being burnt." In tests as ordinarily made with areal stimuli the effects of heat and cold *e.g.*, 60° C. and ice, radiate to the surrounding parts so that at the focus of stimulation and there only, does complete inhibition of the critical elements occur. In the skin bordering the focus of stimulation the affective element becomes so attenuated that it no longer completely inhibits the critical element and the specific nature of the stimulus is correctly appreciated. Hence it is not unusual for normal persons to be able to name the stimulus *e.g.*, for heat at 70° C. or for a freezing mixture of ice and snow.

In pathological conditions involving the cerebral cortex, and in the regeneration period after peripheral nerve injuries, it is not uncommon to find that 60° C. or ice may evoke its fundamental affective element, *i.e.*, hurt or unpleasantness, in conjunction with a qualifying critical or pseudocritical element which is the opposite of what the stimulus used would be expected to evoke, *viz.*, "cold" in the case of 60° C. and "hot" or "burning" in the case of ice. These conditions have long been known under the names paradoxical cold and paradoxical heat respectively. A fact to be remembered is that cold is analgesic and tends to modify the purely affective element. It is in the early stages of exposure to extreme cold and in the reactionary stages after exposure that the pure affective or hurt element is most felt.

Apart from the question of punctate sensibility the facts here adduced indicate that separate systems of nerve fibers mediate critical and affective sensibility and that within the critical domain separate subsystems mediate touch, the specific element warmth, and the specific element cold. The affective system does not show evidence of differentiation of function other than as set forth above *i.e.*, where it enters into the makeup of such complex affective forms as pricking, heat and cold. It is evident, therefore, that protopathic heat and protopathic cold, so much insisted upon by Rivers and Head (1) as primary fundamental forms, are in reality not primary forms but composites of simpler elements.

In Charts B, C and D evidence is found of impairment of deep critical sensibility with a corresponding lowering of threshold for deep affective stimuli (protopathic dissociation). Compare Chart B for impairment of pressure-touch and Chart C for impairment of localization and of the sense of posture and passive movement. In testing this latter it was noteworthy that the impairment was mainly for flexion of the fingers, a movement which activates the receptors in the antagonist extensors. It seems, therefore, that the radial nerve mediates many forms of deep critical sensibility for the fingers and dorsum of the hand if we assume, as we reasonably may, that the defects of deep critical sensibility observed were the result of injury of the radial nerve and not of accidental complications. The lowering of the threshold for pressure-pain stimuli at A and B in Chart B, and the attendant over-reaction, indicate hyperfunction of the affective mechanisms partly as the result of removal of the inhibition exerted by the corresponding deep critical elements. Compare this dissociation of the deep critical elements pressure-touch,

localization (in part), posture and passive movement, from the deep affective or hurt element, with the author's classification of the peripheral nerves (6). Spatial discrimination, as tested by the compass points simultaneously applied, is regarded by Rivers and Head (1) as the most delicate of all the "epicritic forms." The author, however, has shown (3) by tests made directly upon subcuticular structures that this form is to some extent also mediated by the more deeply situated mechanisms. The compass tests recorded for April 19th showed a marked defect within the radial area on the right hand. The records for May 21st showed improved sensibility but there still remained a marked defect for the appreciation of "twos." By August 23rd sensibility for the compass points was as good, if not better, than on the sound limb. The question as to whether a separate set of fibers mediates this form of sensibility had perhaps better be deferred until it has been more clearly established that it is in reality a simple form and not what it appears to the author to be *viz.*, a mere complex resultant of a twofold simultaneous appeal to the mechanism of an elementary form, *viz.*, pressure-touch.

The question arises: Which of the two basic forms *i.e.*, critical or affective, is prior in the order of time? Is one a development of the other, or has each form been an independent entity from the beginning? In view of certain easily demonstrable facts it seems that the evidence, as far as it goes, points to the critical system as an entity intrinsically independent of the affective system. Thus in the spinal frog as shown by Baglioni (7) and in the spinal dog as shown by Sherrington (8) affective stimulation *e.g.* pricking of the planta, evokes the flexion reflex whereas critical stimulation *e.g.*, gentle upward pressure of the foot (dorsiflexion), evokes the extensor thrust. A further point is that in syringomyelia the critical elements pointedness, warmth and the specific element cold in such stimuli as pricking, heat (above 45° C.) and ice, may be dissociated from the pure affective element hurt or unpleasantness (3). In the light of our present knowledge it seems that, as low in the scale as the batrachians, the critical and affective systems are independent anatomical entities. Neither seems to be prior to the other in the order of development but both are closely related functionally in a "coöperation of antagonism" which is close kin to the reciprocal innervation of antagonistic motor mechanisms, and which forms the basis not only of cognitive methods of protection but of ordered sensation and psychic development. Indeed "coöperation of antagonism" seems to be the basic point of ordered functioning in the

neural mechanisms from the simplest reflex to the most complex psychic reaction.

CONCLUSIONS

(1) The occurrence of protopathic and critical dissociation after peripheral nerve injuries points to the existence of two fundamental independent anatomical systems of nerve fibers for the mediation of the basic critical and affective forms of sensibility.

(2) The critical and affective systems have intimate functional relations each system functioning in a general way as the antagonist of the other.

(3) Within certain limits of stimulation each system may partially inhibit the other so that elements from each may fuse, or enter consciousness simultaneously, forming the basis of our ordinary composite sensations such as pricking, heat, cold, etc.

(4) The fundamental critical system is further differentiated into independent sets or sub-systems of fibers for the mediation of the specific elements warmth, cold, etc.

(5) The affective system does not become differentiated otherwise than as it functions side by side with the critical system supplying the affective element in our ordinary composite sensations.

(6) "Protopathic" heat and cold as primary forms of sensibility have no existence in fact.

(7) Spatial discrimination as tested by the simultaneous application of the compass points is not a primary form of sensibility.

(8) The so-called "epicritic ranges" for heat (warmth) and cold considered as primary independent forms of sensibility have no existence in fact. They are merely an arbitrary division of the general range which for each of the critical elements warmth and cold is a natural continuum.

(9) The radial nerve mediates deep critical and affective forms for portions of the fingers and dorsum of the hand.

(10) Normal and newly regenerating primary sensory neurones of the affective system when injured or overstimulated continue to hyperfunction for some time after the stimulus has been withdrawn.

(11) Newly regenerating primary affective neurones exhibit a marked tendency to function according to the "All or nothing" principle.

(12) Overreaction is, in part, the result of release of the affective mechanisms, with their inherent "All or nothing" tendency, from the inhibitory influence of the critical mechanisms.

(13) Neither system, as low in the scale as the batrachians, seems to be prior to the other in point of time or development.

(14) In deep sensibility the critical and affective elements are mediated by separate anatomical systems which have functional inter-relations like those found in the superficial critical and affective systems.

(15) The "coöperation of antagonism," under which the critical and affective systems function, furnishes not only the basis of cognitive methods of adjustment to environmental changes and of ordered sensation and psychic development but is the basic point of ordered functioning in neural mechanisms from the simplest reflex to the most complex mental reaction.

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A STUDY OF THE RESISTANCE OF RED BLOOD CELLS
TO THE HEMOLYTIC ACTION OF HYPOTONIC
SALT SOLUTION IN PSYCHONEUROSES *

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The resistance of red blood cells may be tested by several methods classifiable into two major groups. First, the physico-chemical method,—this method is thought to be dependent primarily upon simple osmotic pressure differences, but as we shall have occasion to show in another paper involves also the factor of cell permeability due to the ionic toxicity of the agent used. Secondly, the biochemical methods. The latter can again be divided into two subgroups: (a) the method based upon the use of plant substances, such as saponin, and (b) the method based upon the use of hemolytic immune sera. The results obtained by any of the above methods are not comparable, since they involve different mechanisms of action and, therefore, throw light upon different phases of the resistance of the red blood cells. Further discrepancies in the results may arise even in the use of the same method, due to the difference in the technic applied with regard to the preparation of both, the hemolytic agent, and of the blood tested. Thus, if the hypotonic salt solution method is used, the solutions may be prepared either by the drop method, by the gravimetric method, or by the more precise titration method. As to the blood, the same may be used in its normal state, directly after obtaining it from the subject or after being defibrinated by mechanical means or by the use of oxalates.

Without going into the discussion of the merits of any of the above technical points, we shall proceed with the description of the method used in our work. The hypotonic salt solutions were made up from a 5 per cent stock salt solution, using carefully calibrated serological pipets and volumetric flasks. The concentrations used were the same as recommended by Karsner, that is, the lowest concentration containing .250 per cent of NaCl, the highest concentration containing .600 per cent of NaCl, with intermediate dilutions differing from each other by .025 per cent NaCl. The 5 per cent stock solution was made up from chemically pure and thoroughly dehydrated

* Preliminary paper. Further contributions are in preparation.

NaCl. The blood in all cases was normal and obtained from the subject by simple venepuncture. For the sake of uniformity, the blood was drawn in all cases between 9 and 11 A.M. Two c.c. of each of the fifteen dilutions were placed in thoroughly clean Wassermann test tubes and one drop of freshly obtained blood was then placed in each of the tubes, using at all times a needle of the same gauge, so that the drops may be as uniform as possible. The tubes were then thoroughly shaken individually and allowed to stand at room temperature undisturbed for about three to four hours and were then read from the higher to the lower concentrations. Observation was made where the first pink tint appeared in the tube. This was denoted the point of initial hemolysis. Further observation was made of the complete disappearance of any sediment in the tube and such a phenomenon denoted the point of complete hemolysis. Thus, in every case, two figures are given—the first for initial hemolysis, and the second for complete hemolysis.

A total of 100 cases were examined. Of these 32 per cent were cases diagnosed as psychoneurosis, neurasthenic type (simple and with admixtures or with organic factors); 31 per cent were diagnosed as psychoneurosis, hysterical type (simple with admixtures or with organic factors); 8 per cent were diagnosed as psychoneurosis, anxiety type; 5 per cent were diagnosed as constitutional psychopathic inferiorities; 4 per cent as dementia precox; 3 per cent as traumatic neurosis; 2 per cent as mental subnormality; 2 per cent as valvular cardiac disease; and 11 per cent as various individual organic cases. The discussion of the significance of the figures obtained for the cases making up the 18 per cent last noted will be omitted for the present.

The average group values obtained for the blood resistance for each of the psychoneurosis groups studied were as follows:

TABLE I

	Initial Hemolysis	Complete Hemolysis
Anxiety type . . . . .	.410 per cent	.335 per cent
Neurasthenic type . . . .	.420 per cent	.340 per cent
Hysterical type . . . . .	.435 per cent	.350 per cent

It is, thus, seen, as indicated by the figures for both initial and complete hemolysis, that the resistance of the erythrocytes is lowest in the case of psychoneurosis, hysterical type, highest in the case of psychoneurosis, anxiety type, and is intermediate in psychoneurosis, neurasthenic type. It must be remembered, however, that as given

above, the averages are obtained for each of the groups as a whole, including not only the simple cases but also those with admixtures and with organic factors. Therefore, the only conclusion that may be drawn from the above picture is as follows: As indicated by the average figures obtained for the group values of the initial and complete hemolytic concentrations of sodium chloride, the separation of the psychoneuroses into neurasthenic, hysterical, and anxiety type may have some physico-chemical basis. However, in order to be able to draw conclusions in regard to the relation of each of the groups to the others, the groups must be analyzed into simple cases, cases with admixtures, and cases with coexisting organic factors.

The group values for the simple groups of the psychoneuroses were as follows:

TABLE II

	Initial Hemolysis	Complete Hemolysis
Neurasthenic type . . . .	.415 per cent	.335 per cent
Anxiety type . . . . .	.425 per cent	.350 per cent
Hysterical type . . . . .	.430 per cent	.355 per cent

Thus, it is seen that the group resistance remains distinct, but that the order has changed some. The blood resistance of the group of the hysterical type remains the lowest, that of the neurasthenic type appears to be the highest, and that of the anxiety type intermediate. This would indicate that the relationship between psychoneurosis, hysterical type, and psychoneurosis, anxiety type, is closer than between the hysterical type and the neurasthenic type, so far as blood resistance is concerned. This will be brought out more clearly in this paper later. It also indicates that the existence of organic factors may work either antagonistically or synergistically with the primary manifestations. Thus, the average percentage of concentration of the three type groups of the psychoneuroses with coexisting organic factors were as follows:

TABLE III

	Initial Hemolysis	Complete Hemolysis
Anxiety type . . . . .	.383 per cent	.308 per cent
Hysterical type . . . . .	.419 per cent	.346 per cent
Neurasthenic type . . . .	.428 per cent	.344 per cent

It is, thus, seen that the resistance of the erythrocytes in the case of anxiety neurosis has considerably increased on account of the

coexistence of organic factors. It has increased, though not to the same extent, in the case of hysterical neurosis, whereas it was markedly reduced in the case of psychoneurosis of the neurasthenic type. The fact that the superimposition of the organic factors has increased the resistance of the red cells to the hypotonic salt solution in both anxiety and hysterical neuroses whereas it has reduced the resistance of the cells in cases of psychoneurosis, neurasthenic type, further substantiates our previous conclusion that there may exist a closer relationship between anxiety and hysterical neuroses than between any of them and psychoneurosis, neurasthenic type.

To gain a more thorough understanding of the effect which the superimposition of the organic factors may have upon the blood resistance of the different cases of psychoneurosis, large numbers of the same or similar organic factors should be studied. This is especially desirable, since it is presumed that different organic factors may have dissimilar effects upon blood resistance of subjects of the same or similar psychoneurotic manifestations. It must be stated, however, that a review of the literature shows that the majority of the organic factors ordinarily effect an increase in the resistance of the red blood cells to the hypotonic salt solution, which renders more support to the results obtained above.

The effect which the admixture of secondary psychoneurotic manifestations has upon the resistance to hypotonic salt solution of red blood cells of subjects with what may be designated as primary manifestations, as indicated by the group values obtained for the percentage concentrations causing initial and complete hemolysis, is pointed out by the following figures:

TABLE IV

Psychoneurosis, neurasthenic type, with other psychoneurotic admixtures,	
Initial hemolysis, .414 per cent	Complete, .328 per cent
Psychoneurosis, hysterical type, with other psychoneurotic admixtures,	
Initial hemolysis, .425 per cent	Complete, .359 per cent
Psychoneurosis, anxiety type, with other psychoneurotic admixtures,	
Initial hemolysis, .425 per cent	Complete, .350 per cent

The effect, as seen from a comparison of Tables II and IV, is practically nil, the group values for the percentage concentration remaining practically the same as in the cases of the simple type.

Of the remaining cases studied, mention is made only of two groups: First, the constitutional psychopathic inferiority group, consisting of five cases. All were complicated by organic conditions. The group values for the percentage of strength causing initial and complete hemolysis were .425 per cent and .360 per cent. Secondly, the dementia precox group, consisting of four cases, one being the simple type, one simple type with organic factors, one the paranoid form, and one the hebephrenic type. The group values of the percentage strengths causing initial and complete hemolysis in this group were .435 per cent and .383 per cent. The resistance of the erythrocytes to the hypotonic salt solution in this group is lower than in the group of constitutional psychopathic state, indicating that not only symptomatically, but also physico-chemically, there exists a group difference between these cases; the group values of the constitutional psychopathic inferiority type very nearly approaching normal; those of the dementia precox being somewhat above normal.

Attempts have been made heretofore to connect dementia precox with organic deficiencies of a profound nature. Thus, the similarity between this and poliomyelitis was pointed out. It has been suggested also that the disturbances designated as dementia precox may be due to an enzymic or some other catalytic deficiency. Here, in the blood resistance values, we likewise see a possibility for substantiating the organic basis presumption. However, this should be studied more thoroughly and in greater volume, in order that definite conclusions may be safely arrived at.

TO SUMMARIZE

1. Psychoneuroses of the neurasthenic type, of the hysterical type, and of the anxiety type, yield different group values for their so-called *blood resistance*, indicating the possibility of the existence of a chemo-physiological basis for such distinction.

2. As pointed out in this investigation, a closer relationship may exist between the psychoneuroses of anxiety type and the psychoneuroses of hysterical type than between the psychoneuroses of neurasthenic type and any of the others.

3. The coexistence of organic factors markedly increased the group values of the blood resistance in the case of the anxiety neuroses and of the hysterias, whereas it decreased the group values for the blood resistance in the case of the neurasthenias, thus rendering further support to the previous assumption.

4. The coexistence of secondary psychoneurotic manifestations

seems to have no effect on the group values for blood resistance of the simple groups of the psychoneuroses studied above.

5. A marked difference exists between cases designated as constitutional psychopathic inferiority, and those of dementia precox, as is indicated in the group values for blood resistance obtained in both cases; the values of constitutional psychopathic inferiority nearly approaching normal; those of dementia precox having an increased resistance.

6. Dementia precox, most likely, has a definite organic basis, as is indicated by the group values obtained for the blood resistance in this study.

ADDENDUM

Throughout this paper the expression "group values" was used. This was done purposely to indicate that individual values may not be used for definitely diagnostic or for other purposes, as the variations between the maximum and minimum values are rather great. The necessity of a more precise, more scientific and more standard method arises. In connection with this the normality or molecular basis, determined by precise chemical methods, is here proposed. The more recent investigations on this subject done at this laboratory were conducted on such a basis, and will be the subject of another contribution in the near future. It is again desired to call attention to the preliminary nature of this paper, and, hence, to the indicative, rather than the conclusive character of the deductions.

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ON THE PATHOLOGY OF SENILE PSYCHOSIS
THE DIFFERENTIAL DIAGNOSTIC SIGNIFICANCE OF
REDLICH-FISCHER'S MILIARY PLAQUES *

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(Concluded from page 156)

Case 23. Clinical Number 20838, Necropsy Number 20-41, Boston State Hospital. *Arteriosclerosis.* Male, age fifty-seven. One year previous to death he fell on getting up. Had headache for three or four weeks before that and continued from that time to lose his mental faculties. Was unable to walk for some time. Flow of thought more or less at random and disconnected. Quiet and contented. Disoriented for time and place, partially for person. Memory is impaired. Dull and apathetic. Died of general arteriosclerosis.

Brain: Weight 1420 grams. Marked cerebral arteriosclerosis. A small cyst of softening in inferior surface of right frontal lobe. Microscopical examination: Cells in fairly good condition. Marked marginal gliosis. Small softened areas in the inferior surface of frontal lobes.

Case 24. Clinical Number 22239, Necropsy Number 20-42, Boston State Hospital. *Arteriosclerosis.* Male, age fifty-nine. Patient had heart trouble for four years. Had shock which paralyzed his whole right side. He had a shock and convulsions and was brought home unconscious. Had been disturbed ever since. Short of breath since last attack. Had very marked edema of the right hand and arm. Enlarged heart with irregular intermittence of systolic murmur. Very marked dyspnea with slight exertion. Memory defective, emotional tone agreeable. Oriented fairly well. Insight and judgment fairly good. Cause of death aneurysm of the arch of the aorta.

Brain: Weight 1420 grams. Multiple softening. Microscopical examination: Multiple thrombic softening. Focal cell of degeneration.

Case 25. Clinical Number 15682, Necropsy Number 20-61, Boston State Hospital. *Arteriosclerosis.* Female, age seventy-six. Unsteady in walking and standing. Irregular and weak heart action. Patient disoriented for time, place and person. Memory: remote much impaired; recent is nil. Marked defect in retention. Fabricates. No insight. During hospital residence she was very restless in the night at times. Died of chronic myocarditis.

* From the Pathological Laboratory, Boston State Hospital, Boston, Mass.

Brain: Weight 1290 grams. Chronic leptomeningitis. Marked sclerosis of cerebral arteries. Microscopical examination: Arteriosclerosis. Perivascular devastation. Marginal gliosis. Marked general fatty degeneration.

Case 26. Clinical Number 22622, Necropsy Number 20-71, Boston State Hospital. *Senile Dementia*. Female, age sixty-six. Patient insisted that her age was fifty-five. She was brought to this hospital on account of periodic episodes of confusion, during which there was impairment of memory for recent events. No delusions or hallucinations. Personality well retained. Had a few periods of marked mental confusion which cleared up after a night's rest. Her gait was unsteady. Died of general arteriosclerosis.

Brain: Weight 1220 grams. Arteriosclerosis of basal arteries. Focal cyst of softening in cerebellum. Microscopical examination: Areas of softening, arteriosclerosis. Marginal and perivascular gliosis.

EPICRISIS

Cases of this group can readily be classed into arteriosclerotic dementia with exception of a few cases. All cases (except 9, 17, 18, 20 and 26), of this group were diagnosed clinically as psychosis with arteriosclerosis to which anatomical findings agreed.

Cases 9, 17, 18 and 20 presented marked arteriosclerotic changes such as perivascular devastation, wedge-shaped cortical gliosis and focal areas of softening, etc. In spite of the mental symptoms which showed nuances similar to those of senile dementia, these cases are probably arteriosclerotic, and not senile dementia. Fischer pointed out that some of the arteriosclerotic cases would show presbyophrenic symptoms (arteriosclerotic pseudopresbyophrenia) which are characteristic for a certain per cent of senile dementia. Probably the manner of development, location of lesions, age of the patient (seventy-four, eighty-three, ninety and seventy-seven respectively), etc., would account for this condition.

Case 26, although diagnosed as senile dementia clinically, presented both mental symptoms and anatomical changes characteristic for arteriosclerotic dementia. The patient showed periodical episodes of confusion, during which there was impairment of memory. The periodical mental confusion cleared up usually after a night's rest. She showed well retained personality. Physically she presented static disturbance. The diagnosis of arteriosclerotic dementia was confirmed by the autopsy findings. The brain showed many areas of softening and perivascular and marginal gliosis. Static disturbances were interpreted as resulting from the cyst of softening in the cerebellum which involved vermis as well as the right hemisphere.

GROUP 4. CASES SHOWING MARKED PARENCHYMATOUS DEGENERATION WITHOUT PLAQUES OR ARTERIOSCLEROTIC CHANGES

Cases of this group showed a general histological picture similar to that of Group 1, differing from it only by the absence of plaques and Alzheimer's degeneration. Histological changes correspond to those of senile dementia of earlier textbooks and those of Fischer's simple senile dementia. The diffuse ganglion cell degeneration is the essential feature of this group. Ganglion cells presented marked fatty pigmentous degeneration, cell sclerosis and fine granular degeneration through the cortical laminae. Frontal lobes and hippocampal gyri, especially the cornu ammonis, revealed most extensive alterations, probably because these areas are most vulnerable in the cerebrum. Neuroglia cells were generally increased either free in tissue or, in the neighborhood of ganglion cells, in the form of catellite cells. A great many neuroglia cells had undergone regressive changes, such as fatty pigmentous degeneration, vacuolization, etc. Cortical vessels presented more or less marked alterations, fatty pigmentous degeneration, hyaline degeneration, etc., but not quite as marked as in the preceding group.

Case 1. Clinical Number 20837, Necropsy Number 19-114, Boston State Hospital. *Senile Dementia.* Female, seventy-seven years of age. Queer and irritable all her life. Purchased extravagant things for herself and gave costly gifts to others. Always troublesome to the community, had a bad temper and quarrelsome. In last two years began to show marked defect of remote and recent memory. Disoriented for place and persons. Had hallucinations of hearing. Made peculiar cackling sounds. Had no insight. Irritable, restless and untidy. One week before death showed spastic rigidity of neck with opisthotonus. Died of bronchopneumonia.

Brain: Weight 1050 grams. Chronic pachy- and leptomeningitis, general atrophy of convolutions. Anomaly of circle of Willis. Microscopical examination: Diffuse fatty degeneration of ganglion cells and neuroglia cells. Moderate arteriosclerosis. No plaques, no Alzheimers.

Case 2. Clinical Number 11319, Necropsy Number 20-18, Boston State Hospital. *Arteriosclerosis.* Female, age seventy-one. Has used more or less alcohol all her life. Later years she drank excessively. Would go to bed and remain, taking almost no food. Six years before death was thrown from a street car and hurt her back. Mental failure began about eight years before death when she became unusually quiet and gradually lost her memory, being unable

sometimes to recognize her children. Finally she suffered a great deal from insomnia, was noisy, untidy, very apprehensive. Family noticed that she was pale and white for some years before admission. On admission she was disoriented for time and person. No grasp on current events. No hallucinations or delusions. She was very pale and anemic, hemoglobin only 30 per cent. Showed signs of secondary anemia. Died of anemic condition.

Brain: Weight 1250 grams. Markedly anemic. Microscopical examination: General marked fatty degeneration. Arteries only slightly thickened. Some slight gliosis. No plaques, no Alzheimers.

Case 3. Clinical Number 22328, Necropsy Number 20-51, Boston State Hospital. *Senile Dementia.* Female, age sixty-seven. For many years before death her sole interest seems to have been to read Beauty Hints and act upon their advice. She began to take Jamaica ginger, beef, iron and wine, and other drugs. For a year she heard voices. She stated that people strapped her to the bed and stole tons of money. On admission she was restless, walked about the ward, thinking it was daytime. Train of thought disconnected and rambling. She was reminiscent and at times fabricated.

Brain: Weight 1150 grams. General atrophy of convolutions. Chronic hemorrhagic internal pachymeningitis. Microscopical examination: General cellular and fibrillar gliosis. Fatty degeneration of ganglion cells, regressive change of capillary walls. No Alzheimer. No plaques.

EPICRISIS

So far as the mental symptoms and anatomical findings are concerned, these cases fall into the clinical group of senile dementia. However, each case of this group presented some peculiarity in the previous history which makes the diagnosis of senile dementia uncertain.

The patient in Case 1 was said to be queer and irritable all her life. She had had a bad temper, was quarrelsome, and always troublesome to the community. It is difficult to judge from the history alone, whether or not she had had previous psychosis. To avoid a false conclusion, this case is left undiagnosed.

The patient in Case 2 had marked somatic symptoms. Her family noticed that she was pale and white for some years (it is not known whether or not the psychosis dated back beyond this time). On admission she was markedly anemic, hemoglobin being only 30 per cent. She showed signs of secondary anemia. At autopsy the brain was found not to be particularly atrophic, but was markedly anemic. It is not infrequent for the chronic exhaustive patients to show marked amnesia, and even Korsakoff's symptom complex. The

marked somatic history of this case would suggest exhaustive psychosis rather than simple senile dementia. Clinically, arteriosclerotic dementia was considered, but the anatomical study failed to verify it.

The patient in Case 3 used to take Jamaica ginger, beef, iron and wine and various drugs. She developed auditory hallucinations and other delirious conditions. She stated that people strapped her to the bed and stole tons of her money. Although delusions or robbery are common to senile dementia, they are dependent mostly upon defective memory and retention. Patient of this psychosis would mislay things and then accuse people of stealing. The delusions of this patient appear to be based on delirious condition rather than defect of retention. It is probable that this case was chronic alcoholic or drug intoxication, and not senile dementia.

GROUP 5. CASES OF MINOR PARENCHYMATOUS DEGENERATION

A general description of pathological changes in this group is almost impossible because each case differed more or less in its nature. Alterations were, although more or less marked, rather moderate when compared with preceding groups. For details, the reader is referred to the description of macro- and microscopical examinations of each case.

Case 1. Clinical Number 21410, Necropsy Number 2186, Danvers State Hospital. *Senile Dementia with Epilepsy.* Female, aged eighty-six. From her twentieth year she has had convulsions at more or less frequent intervals. In later years the convulsions have been less frequent. During the last two years she has failed a good deal both mentally and physically. In the last three years she has had more frequent convulsions. On admission she was greatly deteriorated and markedly confused. Died of pulmonary tuberculosis.

Brain: Weight 1150 grams. Atrophy of convolutions. Brain firm in consistency. Moderate sclerosis of basal arteries. Microscopical examination: Marked gliosis. Slight parenchymatous degeneration. Sclerosis of Ammon's horn. Cajal's cells in the cortex.

Case 2. Clinical Number 19072, Necropsy Number 19-17, Boston State Hospital. *Involution Melancholia.* Female, age seventy-seven. About fifty years ago patient had an attack of mental trouble with suicidal tendencies after the birth of second child. At that time was committed to a State institution. Was discharged after a

year, but was never entirely recovered. At times showed peculiar actions and was not interested in her surroundings. In later years she became markedly demented and disoriented. At times disturbed and irritable.

Brain: Weight 1245 grams. Anomaly of circle of Willis. Slight sclerosis of basal arteries. Microscopical examination: Moderate fatty degeneration of ganglion cells.

Case 3. Clinical Number 19007, Necropsy Number 19-33, Boston State Hospital. *Involution Melancholia.* Male, age fifty-five. Onset two years before death. He would get excited over trifling things. Wandered about the rooms at night. He lost a great deal in weight. Refused the food. He was well oriented, fully understood the nature of his surroundings. He was much depressed and had various somatic ideas. While in the hospital attempted suicide saying that he was a nuisance. Died of exhaustion.

Brain: Weight 1515 grams. No marked macroscopical changes. Microscopical examination: Appreciable cellular gliosis. Very little fatty degeneration of ganglion cells.

Case 4. Clinical Number 7309, Necropsy Number 20-25, Boston State Hospital. *Alcoholic Deterioration.* Male, age fifty-six. Patient drank excessively all his life. Was markedly deteriorated and demented. Had hallucinations of sight and hearing. Was disoriented. During the six years of his hospital residence was occasionally very noisy and violent. Speech incoherent. Died of acute enteritis.

Brain: Weight 1450 grams. Slight chronic leptomeningitis. Moderate arteriosclerosis. Microscopical examination: Moderate fatty degeneration of ganglion cells.

EPICRISIS

Case 1 was considered clinically as senile dementia with epilepsy. There is no doubt that this patient was an epileptic subject. Whether or not the mental failure occurring during the last two years was due to senile involution or to a later stage of epilepsy is difficult to decide. In the last three years she has had more frequent attacks of convulsions, indicating an epileptic deterioration. Although the brain was slightly atrophic it did not show senile changes, but did show characteristic changes ascribed to epilepsy. These facts would seem to suggest epileptic deterioration rather than senile dementia.

Case 2 was diagnosed clinically as involution melancholia. Previous history shows, however, that the psychosis began when the patient was about twenty-seven with melancholia and suicidal tendencies. From that time she never entirely recovered. The melancholic trends shown in later years should be regarded as symptoms of the

same disease continuing from earlier life. It would appear that this patient was either manic depressive, depressed phase, or dementia precox,—more probably the latter.

Case 3 was diagnosed clinically as involution melancholia and Case 4 as alcoholic deterioration with which the pathological anatomy, at our present knowledge, agreed.

GROUP 6. ORGANIC LESIONS OF OTHER NATURE

Case 1 showed a large endothelioma in the right frontal lobe. Convolutions were markedly flattened due to the abnormally increased intracranial pressure. Ganglion cells showed rather diffuse degeneration such as is found in senile brains. Case 2 presented chronic pachy- and leptomenigitis and atrophy of frontal convolutions. Microscopically, meningeal, vascular and parenchymatous changes were those of typical general paralysis. A detailed description is omitted because of its unimportance in this present study.

Case 1. Clinical Number 18056, Necropsy Number 20-63, Boston State Hospital. *Senile Dementia.* Female, age sixty-eight. One year previous to her death patient was asphyxiated by gas. It transpired that she had probably hung her clothing on a loosely connected gas jet and went to bed in a perfectly cheerful mood. She was found unconscious and taken to a hospital. She remained dazed for a week following her recovery from unconsciousness. Since that time she showed marked mental symptoms. She lost her memory; was not interested in her surroundings; wandered about the house; would not eat. Occasionally was very restless at night. Died of bronchopneumonia.

Brain: Weight 1215 grams. Chronic pachymeningitis, marked chronic leptomenigitis. Moderate sclerosis of basal arteries. Microscopical examination: Irregular foci of fibrillar gliosis. Small areas of softening which do not appear to be associated with vascular alterations. Increase of amyloid bodies. Ganglion cells in fair condition.

Case 2. Clinical Number 20177, Necropsy Number 19-71, Boston State Hospital. *Senile Dementia.* Female, age eighty-five. About ten years before death patient began to seem contrary and turned against her family. Memory became markedly impaired, imagined that neighbors and landlady talked about her. Accused others of stealing things which she herself had mislaid. Had hallucinations of hearing. Had marked symptoms of cardiorenal disease. On admission she appeared dull and stupid. Complete physical examination was not done.

Brain: Weight 1070 grams. A large endothelioma over the right frontal pole, compressing whole right frontal lobe and adjacent

part of the left hemisphere. Dura mater remarkably thickened and adherent. Microscopical examination: Cells showed moderate fatty degeneration, except the immediate neighborhood of the tumor which showed complete devastation. No Alzheimers, no plaques.

Case 3. Clinical Number 22675, Necropsy Number 20-78, Boston State Hospital. *Senile Dementia.* Female, age sixty-eight. Two years previous to her death she thought people were talking about her and they did not want her around. Was secretive and very forgetful. Memory greatly impaired for both recent and remote events. Physically, she did not show anything unusual except slight tremor of the hands. No apparent speech defect. Wassermann on serum positive. She died before the spinal test was done.

Brain: Weight 1220 grams. Chronic pachy- and leptomeningitis. Marked frontal atrophy. Microscopical examination: Showed typical pathological changes of general paralysis. No Alzheimers, no plaques.

EPICRISIS

Case 1 offers considerable difficulty in interpretation. It appears, from the history, that she was asphyxiated accidentally by illuminating gas. After recovery from unconsciousness she began to show mental symptoms—loss of memory, aphasia, restlessness at night, etc. These mental symptoms pass either for gas poisoning or for senile dementia. Anatomically multiple small foci of gliosis and softening were encountered, which unlike the cases of Group 3, did not seem to be associated with the arteriosclerotic process. It is probable that these areas had resulted from multiple hemorrhages due to gas poisoning. On the other hand, the general histological picture did not correspond to that of senile dementia. These facts seem to favor the diagnosis of gas poisoning.

Case 2 showed three important facts to be considered in regard to the diagnosis: 1. Mental symptoms suggestive of senile dementia; 2. Cardiorenal disease; 3. Brain tumor. On account of the incomplete physical examination (too short a stay), nothing definite can be said about the cardiorenal condition. Mental symptoms due to the brain tumor are manifold, corresponding to the manner of development, locations, grades of intracranial pressure, etc. (—). Even the same kind of tumor in the same location would be accompanied by various symptoms in different individuals and in different ages. Ten years' duration is perhaps a little too long for senile dementia, if not absolutely against it. On the other hand, judging from the size of the tumor and its finer structure, it appears that the tumor had been existing for a considerable length of time, probably more than ten years. Mental symptoms, although somewhat charac-

teristic for senile dementia, were probably due to the organic lesion of the tumor and not to the pure senile involution. The general histological picture also seemed to favor this supposition.

TABLE I
GROUP I

Case	Sex	Age	Brain W.	Plaques	Alzheimer	Cell degen.	Focal lesions	Clin. Diag.	Diagnosis
1	F	71	1090	200	....	diffuse	....	s. d.	S. D.
2	M	79	1060	300	....	diffuse	....	s. d.	S. D.
3	M	83	1330	10	....	diffuse	....	a. s.	S. D.
4	F	73	1100	20	....	diffuse	....	s.d.with a. s.	S. D.
5	F	81	1250	100	....	diffuse	....	s. d.	S. D.
6	F	79	1020	1	....	moderate	....	s. d.	Paranoid D. P.
7	F	63	1280	100	....	diffuse	....	s. d.	S. D.
8	F	75	1150	400	....	diffuse	....	s. d.	S. D.
9	F	77	1200	20	....	diffuse	....	s. d.	S. D.
10	M	78	1170	50	....	mod. diffuse	....	s. d.	S. D.
11	F	90	1130	50	....	diffuse	....	s. d.	S. D.
12	M	67	1150	50	....	diffuse	....	a. s.	S. D.
13	F	77	900	100	....	diffuse	....	s. d.	S. D.
14	F	86	1230	400	....	diffuse	....	a. s.	S. D.
15	F	78	1150	50	....	diffuse	....	a. s.	S. D.
16	F	63	960	20	....	diffuse	....	s. d.	S. D.
17	M	55	1030	8	....	diffuse	....	a. s.	S. D.
18	M	86	1165	30	....	diffuse	....	a. s.	S. D.
19	F	61	1030	40	....	diffuse	....	a. s.	S. D.
20	F	94	1305	20	....	diffuse	....	s. d.	S. D.
21	F	84	1140	20	....	diffuse	....	s. d.	S. D.
22	F	94	1150	80	....	diffuse	....	s. d.	S. D.
23	F	88	1055	50	....	diffuse	....	s. d.	S. D.
24	F	73	930	50	....	diffuse	....	s. d.	S. D.
25	M	73	1375	50	....	diffuse	....	a. s.	S. D.
26	M	83	1350	40	....	mod. diffuse	....	s. d.	S. D.
27	F	70	1060	100	....	mod. diffuse	....	s. d.	S. D.
28	F	81	1200	10	....	mod. diffuse	....	s. d.	S. D.
29	F	86	1240	20	....	diffuse	....	s. d.	S. D.
30	F	79	1240	8	....	mod. diffuse	....	s. d.	S. D.
31	F	78	1030	30	....	diffuse	....	s. d.	S. D.
32	F	83	1005	100	....	diffuse	....	s. d.	S. D.
33	M	75	1220	20	....	diffuse	....	s. d.	S. D.
34	F	69	1120	10	....	diffuse	....	a. s.	S. D.
35	F	59	1160	100	....	diffuse	....	s. d.	Alzheimer's disease
36	F	79	1100	2	....	marked diffuse	....	s. d.	D. P. (?)
37	F	72	940	30	....	mod. diffuse	....	a. s.	S. D.
38	M	84	1250	50	....	diffuse	....	s. d.	S. D.
39	F	69	1 60	20	....	diffuse	....	a. s.	S. D.
40	F	87	1120	100	....	diffuse	....	s. d.	S. D.
41	F	73	1010	40	....	diffuse	....	s. d.	S. D.
42	F	2	1070	50	....	diffuse	....	s. d.	S. D.
43	F	62	1320	50	....	diffuse	....	a. s.	S. D.
44	F	77	1120	100	....	diffuse	....	s. d.	S. D.
45	F	86	1150	30	....	diffuse	....	s. d.	S. D.
46	F	81	1210	190	....	diffuse	....	s. d.	S. D.
47	F	69	1330	20	....	diffuse	....	a. s.	S. D.

GROUP 2

Case	Sex	Age	B.W.	Plaques	Alzh.	Cell Change	Focal Lesions	Clin. Diag.	Diagnosis
1	M	68	1400	5	....	mod. diffuse	softening	a. s.	S. D. with A. S.
2	F	77	1200	3	....	focal	cyst.	s. d.	S. D. with A. S.
3	F	86	1190	100	....	diffuse	cyst.	s. d.	S. D. with A. S.
4	F	72	1090	200	....	diffuse and focal	softening	a. s.	S. D. with A. S.
5	M	72	1210	50	....	diffuse	softening	a. s.	A. S. with S. D.
6	M	61	1230	1	....	diffuse and focal	softening	a. s.	A. S. and F. M.
7	M	69	1120	100	....	diffuse and focal	hemorrhage softening	a. s.	S. D. with A. S.
8	F	83	1075	40	....	diffuse	softening	a. s.	S. D. with A. S.
9	M	64	1150	34	....	diffuse	softening	a. s.	S. D. with F. M.
10	M	79	1375	20	....	diffuse	cyst. of softening	s. d.	S. D. with A. S.
11	F	89	1120	40	....	diffuse	softening	s. d.	S. D. with A. S.
12	F	81	1150	40	....	diffuse and focal	cyst. of softening	s. d.	S. D. with A. S.
13	F	61	1155	40	....	diffuse and focal	cyst. of softening	a. s.	S. D. with A. S.
14	F	73	1340	2-3	....	diffuse and focal	softening	s. d.	S. D. with A. S.
15	M	70	1055	40	....	diffuse	hemorrhage softening	s. d.	S. D. with A. S.
16	F	75	1345	50	....	diffuse	softening	a. s.	S. D. with A. S.
17	F	69	1450	60	....	diffuse	hemorrhage	s. d.	S. D. with A. S.

GROUP 3

Case	Sex	Age	Brain W.	Plaques	Alzheimer	Cell Change	Focal Lesions	Clin. Diag.	Diagnosis
1	F	62	960	....	....	....	hemorrhage softening	a. s.	A. S.
2	M	81	1450	....	....	focal	softening	a. s.	A. S.
3	F	65	1120	....	....	....	hemorrhage	a. s.	A. S.
4	F	65	1200	....	....	focal	hemorrhage	a. s.	A. S.
5	M	81	1260	....	....	focal	.....	a. s.	A. S.
6	M	74	1150	....	....	focal	hemorrhage softening	a. s.	A. S.
7	M	62	1490	....	....	focal	hemorrhage softening	a. s.	A. S.
8	F	60	1310	....	....	focal	softening	a. s.	A. S.
9	F	74	1150	....	....	focal	softening	a. s.	A. S.
10	M	56	1345	....	....	diffuse	softening hemorrhage	a. s.	A. S.
11	F	65	1120	....	....	....	cyst. hemorrhage	a. s.	A. S.
12	F	73	1135	....	....	local diffuse	.....	a. s.	A. S.
13	F	69	1055	....	....	diffuse local	softening hemorrhage	a. s.	A. S.
14	F	60	1175	....	....	....	softening	a. s.	A. S.
15	F	71	1345	....	....	focal	.....	a. s.	A. S.
16	M	60	1430	....	....	....	cyst. of softening	a. s.	A. S.
17	M	83	1220	....	....	diffuse focal	softening	s. d.	A. S.
18	F	90	1050	....	....	diffuse	cyst. of softening	s. d.	A. S.
19	F	70	1110	....	....	focal	softening	a. s.	A. S.
20	F	77	1100	....	....	....	softening	s. d.	A. S.
21	M	77	1370	....	....	diffuse	cysts	a. s.	A. S.
22	M	68	1100	....	....	....	softening	a. s.	A. S.
23	M	57	1420	....	....	....	cysts of softening	a. s.	A. S.
24	M	59	1420	....	....	focal	softening	a. s.	A. S.
25	F	76	1290	....	....	diffuse focal	.....	a. s.	A. S.
26	F	66	1220	....	....	.....	cysts of softening	s. d.	A. S.

GROUP 4									
Case	Sex	Age	Brain W.	Plaques	Alzheimer	Cell Change	Focal Lesions	Clin. Diag.	Diagnosis
1	F	77	1050	....	....	diffuse	.....	s. d.	Undiag.
2	F	71	1250	....	....	diffuse	.....	a. s.	Exhaustion
3	F	67	1150	....	....	diffuse	.....	s. d.	Chronic intoxication

GROUP 5									
Case	Sex	Age	Brain W.	Plaques	Alzheimer	Cell Change	Focal Lesions	Clin. Diag.	Diagnosis
1	F	86	1150	....	....	moderate	.....	s. d. with epilepsy	Epilepsy
2	F	77	1245	....	....	moderate	.....	i. m.	D. P.
3	M	55	1515	....	....	.....	.....	i. m.	I. M.
4	M	56	1450	...	....	moderate	.....	alco.	Chronic Alc. Intoxication

GROUP 6									
Case	Sex	Age	Brain W.	Plaques	Alzheimer	Cell Change	Focal Lesions	Clin. Diag.	Diagnosis
1	F	68	1215	....	....	.....	.....	s. d.	Gas poisoning
2	F	85	1070	....	....	moderate	endothelioma	s. d.	Tumor of brain
3	F	68	1220	....	....	diffuse	.....	s. d.	G. P.

Case 3 offers no argument as to its diagnosis because of the definite histopathological findings. It is a case of general paralysis with mental symptoms similar to those of senile dementia. It is a generally accepted fact that general paralysis in advanced age often presents symptoms indistinguishable from those of senile dementia. This fact necessitates the serological tests of old persons suffering from mental disease, even if there are no characteristic paralytic symptoms.

ACCURACY OF THE CLINICAL DIAGNOSES

In Danvers State Hospital diagnoses were made in Staff Meeting, held every morning with all the physicians present. In Boston State Hospital, they were made mostly by charge physicians and the special cases were presented at Staff Meeting for discussion. If the writer's clinico-anatomical diagnoses were granted as correct, the accuracy of the clinical diagnoses is as follows:

Group 1.....	66 per cent
Group 2.....	-----
Group 3.....	85 per cent
Group 4.....	0 per cent
Group 5.....	50 per cent
Group 6.....	0 per cent
Total accuracy.....	66 per cent

Group 2 was excluded from consideration because of the uncertainty of the clinico-anatomical diagnoses. From the foregoing, it appears that the clinical diagnosis in senile dementia is less accurate than in arteriosclerotic dementia. Various reasons can be attributed to this situation: First, the difficulty of thorough mental examination in advanced senile subjects; second, the presence of marked sclerosis of peripheral vessels in spite of the moderate sclerosis in cerebral vessels; third, presence of the mental symptoms indistinguishable for both arteriosclerotic and senile dementia; fourth, unsatisfactory observation because of the shortness of the time intervening between admission and exitus, etc. Taking these obstacles into consideration, it must be admitted that the correct diagnoses of 66 per cent in senile dementia is fairly accurate. The reader's attention is called in this place to the fact that the anatomical grouping, except in few cases, readily falls into the clinical groups of psychoses.

Mental diseases other than senile dementia and arteriosclerotic dementia appear to offer the most difficulty in correct interpretation. This is seen readily when one understands how the clinical symptoms manifest themselves, colorized according to the various conditions, such as involution, exhaustion, senility, etc., which prevail in most of our patients.

SENILE DEMENTIA AND MILIARY PLAQUES

In the study of one hundred cases of senile patients clinically diagnosed as senile dementia, arteriosclerotic psychosis, involution melancholia and alcoholic psychosis, miliary plaques were found in sixty-four cases. From these, seventeen cases showed focal lesions resulting from arteriosclerosis. From among the forty-seven cases of plaque brains without arteriosclerotic lesions, forty-four cases were considered clinico-anatomically as senile dementia. One case was diagnosed as Alzheimer's Disease, another as Paranoid Dementia Praecox, and the remaining one as unclassified earlier psychosis.

The case of Alzheimer's Disease presented one hundred plaques and very abundant basket-like neurofibrillar degenerations. Case 6, a woman of seventy-nine years of age, showed only one plaque in an entire section from hippocampal gyrus and there was no Alzheimer's degeneration. Case 36, another woman of seventy-nine years of age also has had psychosis apparently from earlier life and revealed two plaques in an entire section from the same region. Unfortunately, the combination of senile alterations and arteriosclerotic changes

made the clinico-anatomical diagnosis of the cases in Group 2 uncertain. Aside from these cases, however, all cases considered clinico-anatomically as senile dementia invariably showed abundant plaques. A few cases (Cases 1, 2, 3, Group 4; Cases 1, 2, Group 6) showed mental symptoms suggestive of senile dementia, but did not show miliary plaques. A further consideration of these cases made the diagnosis of senile dementia doubtful. They should probably belong to some other diseases.

The result of this study is in remarkable accordance with that of Sinchowicz, who found miliary plaques in all cases of senile dementia, and who considered nonplaque cases to be other psychoses.

Differing from Sinchowicz and the writer's result, most of the observers stated that they found plaques in a certain type of senile dementia; Fischer in presbyophrenic dementia; Sigg in agitated senile psychosis; Schonfeld in agitated type as well as simple senile dementia. The difference in opinions may probably be due to the different interpretation of the cases by various authors. Question may arise, in this study as to the accuracy of the clinico-anatomical diagnosis, especially in the cases of Groups 4 and 6. The writer has already stated his reason why these cases cannot be considered as typical senile dementia. Supposing these five cases all to be senile dementia, the percentage of the cases without miliary plaques, but still belonging to senile dementia, is extremely low when compared with Fischer's and others. The writer feels almost certain that all cases of senile dementia should show miliary plaques, and in those cases failing to do so, the diagnosis of senile dementia is doubtful.

All workers proved in fact that the majority of cases diagnosed as senile dementia show plaques. Almost all cases of Alzheimer's disease which should be considered as a type of senile dementia, have shown abundant plaques, together with Alzheimer's degenerations. If the presence of the miliary plaques proves to be an important significance for the diagnosis of Alzheimer's disease, why cannot the same importance be attributed in senile dementia?

The writer agrees with Fischer, Spielmeyer and Sinchowicz in that plaque cases should belong to a clinically differentiable disease group. This group should be designated as senile dementia, since all cases of senile dementia with no regard to subforms, invariably show this peculiar alteration.

The existence of a so-called simple senile dementia of Fischer's sense, in which plaques fail to be demonstrated, appears to be doubtful, if it cannot be positively denied. Theoretically speaking, there

may occur cases of a medium stage of normal senility and senile dementia in which plaques might not have appeared. However, cases of long duration with mental disturbances without plaques may possibly belong to other psychoses.

The plaques under consideration, however, were found in psychic normal old subjects by various workers, such as Constantini, Oppenheim, Huebner, Fischer, Sinchowicz, et al. They were almost always individuals very advanced in age and the number of plaques in their brains was limited. According to Sinchowicz, persons over eighty years of age may show plaques without psychosis, the number of plaques increasing with the advance of age. A person one hundred and four years of age, presenting ten plaques in one optic field, was considered by Sinchowicz as physiological senile dementia.

Huebner, Fuller and others contend that the miliary plaques cannot be considered as characteristic for any special form of mental disease, since these peculiar structures are found in the brains of elderly persons dying without psychosis, and also in psychoses other than senile dementia.

But it must be borne in mind that these special cases are very rare. In connection with this question, Fischer studied forty brains of individuals dying in general hospitals and found seven cases presenting spherotrichia. A close study of history revealed that five of these seven cases corresponded to presbyophrenic dementia and only two cases were apparently normal (seventy-three and seventy-eight years old). As the result of his studies, Fischer concluded: "If one sees, on one hand, that the patients with symptoms of presbyophrenic dementia invariably suffer from spherotrichia, while on the other hand, only 6 per cent of mentally normal individuals present druses in limited number, it can hardly be considered otherwise than that the plaques can be present latent for a certain length of time, and if the bearers die early, they can remain psychic normal during life."

Sinchowicz explained this in a somewhat different manner, when he stated that every individual, if he lives long enough, would develop miliary plaques and when they reach a certain amount (more than ten in one field) the individual can no longer be differentiated mentally from pathological senile dementia. According to Sinchowicz, therefore, the presence of miliary plaques in normal senium is a physiological process, there being only a gradual difference between this and pathological senium. Senile dementia is nothing

else to this author than abnormal intensification and earlier onset of physiological senile involution.

Psychoses other than senile dementia showing miliary plaques have been reported by a number of workers. Blocq and Marinesco reported miliary plaques in the brain of an aged epileptic and the case of an elderly subject who had shown dementia aphasia, asymboly and epileptiform attacks. Leri found plaques in the cerebral cortex of a person dying at the age of fifty-eight, having previously suffered from epilepsy, a pronounced dementia, and marked aphasic disturbances. Leri explained the epileptic attacks as resulting from irritation produced by the miliary plaques. In Huebner's study miliary plaques were found, besides in cases of senile dementia, in a case of manic depressive, seventy-nine years, and in another case of alcoholic dementia sixty-six years of age, both showing little dementia during life. Sinchowicz reported case of old dementia praecox and Korsakoff's psychosis presenting plaques. Fuller found plaques in a case of "perhaps always abnormal" person complicated with ptomaine poisoning.

In the present study, a case of dementia praecox and a case of unclassified earlier psychosis (dementia praecox?) have shown miliary plaques in limited number. Associated cerebral changes in these two cases were less marked than in senile dementia. It is evident, from this study and from others, that psychoses other than senile dementia could show miliary plaques as well as advanced normal senile persons.

How then, are these cases to be interpreted? Are these the latent stage of senile dementia combined with other psychoses, or are the plaques only accidental findings, having nothing to do with the mental symptoms? The plaques, so peculiar and characteristic, found in all cases of senile dementia, can in no way be considered as accidental, as having no effect on the brains of the bearers. Sinchowicz's conception, that some of the psychoses may show earlier onset of advanced senility, to which normal persons reach after eighty years of age, is quite plausible. With gradual onset and slow development, the patients may not show acute dementia or any sudden change of mental symptoms. The rare cases hitherto reported should belong to some other psychoses combined with advanced senile involution.

The writer cannot agree with Fischer in the idea that all persons with miliary plaques in the brain belong to certain type of senile

dementia and that patients whose brains show plaques, but who fail to show mental symptoms are in the latent stage of the disease. If we have normal senile persons with plaques and without mental symptoms (Sinchowicz), there is no reason why the same condition cannot occur in the various psychotic persons of old age. The miliary plaques in other psychoses should be regarded as signifying an end stage of the same disease, rather than a complication, just as the plaques in normal old persons represent a terminal stage of the physiological involution. This conception, however, is not against the possibilities of a combination of senile dementia and other psychoses which may sometimes occur. According to the writer's interpretation, therefore, miliary plaques do not necessarily indicate the diagnosis of senile dementia, although the presence proves to be highly suggestive. By the absence of the plaques the diagnosis of senile dementia can be ruled out. The histological study along when the former history of the bearer is unknown, does not provide adequate data for a definite diagnosis. The writer must admit that Huebner's statement that medico-legally the presence of the miliary plaques is not characteristic for any definite mental disease and the only thing that can be said is, the subject had at least reached the fifth decade. From the clinico-anatomical standpoint, however, the significance of the miliary plaques is quite different. A great importance can be attached to the presence of the plaques in making the diagnosis of the senile dementia and only by this presence when supported by clinical evidence, can the correct diagnosis be furnished.

Fischer found a close relationship between the duration of the disease and the form of plaques. The longer the duration was the older appeared the plaques. In acute delirious condition a severe grade of cerebral devastation by plaques, which were growing in an infiltrative manner, was found. Sinchowicz, on the other hand, laid great importance on the number of plaques with regard to the severity of the disease. According to Sinchowicz, severe cases are apt to show abundant plaques, often grouping together mixed with large forms. These statements point apparently to the close relationship of plaques and mental disturbances. The writer found the same condition in most of the cases of this study. Only a few cases were found to be exceptions. A few exceptions, however, can readily be explained when one understands that the mental mechanism depends mostly upon the nervous element—nerve cells with their prolongations. When the nerve cells are in fair condition and the integrity of the prolongations undisturbed a person can remain relatively nor-

mal in spite of the intervening interstitial changes. It does not seem to the writer that the senile plaques are the direct cause of the senile mental disturbances. The abnormal involution process which leads to the formation of plaques in senile dementia must be regarded as the real cause of the disease, the plaques being only an indication of this process. Therefore the severity of the mental symptoms and the intensity of the plaques may not be always parallel. This reasoning is supported evidently by histological findings. In some cases plaques were very abundant when the parenchymatous degeneration was less marked, while in others the opposite situation was ruled. The number of Alzheimer's neurofibrillar changes which are regarded as an advanced type of cell degenerations, was not always parallel with the intensity of plaques. Nevertheless the plaque brains were shown, in general, with marked parenchymatous degeneration (including Alzheimer's degeneration), which, the writer thinks, is directly responsible for the disturbed mental mechanism of senile dementia.

As has been stated above, the miliary plaques are characteristic for senile dementia and not for any special form of this disease. Neither the appearance, the number of plaques, nor the arrangement of plaques offer any clue toward the diagnosis of the clinical subforms of senile dementia. These forms are, it seems to the writer, only different manifestations according to the various predispositions of the individuals. The analogue may be found in slight alcoholic intoxication. The same dose of spirits may produce in one group of people a depressed state, while in others euphoric or maniacal symptoms may appear. Some people are naturally suspicious, jealous, paranoid, pessimistic, etc., while others are good-natured, indifferent, optimistic or hypomanic, etc. These different predispositions would be intensified by the underlying same pathological process, the result being shown in various forms of the senile dementia.

The further classification of senile dementia, therefore, is not a pathological, but a clinical problem.

ARTERIOSCLEROSIS AND SENILE PLAQUES

Twenty-seven per cent of plaque brains presented a combination of arteriosclerotic focal lesions and plaques. These cases were diagnosed clinically either as senile or as arteriosclerotic dementia, one case only being diagnosed as a combination of these two.

It has been claimed by some authors that cerebral arteriosclerosis

has a certain immunity against the development of miliary plaques. Bleuler states in his textbook, under the differential diagnosis of senile and arteriosclerotic dementia that fortunately a combination of these diseases is rare. What the writer has obtained from this study evidently contradicts the statements of the above authors. Fuller reported 62 per cent of plaque brains exhibited focal lesions resulting from arteriosclerosis and all plaque brains showed more or less advanced cerebral arteriosclerosis. It seems to the writer that there is no reason why the arteriosclerotic brains cannot be accompanied by the involutinal process which leads to the formation of miliary plaques.

However, it is a fact that the plaque brains are not necessarily associated with arteriosclerotic processes. In the present study 73 per cent of plaque brains did not show arteriosclerotic focal lesions and 60 per cent of arteriosclerotic brains did not reveal any plaques at all. Therefore, the arteriosclerotic process itself does not seem to have any direct causative relationship to the formation of plaques.

A combination of these two alterations must be regarded, from an anatomical point of view, as two independent disease processes. But clinically how are these cases to be interpreted? The presence of miliary plaques in a large number would indicate the diagnosis of senile dementia, either with or without arteriosclerotic dementia.

How do we know the associated changes of arteriosclerosis did or did not play a certain part in clinical manifestations? It is almost impossible to answer this question.

There are possibilities, again, for the arteriosclerotic brains to undergo a further senile involution than does the normal brain and a small number of plaques may be the result of the disease and not of senile dementia. Senile plaques in arteriosclerotic brains, therefore, although very suggestive of combined senile dementia, are not an absolute indication.

SYMPTOMATOLOGY OF SENILE DEMENTIA WITH REFERENCE TO DIFFERENTIAL DIAGNOSIS, ESPECIALLY FROM ARTERIOSCLEROTIC DEMENTIA

The writer mentioned in the introduction that the clinical differentiation of senile dementia from other diseases is one of the most difficult problems of the psychiatry. The criteria must be based on precisely analyzed cases handling a large material. It is, therefore,

adequate to discuss the clinical symptomatology in this place after we have studied a reasonable number of cases.

Symptoms shown in senile dementia are manifold and even different in each type of cases. This is not a place to go over each type of case and differentiate the one from another. If we could eliminate the most important symptoms common to senile dementia and serve to differentiate this from other psychoses our purpose is obtained.

In making diagnosis of senile dementia observation of the whole course of the disease is necessary. A single symptom shown at one time, even if it is characteristic, would oftentimes lead to an erroneous conclusion. Speaking in general, senile dementia is a disease which shows a steady progress of mental decay, whereas the arteriosclerotic dementia course, in a majority of cases, remissions shows. Arteriosclerotic cases improve oftentimes to a remarkable degree, especially by the hospital care. But with each recurring attack there is further dementia, in which attention and memory suffer. Bleuler called attention to this fact and claims that periodical confusion and clearing up would suggest arteriosclerotic dementia rather than senile. Case 26, group 3, gives a good example. Patient had periods of marked mental confusion, during which there was impairment of memory for recent events but cleared up after a night's rest. Although this case was diagnosed as senile dementia clinically, the brain presented typical arteriosclerotic changes, indicating the diagnosis of arteriosclerotic dementia. On the other hand, however, some cases of senile dementia, especially those with paranoid ideas show considerable improvement when taken care in the institution. The paranoid ideas of these patients, being not deeply grounded, would seem to disappear temporarily by removal of patients from accustomed surroundings. This condition is, however, not a true improvement but indicates rather mental failure which enables the patients to forget the bitter situation they had experienced in fancy.

Insight: Alzheimer and others pointed out that the cases of arteriosclerotic dementia would show a fair insight in the beginning of the disease while those of senile dementia fail to do so. The pathological nature of these two diseases,—focal lesion in the former, diffuse alteration in the latter, would account for this condition. In the later stage of the disease, however, the insight is absent in arteriosclerotic cases as well as in senile dementia. All cases of this study were observed in a rather progressed stage while in the institution and no definite histories obtained as to the earlier symptoms of

patients, especially with regard to the insight. If inquiry was made toward this direction in obtaining former history it might have proved to be of a great assistance in differential diagnosis.

Impairment of retention (forgetfulness): This is one of the most prominent symptoms shown in senile dementia. In fact all cases of group 1 presented marked impairment of retention. A large percentage of patients, especially women mislay things and being unable to find, would accuse people of stealing them. The delusions of robbery developed in this manner is quite common and characteristic for senile dementia, although they are in no way pathognomonic. Case 20 is the only one in group 3 which displayed the delusions of robbery, while the same was shown in 10 cases in group 1. One patient would forget the location of her bed in the hospital. Another patient could not find his way from one room to another while in his own home. Patient in case 45, group 1, asked always for some food because she would forget that she had meals. Arteriosclerotic cases show also impairment of retention, but generally not so marked as in senile dementia.

General failure of memory: Although physiological in advanced age, this is most marked in senile dementia. Many a patient in this study failed to recognize their immediate relatives and forgot their names. Peculiarly, however, these patients still have recollections of their long-lost parents and friends. One patient (age sixty-eight) refused to take bath believing she is still young and has menstruation. Another patient, female of eighty-four years of age, left her husband to live with another man. This man being dead she went to live with some other old man. These patients think they are forty or forty-five when they are over eighty years of age. With failure of recent memory the recollections of past experiences appear sometimes vividly in the foreground. Savage describes this condition adequately as "denudation," when he wrote: "Just as in geology the structure of rocks and contour of country are made evident by the loss of the superficial strata, so also with mind. There may be a loss of certain intellectual or mental capacities that disclose certain others. There is an extraordinary condition in which recent events are forgotten, but older experiences are very vividly recalled, just as with hypnotic experience, it has been seen that a person who has been hypnotized has, during the hypnotic state, recounted events that have occurred in extreme youth, or even in infancy, of which he had no recollection during his normal waking life." Thus a number of

patients showed vivid recollections of events of earlier life once forgotten, but now appearing in the foreground to play an active rôle in the patient's present life. The childish conduct of senile patients is partly due to this condition because the occurrences and experiences of the last fifty, sixty or seventy years are entirely washed away, and the only experiences remaining are those which occurred in childhood. In the extreme grade of senile dementia, not only recent, but also remote events are forgotten, and the patients have no recollections whatever. Finally there is nothing but a vegetative existence. There is no grasp of surroundings, no comprehension, and no mental initiative. Cases 13 and 15 of group 1 illustrate this condition.

The defect in recent memory is very often made good by extensive fabrication in senile dementia. In fact, a large per cent of cases of this study presented this symptom. Although characteristic of senile dementia, the fabrication appears sometimes in arteriosclerotic dementia, as is shown in case 25, group 3. (Arteriosclerotic pseudo-presbyophrenia, Fischer.)

Nocturnal restlessness has been given as one of the most characteristic symptoms of senile dementia. The patients would get up at night, dishevel the bed, wander about the house, and rummage chests and closets without evident purpose. Many patients in this study wandered out in the street and were picked up by policemen. On these occasions patients are apt to be disoriented and to show considerable confusion, being unable to find their way about. In an analysis of two hundred cases of senile dementia, Pickett¹ gives a list of symptoms in which the "wandering street" is the most frequent of all. However, it must be remembered that nocturnal restlessness is more or less common in aged people, psychotic or normal, and may appear in other forms of disease, though less in intensity. Thus cases 6, 13 and 17 of group 3 manifested nocturnal restlessness, although diagnosed clinico-anatomically as arteriosclerotic dementia.

The Emotional Picture is somewhat characteristic of arteriosclerotic and senile dementia. Arteriosclerotic patients develop marked emotional incontinence in a great majority of cases. They are easily depressed, disheartened, at times whining; again, they may be irritable, show considerable psychic pain and may be subject to

¹ Pickett, William: Senile Dementia: A Clinical Study of Two Hundred Cases with Particular Regard to Types of the Disease. JOURNAL OF NERVOUS AND MENTAL DISEASE, February, 1904.

emotional outbursts. Some develop delusions of self-accusation, nihilistic ideas, think they are going to be buried alive and consequently become restless, cry and are agitated. Melancholic and hypochondriacal ideas were observed in a great majority of arteriosclerotic cases of this study. These ideas sometimes lead patients to suicidal attempts.

Melancholic and manic conditions, especially the former, are not rare in senile dementia. Most of the ideas of these patients, however, are self-centered, superficial and transitory. The fundamental emotional tone is oftentimes that of surly dissatisfaction or of childish happiness and exalted self-confidence. The depressive condition may be accompanied by anxiety, but not as often as in arteriosclerotic dementia. (Bleuler.)

Hallucinations of hearing and sight are quite common in senile dementia. They often see friends and parents long ago departed and hear them talking. Hallucinations of smell and taste appear to be very rare. Arteriosclerotic cases may show hallucinations, especially of hearing and sight, but less marked than in senile dementia.

Focal symptoms are the most important feature in differential diagnosis of senile and arteriosclerotic dementia. In the latter the symptoms appear as persistent, well-defined paralyses, contractures, aphasia, asymbolism, word blindness, mind blindness, hemianopia, astereognosis, etc. It must be remembered, however, that the arteriosclerotic lesions located in dumb regions of the brain would not show any symptoms such as mentioned above. On the other hand, cases of senile dementia could show focal symptoms not resulting from arteriosclerotic lesions. It is well known that Alzheimer's disease presents many focal symptoms, such as aphasia, apraxia, paraphasia, asymbolia, spasticity, contracture, etc. Many senile dementia cases of our series, in fact, displayed disturbances of various grades, some even being apparently aphasic. These cases did not show arteriosclerotic lesions in speech centers, but did show extreme senile changes. The focal symptoms shown by these patients, therefore, should be regarded as due to the senile, rather than the arteriosclerotic involvement.

The symptoms given above are important only in regard to the differential diagnosis. The reader's attention must be called again to the fact that no single symptom, however characteristic it may be, is adequate in furnishing a correct diagnosis. It is always the sum of the mental and physical symptoms and observation of whole clinical course that gives the conclusive diagnosis.

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SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

JOINT MEETING OF NOVEMBER 14, 1922, WITH THE NEUROLOGICAL
SECTION OF THE ACADEMY OF MEDICINE

DR. FOSTER KENNEDY AND DR. S. PHILIP GOODHART PRESIDED

A COMPARATIVE STUDY OF THE ICE BOX AND WATER BATH FIXATION METHODS IN THE WASSERMANN REACTION AS APPLIED TO NERVOUS DISEASES

Dr. Lewis Stevenson read this paper by invitation. He said that the impression has gained ground among laboratory workers that the ice box method has given positive results in syphilis which have not been found with the older methods. In 1919, studies made by Wile and Hasley of 459 cases of syphilis in all stages showed that the ice box method was more sensitive. Other workers confirmed this view. In the author's work on the blood Wassermann reaction in tabes (which by the older method is usually negative) the ice box method is found more delicate and reliable. It is especially applicable to syphilis of the nervous system, in which the percentage of positive reactions has been found to be increased about 40 per cent. Perhaps in other forms of syphilis this would not be so marked. It would seem that the ice box method searches out the syphilitic process not discoverable by the water bath fixation method and therefore ought to be used as a routine method in nervous diseases. The method frequently aids in the discovery of the etiological factor in obscure disease of the spinal cord and brain, and, in our experience, positive results were never obtained in nonluetetic nervous diseases.

Discussion: Dr. David J. Kaliski said: The facts mentioned by Dr. Stevenson as to the superiority of this method have been brought out by many writers. It seems well established that the ice box method should be used as a routine either alone or in addition to the water bath. We use both combined. Incubation in iced water may be even more effective than the dry method. The method is a safe specific one if not carried on too long. Like other procedures it has its dangers. If carried on for, say, eighteen hours or over, there are a definite number of nonspecific reactions. With certain limitations, up to four hours, for instance, the method should be used as a routine procedure in all Wassermann laboratories. There is a possible explanation for the large number of negative results reported by Dr. Stevenson in cases of tabes. (My experience does not confirm this point.) When we did only water bath incubations our percentages of negatives was not so low in a very large series of

cases. One had to take into consideration the amount of natural hemolysin present in different sera. Unless that is considered the weak reactions would not be detected. Another point is that tabes in the later stages is known to give a large percentage of negative reactions with any method.

ARTIFICIAL NERVE BRANCHES FOR INNERVATION OF PARALYZED MUSCLES

Dr. Byron Stookey said: By growing artificial nerve branches I have attempted to solve the problem of innervation of paralyzed muscle when its nerve supply is destroyed so that neither direct nerve implantation nor nerve suture are available. Experimentally I found it possible to make a nerve grow an artificial nerve branch at any desired level by using a free nerve transplant and direct implantation of the latter into the muscle. Branches were grown from nerves at levels where normally branches are not found, such as from the ulnar and median nerves in the arm and to muscles normally not innervated by the nerve selected. After depriving the biceps of its nerve supply an artificial nerve branch was grown from the ulnar to the biceps. At various intervals, from 120 to 239 days, after the formation of an artificial nerve branch, electric stimulation gave a rapid, full contraction of the biceps. The biceps muscle in each was normal in size and color, showing no fibrillations or the yellowish color characteristic of degenerate muscle. Histological studies showed normal muscle fasciculi of normal size and with distinct striations. In both longitudinal and cross sections numerous nerve bundles and nerve fibers were found, thus showing that regeneration and innervation had taken place. (Tracings and microscopical sections were shown.) The formation of artificial nerve branches had not caused any apparent paralysis in the peripheral ulnar musculature. However, I feel that in the formation of artificial nerve branches some paralysis may result but that this may be minimized by delicate technic and by selecting certain points on the nerve trunk at which to form the branches. It was further suggested that the method may be of value in individual muscle paralysis of anterior poliomyelitis, such as the deltoid, the biceps, etc.

Discussion: Dr. I. Abrahamson said he would like to ask Dr. Stookey if he controlled his work by electrical examinations and what information he obtained from such tests.

Dr. Oliver Strong said he had examined some of the sections and had seen the bundles of fibers of which Dr. Stookey speaks. A good many of those who have heard this paper have not had the opportunity to examine the subject on the histological side, and are not aware of its difficulties. It is a very hard matter to demonstrate individual nerve fibers in tissues, although nerve bundles can usually be distinguished more easily. In overcoming this difficulty modern neurosilver stains are of great advantage. Of course one might use a myelin sheath stain, but where the regenerating nerve fibers have not reached their full state of development they may not have acquired

the sheath and in any case the sheath is absent near the termination of the fiber, so that the choice of the silver stain for axiscylinder staining was a wise one. In this way one can see individual fibers here and there in the muscles. Those who are not familiar with the histological side of the work are apt to suppose that we can demonstrate the nerve end plates in this manner, but this is not necessarily the case as this stain does not always demonstrate the motor plates even when the fibers are stained up to the termination of the latter.

The criticism might be made by some workers that these were sensory nerves and not motor fibers. Aside from the improbability that only one type would be regenerated, the answer to this is that the muscle fibers were in an absolutely normal condition, which, of course, would not be the case unless the muscle were receiving the proper innervation. It is hard to appreciate, even when hearing this presentation, the enormous amount of work that has been given to the histological side in regard to the regeneration of nerve fibers. This question of nerve regeneration is a very important one and there are two principal theories as to the way in which it takes place. One of these theories is that of centrogenesis, according to which the regenerating fibers are outgrowths of the central stumps; and the other is that of autogenesis, according to which the nerve regenerates in situ. The neurilemma cells of the distal stump proliferate and from what are termed band fibers. The autogenists hold that the new nerve fibers are formed out of the substance of the band fibers. By means of the silver staining methods the axiscylinders, especially the regenerating ones, can be clearly demonstrated. The clearness of the results obtained by this method is shown in the picture of the cross sections of regenerating nerve fibers, which by no means exaggerates the amount of detail which can be made out, and the clearness of the preparation. The application of this histological method shows that the new fibers are outgrowths from the central stump. The band fibers which are formed by the old neurilemma sheaths are very important in establishing the old connection with the central nerve fibers but the regenerating fibers are not formed out of them but grow along or in them from the central stumps to their appropriate destinations. The sprouting nerve fibers, for example, traverse blood clots or enter muscle tissue where there are no band fibers. The fibers entering the scar tend to branch and thus find their way across the scar to the band fibers on the other side. By following the band fibers they are found to finally reach the vicinity of their former terminations in the muscle fibers. When they reach the vicinity of the old motor end plate possibly some chemotactic influence of the remnants of the old motor end plate attracts the motor fibers to their proper terminations in them.

Some very interesting work has been done by Jello and others on the innervation of the motor end plates in the embryo. From this it would appear that they reach the embryonic muscle fibers and come in contact with them before the sarcolemma is formed. This explains the tryptolemmal location of the end arborizations and pos-

sibly the profound influence of the nerve fiber on the muscle fiber. There is evidently some relation between the nerve fiber and the nucleus of the embryonic muscle fiber. The nuclei of the embryonic muscle cells are central, but later in the course of development become superficially placed. The growing nerve fibers in the vicinity of a muscle nucleus show thickening. They then arborize and as they arborize the muscle nuclei in their proximity proliferate, thereby forming multinucleated "sole plate." In regard to the practical application of these latter observations, possibly accelerating chemical substances might be used to aid regeneration. Very probably chemotatic influences form an important part of the rôle played by the band fibers and also by the pieces of resected nerves used in Dr. Stookey's experiments.

Dr. Louis Casamajor said he had followed this work with particular interest. This is a combination of nerve graft and nerve implantation. The muscle in these cases had had no chance to degenerate. Such a formation of branch is possible, but further work is necessary to show whether a similar success can be obtained in a muscle which has already undergone atrophy. In our operations we usually encounter muscle which has already become atrophic. These particular experiments should not be applied to the human subject, because we should not care to sacrifice part of the ulnar to get a good biceps. A man could get along with a poor biceps but he could not do without a good hand. In the paralyzes of poliomyelitis this method would have a definite application. Muscle transplants have been fairly successful but the results have not been very fortunate; it is better than nothing, but not much better. We might obtain neuronization of the muscles and a great deal might be added to the happiness of the individual. Sacrifice could be made of part of the posterior tibial which would be quite justifiable if this could be done after the muscle had degenerated. There might be some return of function and this would hold out the greatest hope that can be held out in these cases.

Dr. Alfred S. Taylor recalled the work done on nerve transplant by Dr. Globus six or eight years ago. He took a segment from a good nerve and implanted it in muscle; the work was not so interesting as this shown to-night, nevertheless it gave good results. The muscle gave good contractions when the nerve was stimulated. Good end plates were seen very clearly in slides from the muscle. I think Dr. Stookey would find them in his muscle if searched for long enough. With regard to dividing a small segment of nerve and not finding paralysis, one Englishman working with the hypoglossal anastomosis, found that one-third of the hypoglossal nerve could be divided without causing paralysis. Western workers have shown that the fibers of a nerve branch are collected 2 or 3 cm. above its exit from the main trunk, and above that distance the fibers pass from one bundle to another very freely. If the nerve trunk is divided at any point well above a branch it is conceivable that the nerve damage

involves axiscylinders going to any one branch and the damage is so diffused that peripheral failure occurs.

In regard to poliomyelitis cases, I am rather pessimistic. I did a number of nerve transplants in such cases twenty years ago. In one or two there was partial regeneration; in eight or ten flat failure. In one case of a child very well cared for, with massage and other treatment for four years after paralysis of the peronei, the neurologist recommended nerve transplantation of the peroneal nerve into the internal popliteal. After six months there was distinct evidence of regeneration by electric stimulation, but the functional result was never satisfactory. The child could evert the foot slightly but never got enough function to be useful. Drop foot persisted, although there was good voluntary movement in the muscles. I would not advise operation in these cases. In poliomyelitis there is more or less of group paralysis and there may be sufficient damage to neighboring nerves to prevent one obtaining a good virile source to tap for a nerve supply when anastomosis is attempted. This is one reason for failure in these cases.

Dr. Charles A. Elsberg said that experiments of this kind in the laboratory will be of assistance to the surgeon. One point I would like to emphasize is that such experiments as these require an extreme delicacy of technic which few workers have attained. These fine nerves must be handled very gently to avoid damage. Many experiments in the past have failed, or given variable results, because of lack of delicacy in the technic. Another point is that from the gross appearance of the muscle and the muscle contractions, there was a very satisfactory evidence of regeneration even without histological examination. The muscle deprived of its nerve supply presents a characteristic appearance in the gross. When the muscle is again supplied its appearance is entirely changed and it looks just like normal muscle and cannot be distinguished from it. With electrical tests they give the same contraction. The question has been raised as to what would have happened if these muscles had been atrophied. Clinically we know that old facial paralyses return to normal. Muscles partly atrophied have a hunger for nerve supply, and are distinctly chemotactic for nerve fibers. If Dr. Stookey had been dealing with muscles deprived of nerve supply the results would have been more striking. I think there is a considerable future for this work and a good outlook for its application in some muscular paralyses, whether due to poliomyelitis, or to other causes.

Dr. M. A. Kraus said: I do not believe that anyone can question the very great importance of these studies from either a theoretical or a practical viewpoint.

There are two points in this connection which I should like to emphasize. Dr. Stookey is aware of the difficulty of determining the fascicular content of a nerve at a given level. Furthermore, there are many different kinds of fibers at a given point—motor, vasomotor and various sensory types. A distance of 2 cms. might make a good deal of difference in the fascicular content.

The second point is that the work of McKinley of the University of Minnesota mentioned by Dr. Taylor, must be considered very carefully before it is accepted. In my opinion, the conclusions are not all proven by the experiments. Indeed, many of his conclusions seem to contradict his findings. The statement that the fascicular picture, on cross-section at various levels of a nerve, varies a good deal, is undoubtedly true, but the fibers which make this continual change, in a vast majority of cases, have different functions, such as motor, vasomotor and sensory—not the same function; in other words, there is a continual gathering into a few fasciculi of fibers of motor, sensory and vasomotor function preparatory to the leaving of these fasciculi as a branch from the main nerve trunk. It follows naturally that there is continual splitting of fasciculi having various functions.

Since McKinley has not noted the entire physiological significance of each fasciculus his conclusions in regard to motor fasciculi do not bear careful scrutiny. Indeed, some of the fasciculi he describes are those to joints. Secondly, the experiments in cutting the sciatic and the single experiment using electrical stimulation were performed 3-4 cm. below the sacral plexus, between the ischial tuberosity and the great trochanter of the femur, a point so near the plexus that changes in the fascicular topography of motor fibers immediately below would naturally be expected. The peripheral combinations from various segments going to muscles must occur distal to the plexus. I do not believe that the work of Marie, Meige, Gosset, Dejerine and M. and Mme. Mouzon, not to mention that of Dr. Ingham and myself, can be thrown out so lightly. This all serves to emphasize some of the difficulties of using nerve branches in practical surgery. It does not in the least detract from the great importance of Dr. Stookey's researches in paving the way which will overcome these difficulties.

Dr. Stookey, in closing, said, in reply to Dr. Abrahamson, that he did not do any electric stimulation during the progress of the experiments. There is no method other than that of Lapique's chronaxie to determine the downgrowth of the neuraxes, and this method is not feasible in animals. We stimulated the biceps muscle in the operative field during the progress of the studies in two animals. I have no other data concerning the rate of the downgrowth.

I am very grateful to Dr. Strong for his thorough discussion of the histological side.

Dr. Casamajor properly raised the question as to the wisdom of going into the ulnar nerve to supply the biceps. We used the ulnar nerve and the biceps muscle experimentally, because this seemed to offer the best technical opportunities in the dog. In the human, the choice of nerves and the decision to make an artificial nerve branch depends entirely on the paralysis and what may be gained. Obviously it would be unwise to induce a paralysis of the intrinsic muscles of the hand in order to obtain innervation of the biceps muscle. In reply to the question about innervation of old paralyzed muscles, I

would refer to the fact that paralyzed muscle regularly regenerates if neuraxes are supplied, providing too long a time has not elapsed and degeneration of the muscle is not too far advanced.

I am aware of the work to which Dr. Taylor called attention. A flap is raised from the nerve and implanted in the muscle. I would like to emphasize one point: by making such a flap from the main nerve trunk damage to the nerve is many times greater and the possibility of successful repair is diminished; but with a fine nerve segment an artificial nerve branch may be made any length desired with infinitely less trauma to the nerve trunk.

Dr. Kraus mentioned Stoffel's work on funicular anatomy. I do not believe there is a definite funicular anatomy any great distance from the point at which the nerve branches arise. The funiculus to the pronator teres is almost a definite nerve within the sheath of the median. Other examples are to be found in the sciatic; but with these exceptions I do not believe a distinct funicular anatomy exists from the origin of the nerve to its peripheral distributions. Langley and Hashimoto have shown that throughout the course of the sciatic nerve nerve plexuses which rearrange the nerve fibers are numerous. Borchartd and Wjasmenski (*Beitr. z. klin. Cir.*, 1917 and 1919) have shown by elaborate studies and dissections on specially prepared nerve trunks, using macerated specimens, that there are no definite funicular paths from the origin of the nerve to the periphery, but that there is a constant interlacing and innumerable nerve plexuses. I believe the only funicular anatomy found is immediately above the origin of nerve branches, where there is a shunting of definite neuraxes on the formation of the nerve branch about to be given off. In certain nerves and certain positions such as the musculospiral in the middle third of the arm, the small funiculi are grouped together into one large bundle. In selecting the points for formation of artificial nerve branches an intimate knowledge of the finer anatomy of the nerves concerned is presumed.

Dr. Taylor mentioned what is apparently anatomical regeneration without functional regeneration. Complete functional regeneration depends upon the afferent proprioceptive impulses as well as efferent impulses. I remember a man, a tailor, who, during the war, had a median nerve suture. There appeared to be a complete regeneration, but the man did not regain function so as to be able to return to his work. He could hold his scissors but he could not use them accurately—probably due to a loss of the muscle-tendon sense—and he had what may be termed, if you will, a peripheral apraxia.

A CRITICAL REVIEW OF THE THEORIES OF THE PATHOGENESIS OF EPILEPSY, WITH A NEW INTERPRETATION OF THE AVAILABLE DATA.

Dr. Michael Osnato briefly discussed the various important theories of the pathogenesis of epilepsy. An attempt was made to construct synthetically a conception that would harmonize all the available data. The chief feature in the conception offered was based

upon the work concerning the biochemistry of the blood in epilepsy. Briefly summarized, this work calls attention particularly to the defective metabolism of the starches in epileptics. Organic acids, chiefly acetic, butyric, lactic and tartaric acids, are formed during the second stage of the breakdown of starches by the amyolytic ferments. In normals, these acids are changed by the action of the liver and small intestine into salts, and are then oxidized into ammonium carbonate, or sodium carbonate and urea. In epileptics, however, these acids are found unoxidized in the urine and the blood. It has been proved that in an acid medium, the nucleohistone content of cellular nuclei is broken down into nucleic acid and proteoses (albumoses). These substances cause the convulsions of the epilepsies. The acids mentioned, especially lactic acid, have the power of disturbing the vasomotor tone of cerebral blood vessels. In the generalized convulsions, the unconsciousness is caused by the sudden vascular shutdown, when these toxic substances reach the brain.

In the smaller Jacksonian type of seizures, the production of these substances (proteoses) may occur locally in the brain tissue or may be imprisoned locally by sharply circumscribed vasoconstriction.

Dr. Louis S. Aronson said he regretted that he had not the opportunity of reading Professor Cuneo's paper, and wished to thank Dr. Osnato for his translation and abstract. It is of interest to note that borax as a remedy for epileptic convulsions was put forth by Gowers many years ago. During the recent war the French had great difficulty in obtaining luminal, and in order to avoid bromide therapy attempts were made to go back to some form of borax for the control of the epileptic seizures. Marie and Bouttier, after trying potassium and also sodium tetraborate, obtained very good results with potassium borotartrate. This is not a mixture; it is a chemical which apparently has some direct effect upon intestinal chemistry and the fundamental reactions that have been alleged to be the basis of the convulsive attack. The authors of this form of treatment claim for it that following its use for several months there is, in a given number of cases, a complete cessation of convulsion, and in the great majority of cases a marked diminution in the number and severity of the attacks. Most cases have 50 per cent fewer attacks, and many of the attacks are converted from major into attacks of petit mal. Marie and Bouttier do not claim any special cure with this mode of treatment and in fact administer a small dose of luminal to many of their patients once daily, when tetraborate of potassium fails them. But they do claim that this preparation can replace the bromides, can do as much good as the bromides as an adjuvant to luminal, without producing the undesirable acne, indigestion, impoverished memory, and weakened sexual function that one so frequently finds in the chronic bromide user. I have seen many of their patients that were free from attacks entirely for nearly two years on the borotartrate

alone, and many that were benefited to considerable degree and very happy that they were not being given bromides. My own experience is limited to the use of the drug for the past four months since I have succeeded in obtaining some from Paris, and all that I can say for the present is that it seems to control some of the cases. It is an extremely hygroscopic crystalline flake that cannot be prescribed other than in small vials of half to two drams, two to three times daily, for the patient to dissolve and drink in fresh solution.

Dr. Foster Kennedy said: I am very much interested in the high degree of carbohydrate fermentation found in the intestine. It is interesting to see the usual dietary reversed. The relation to intoxication is more probable than to nervous instability. The fact of deprivation of the blood supply seems to be the chief factor. I tried on myself the experiment of compressing both carotids, and before I could count two, lost consciousness. The great underlying factor is that of vascular instability. The causes are faulty chemistry. I believe there is only a difference of degree between the ordinary syncopal attack and that of the epileptic convulsion. The phenomena have the same underlying basis, namely, vasomotor disturbance.

Dr. S. P. Goodhart asked if Dr. Osnato had considered the aura as part of the epileptic seizure.

Dr. Osnato (closing) said: In reply to Dr. Kennedy, fifteen years ago, Pike tied the internal carotids and the vertebrales close to the subclavian in cats. There immediately ensued asphyxia and a tonic spasm having all the characteristics of decerebrate rigidity. Artificial respiration continued during the ten minutes that the occlusion was allowed to continue. Immediately, and for a period of four or five days, the cat would have a series of convulsions which could be brought on even by stroking its fur, jarring the table, or making loud noises. This experiment is explained, in view of the biochemical studies of Cuneo, by the fact that when cells are shut off from their blood supply immediate catabolic changes occur. The nucleohistone breaks down into nucleinic acid and proteoses in the presence of the acid medium supplied in this particular case by the asphyxiated blood.

I am quite certain that epilepsy is not a brain disease, that is, that the disease could not be explained by investigation inside the skull alone. I have carefully gone over fifty-seven private cases of epilepsy and was struck by the fact that only three of these had any sort of objective neurological signs. Two of these cases showed sensory motor types of cortical disturbances. They were traumatic cases with craniocerebral injury. The other case was of the so-called idiopathic type and showed a Babinski on one side and a sixth nerve involvement on the other.

I have selected private cases because, although they were few in number, they were much better material than larger groups of cases from a clinic. Even in good neurological clinics patients are examined usually only once and then by men whose training neurologically has

not been completed. There are also many other sources of error in the examination of clinic patients. However, I have no doubt that if it were possible to examine even thousands of cases of idiopathic epilepsy, the numbers showing actual objective neurological signs would be very few indeed. Epilepsy is, therefore, not primarily a disease of the structure of the nervous system, but makes itself felt through it in the convulsion and some other episodes.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

2. ENDOCRINOPATHIES

Rubinstein. PARABIOSIS FOR RESEARCH ON ENDOCRINE GLANDS. [*Semana Médica*, April 1921, Vol. XXVIII, No. 6.]

This is an interesting experimental study. The author says that with parabiosis induced, for example, by suturing side to side two puppies from the same litter, if the hypophysis of one be removed, the hypophysis of the other will hypertrophy. This puppy, by the end of the year, will show the effects of excessive hypophysis secretion, while the other puppy will show the effects of inadequate secretion.

Hollander, L. RÔLE OF ENDOCRINE GLANDS [*Archives of Derm. and Syph.*, May, 1921, Nos. 3-5.]

Skin disturbances as affected, in part, by endocrine imbalance, is here discussed. In skin cases presenting increase in metabolic activities, in addition to regulating the patient's habits, enforcing dietetic and hygienic measures, cleansing of the skin with hot fomentations at night and frequent washings during the day, aseptic removal of comedones and opening pustules, the author prescribes suprarenal gland substance, five grains, three times a day. In cases of an ambivalent type—lazy, plethoric, over-nourished, closely bordering on lowered thyroid gland activity, thyroid gland substance, one-fourth grain, three times a day is prescribed. The conception that the underlying etiologic factor in acne is somewhere in the domain of the endocrine glands—probably in the gonads—is one of the author's generalizations. In a good many instances the endocrine administration described is supplemented with ovarian or testicular extract administration. The administration of dry gonad extracts proved unsuccessful. He pays no attention to the vastly more important mental synthesis of the gonadal functions.

Cramer, W. ON SYMPATHETIC FEVER AND HYPERPYREXIAL HEAT-STROKE. [*Brit. J. Exper. Path.*, 1920, Vol. I, No. 31.]

In previous papers the conception has been developed that the thyroid and adrenal glands working together form a humoral apparatus for the heat regulation of the body (see *Medical Science*, 1919, Vol. I, No. 117). Their functional activity produces a continuous sympathetic stimulation which leads to increased heat production through mobilization of the liver

glycogen which is passed into the blood stream and oxydized. This may be balanced by increased heat loss due to the raising of the hairs of the coat as the result of the stimulation of the arrectores pilorum. Or with more active secretion of the adrenalin there is constriction of the cutaneous vessels and diminished heat loss. Thus fever results, which from its origin it is proposed to call "sympathetic fever." In man and a few animals, such as the horse, the function of the hairy coat in regulating the heat loss is taken on by the sweat glands. A short but very virulent "sympathetic fever" of this type can be produced by the subcutaneous injection of B-tetrahydro naphthylamine. With appropriate doses the temperature rises within one hour after the injection and the animal dies in hyperprexia with convulsions and deeply-congested lungs. If the animal survives the temperature returns to the normal level in four to five hours. But the dose necessary to produce this effect depends on the climatic conditions under which the animal is being kept. Thus a dose which will kill a mouse kept in a warm room in hyperpyrexia within one hour will have little or no effect on a mouse kept in a cool room. Again, a dose which has little or no effect on a mouse kept in a warm room by itself, will produce a rapidly fatal hyperpyrexia if ten or twelve such animals are crowded together in a cage. It is argued, therefore, that this condition is an "experimental heat-stroke," and that in its features and postmortem findings it presents a striking resemblance to hyperpyrexial heat-stroke in man. It is pointed out that this condition of experimental heat-stroke is different from the rise of temperature terminating in death which can be produced in a normal animal by exposing it to a hot environment. The explanation of hyperpyrexial heat-stroke in man is therefore that an extrinsic factor, namely, deficient cooling due to the conditions of the environment, acts upon an organism which is under the influence of a hyperactive sympathetic system. This latter results from a breaking down of the restraining mechanism which normally inhibits the activity of the thyroid-adrenal apparatus when an organism is placed in a warm environment. The bearing of this view on the treatment of heat-stroke is discussed. The importance of drastic cooling in the early stages of heat-stroke as a prophylactic treatment is emphasized. As accessory methods the use of chloral and anaesthetics (ether, chloroform) is recommended as antagonists to sympathetic hyperactivity. Morphine aggravates the condition although it obscures some of the symptoms. Saline infusions are contra-indicated and venesection is only symptomatic treatment. [Medical Science.]

Graves. THE INFLUENCE OF THE DUCTLESS GLANDS. [N. Y. Med. Jour., November 6, 1920.]

This author discusses two aspects of the relationship that exists between the endocrine system and the gynæcological conditions. In the first place, he considers the relation of the ductless glands to the specific neuroses in patients suffering from pelvic disease. He found in an examination of 1000 private patients that in 84 per cent "nervousness" of a greater or less degree was a part of their complaint; in other words, there was some disturbance of the emotional state. He quotes Cannon's

work on the connection between the adrenal secretion and the emotions of fear, anger and rage and refers to the emotional and physical phenomena which are associated with disturbances of the thyroid and pituitary functions. He defines functional nervousness as a continuous state of emotional excitement, sensory in character and induced by the reciprocal action under stimulation between the autonomic nervous system and certain glands of internal secretion. For an explanation of these conditions, he inclines to the theories of psychoanalysis, but rejects the extreme Freudian doctrine of the suppressed libido and agrees with Adler, who explains the neurotic constitution by assuming that the patient is conscious of a feeling of inferiority, which results from her organic deficiency. This deficiency may or may not be concerned with the sexual glands. It is necessary to distinguish the neuroses which have been acquired as a result of pelvic changes from the constitutional "fixations" of childhood, as well as from the neuroses which are purely psychic and those cases marked by hypersecretion or deficiency of gland products. The aid of the neurologist or internist may be of value. Women are said to be more peculiarly "nervous" than men. The internal glandular equipment of women is, without doubt, more unstable and they are peculiarly liable to the influence of disturbances of the ductless glands. In the second place, the author calls attention to the fact that the ovary has two separately active parts—the interstitial cells and the germ cells. This division is not comparable to the two parts of the pituitary or adrenal glands. Extract of the whole gland is as efficacious in treatment as corpus luteum or extract of ovarian residue and it has an undoubted specific action on menstrual irregularities, such as hot flushes, temporary functional amenorrhea, dribbling before and after the catamenia and "small clotting." In the permanent amenorrheas, especially those associated with pluriglandular disturbances, it has little or no effect in restoring the menstrual function, but it improves the general health. It is best given in large doses separately from the other gland extracts. In certain types of dysmenorrhea it is of value, but in the severe types it is of little help. It is not indicated in the treatment of menorrhagia or metrorrhagia. [Austr. M. J.]

Porak, R. GLAND EXTRACTS IN DIFFERENTIAL DIAGNOSIS. [Annales de Méd., Paris, January, 1920.]

This angle of the subject, namely, how the administration of glandular extracts may be of aid in differential diagnosis, is here well discussed. The difference in the reaction following the use of the extracts is often so marked as to aid in differential diagnosis. Suprarenal extract and thyroid extract in the healthy display an immediate pressure reducing and pulse slowing action. With myxedema, however, it is very slight, or the effect may be the reverse, the pulse becoming accelerated. In one girl of ten with a white swelling of the knee and tendency to obesity, no effect was apparent from test administration of thyroid extract. This

confirmed the suspicion of a hypothyroid state and under regular and continuous thyroid treatment improvement was soon observed; in ten days the weight dropped from 34.3 kg. to 30. Pituitary extract accelerates the pulse in myxedema and slows it in the normal, while it causes the pulse to grow slower from the oculocardiac reflex in myxedema. The test is made with intramuscular injection of 0.5 to 2 c.c. of thyroid extract or pituitary extract.

Arnoldi, W., u. Leschke, E. THE ACTION OF ENDOCRINE PREPARATIONS ON RESPIRATORY METABOLISM. [Ztschr. f. klin. Med., 1921, Vol. XCII, No. 364.]

Experiments were made on the respiratory exchange and the nitrogen balance of a young undernourished woman to whom was administered thymine, the extracts of the anterior and the posterior lobes of the pituitary, thyroid preparation, adrenalin, and luteoglandol (an ovarian preparation) during various stages of carbohydrate nutrition. It was found that the effect of these preparations on metabolism depends upon the condition of nutrition of the patient, especially the amount of carbohydrate which is being consumed. With large doses a marked effect of the drugs is obtained and proteins are catabolized along with carbohydrate. When the amount of carbohydrate administered at the same time is large there is a reduction of water and salts excreted and the weight of the patient increased. [Med. Sc.]

Patton, A. D. SOME ASPECTS OF ENDOCRINE THERAPY. [The Journal of the Medical Association of Georgia, January, 1922, Vol. XI, No. 1.]

The writer warns against too ready acceptance of conclusions regarding ductless gland therapy, from either misled enthusiasts or manufacturers. Diagnosis of dysendocrinoses is difficult; hypo- and hyperfunction of a gland may alternate; other ductless glands are especially apt to be affected and hyperfunction of an endocrine gland, as of any other organ, must have bacterial or toxic or other cause. The therapeutic effect on a human gland, of the product of an animal gland, is in question—is Hallion's law applicable to *all* ductless glands? Does the effect vary dosage? It is early or late? Temporary or permanent? The assumption that a large gland, whether neoplastic or not, is over-secreting, is questioned as neoplasms in other tissue do not increase secretion. If increased, is the secretion normal? As ductless glands are highly specialized tissue they probably deteriorate rapidly after death, therefore we are not certain that the animal gland products available are active, or identical with healthy, living human gland secretions. Some endocrine products may be more effective during certain cycles of life, as the ovarian extracts seem to be during puberty and the menopause: their capacity for harm may vary similarly. Diagnosis of disease should be made first, then the object of treatment considered, and, lastly, a remedy applied. Of this remedy we should know the preparation,

dosage, activity, effect both in health and disease, and method and time of elimination or destruction. The "therapeutic test" of thyroid function is especially condemned as dangerous, and thyroxin is considered the most dangerous drug known in medicine. The writer concludes that we really know very little about any available endocrine product at present, that some ductless gland products are potent and dangerous, and that our information should come from scientists and not from advertising departments. [Author's abstract.]

Grosshart, Ross. FUNCTIONAL DISTURBANCES OF NERVOUS SYSTEM DUE TO PELVIC REFLEXES, AND ANOMALIES OF THE INTERNAL SECRETIONS. [Oklahoma Med. Jl., 1921.]

Realizing the great importance of my subject and inability to do it justice, I approach it with hesitation, but there are a few vital observations I wish to record, as the medical literature is meager on the subject. You can find a complete discussion on pelvic pathology and its reflexes, but little that touches on the relation between pelvic anomalies and the secretions of the endocrine glands. In my opinion the remote effects of pelvic disease—*i.e.*, those due to disturbed endocrine function, cause more distress to the human family than the pathological conditions which we are able to remove surgically. But one is not in a position to operate his patient successfully unless he has a clear understanding of the function of the internal secretions. With this knowledge, he is able to give an intelligent prognosis and the proper care that will save him from the criticism of a dissatisfied patient. I believe that we are of one opinion, that the internal secretory glands are very closely connected, one to the other, in a sort of closed chain arrangement. Disturbed function of the adrenals, may produce derangement of thyroid or ovarian function, or *vice versa*, each had its physiological opposite. The mental and physical characteristics of the child are in a measure dependent on the internal secretions of the mother. The vasomotor and other nerve centers are probably largely dependent on internal secretory function. There are a few vital observations which I intend to discuss. (1) Importance of properly conducted intercourse, in determining the mental and physical calibre of the future generation. (2) Relation of intercourse to divorce. (3) Passion as a stimulus to progress. (4) Relation of passion to organic functions. (5) Effect of sexual disappointment; (a) heart action, (b) hallucination, (c) hysteria, (d) anemia. (6) Congenital malformations.

(1) Much has been written of the wonderful strides made in the diagnoses and treatment of disease. But the important subject of sex relationship has received little attention—delicacy has bridled the tongue of educators, physicians and parent. Science has remained silent, and permitted this most vital subject to be imparted to the young generation by instructors as ignorant as the pupil. The mothers of to-day, due to social prejudice to sex education, are acting as incubators and too often,

owing to disease or fountain syringes, do not even serve this function. The modern woman, through selfish motives, hesitates to assume the responsibilities of motherhood which interfere with her social duties. She submits to intercourse in a half-hearted manner, her mind occupied with the latest society gossip and her hope resting in the fountain syringe. The progeny of love is genius. To substantiate my remarks, I will call your attention to the fact that love babies are usually normal, and by their superior intelligence are often able to eradicate the stigma attached to their birth. Why are they superior to the offspring of the social butterfly? Simply because they were conceived normally. Neurologists emphasize the importance of normal conception, and point to such nervous disorders as epilepsy and degeneracy as traceable to alcoholism or drug addiction at the time of intercourse as frequent causes of these distressing afflictions. (2) The relations of intercourse to divorce is of striking interest. It has been my observation that eight out of ten divorces started during the honeymoon. The natural delicacy of the mother to entering into a discussion of wifely duties with her daughter, on the one hand, leaves the young wife in a state of fearful expectancy and apprehension. The young husband, who usually has acquired all his sexual knowledge in the brothel, treats his innocent mate in the only manner he has any knowledge of. Accustomed to the experienced woman of the underworld, he proceeds to the sexual act with little ceremony, thus creating a feeling of repulsion in the young bride. (3) Passion as a stimulus to progress. Human civilization was at a standstill until Eve discovered she was naked in the garden of Eden. Up to this time there was no advancement—man lived in the present and was satisfied with self. I cannot recollect a masterpiece in art or literature that was the product of a chaste man, or woman. (4) The relation of passion and sexual disappointment to other organic functions. (1) The so-called nervous hearts with or without the evidence of internal secretory disturbance. In my opinion there is a strong sexual element in every case of hysteria. Chlorotic girls, and boys, owe their condition to ungratified sexual impulse and would be relieved by normal intercourse. Congenital abnormalities as a cause of abnormal sex relation must be eliminated before giving a prognosis or advising treatment.

My only excuse for offering this paper is to stimulate every practitioner of medicine, irrespective of his specialty, to familiarize himself with the subject. If every medical man would take it upon himself to do a little missionary work in this field, and enlighten the fathers and mothers of to-day, on the necessity of sex education, posterity would be bettered physically, mentally and morally. The endocrine glands should be protected from infection in so far as it rests within our power. Thyroid, ovarian and adrenal disease are often due to tonsil infections. Personally I believe that cystic ovaries and hyperthyroidism are always due to disease of the upper air passages. I would counsel the surgeon before undertaking a pelvic operation to be sure that the primary con-

dition cannot be found in the throat. I would advise the diagnostician to study his case well before advising surgery. It may depend upon sexual defect and surgery in this case might cause unhappiness and divorce.

The physician when consulted by a patient for some nerve disorder, who fails to take the sexual history and neglects to search for tender ovaries, slight leucorrhoeal discharge, thickened pampiniform plexes, tachycardia and other signs of ungratified sexual desire is unworthy of his title. It is this class of patient that finds her way to the Christian Scientist, chiropractor or divorce court. A good looking iceman might cure all her ills but make her a social outcast. The proper medical advice would make her a happy woman and perhaps a mother. My plea is education of public, discharge your duty as physician and surgeon, put into the schools educators of merit and integrity, and make the next generation charitable, mentally, morally, thereby raising the standard of morals and civilization. [Author's abstract.]

Santy and Bizot. BLOCKING THE PLEXUS FOR THYROID OPERATIONS. [Rev. de Chir., 1921, Vol. LIX, Nos. 9-10.]

Bilateral paravertebral anesthesia of the cervical plexus and brachial plexus, which allows thyroidectomy or resection of a cancer of the esophagus with ease and dispatch is the technic described in this paper. The patients probably would not have been able to stand any other method of anesthesia in certain instances. Coöperation during the operation helps considerably.

Borchardt, L. GENERAL PRINCIPLES OF ORGANOTHERAPY. [Therap. Halbmonatshefte, Berlin, 1920. J. A. M. A.]

Borchardt recalls that some of the active substances isolated from certain organs display an action which has nothing to do with the original function of the organ, and warns that we must not overestimate the reciprocal or antagonistic action between different organ extracts. He cites as important Langley and Elliot's assertion that epinephrin in all its actions on any organ behaves the same as electric stimulation of the afferent sympathetic fibers of that organ. Suprarenal and certain other extracts seem to activate the protoplasm, and thus increase the functional capacity, like parenteral protein therapy. If the organ extracts contain any protein, there is a superposed protein therapy effect. Both suprarenal and pituitary extract increase the immune reactions. In typhoid, the former has increased the agglutinins from 1:20 to 1:5,120 or even 1:10,240, and pituitary up to 1:2,560. There is much to sustain the assumption that the hemostatic action of organ preparations is due to this promoting of the functional capacity. This is probably also the explanation of the benefit from transfusion of blood. The blood is destroyed, and at most its elements are used in the production of new blood. The promptly favorable effect is probably merely from stimulation of the functional capacity of the blood-producing system. Bone marrow

and spleen extract may yield as favorable results in the line of regeneration of the blood as transfusion of blood itself. Pituitary treatment of typhoid, tuberculosis, cholera, etc., has been tried on this theoretical function-promoting basis, and with promising results in some circumstances. We have thus at our command a substituting hormone therapy, as in thyroid treatment of obesity; a ferment therapy, as in supplying the finished pepsin or a hormone which stimulates some special secretion; a hormone therapy seeking to utilize the reciprocal and antagonistic action of the endocrine glands, and, finally, we have the protoplasma activation therapy as in parenteral protein therapy. Hitherto, he adds, the application of these principles has been mostly empiric.

Grauert. INDICATIONS FOR OPERATIONS ON THE THYROID. [Arch. f. klin. Chir., November 24, 1921, p. 118.]

The problem of surgical operation is not an easy one and the author endeavors to indicate the proper time for operation. When only a few symptoms are present, or when acute symptoms have subsided, leaving extreme euphoria, these should be regarded as indications for operative treatment. The euphoria is liable to yield suddenly to grave exacerbation of the former symptoms. He describes a family in which between two sisters the complete syndromy was divided. This distribution of symptoms among the members of a family is worthy of more research. Another point to which he calls attention is the possible alternation in the same person of symptoms indicating insufficient and excessive endocrine functioning. Operative cure resulted in two cases he describes in which exophthalmic goiter developed in women of myxedematous type. In another case there were symptoms of schizophrenia but after partial thyroidectomy a symptomatic cure was apparent.

Hoshimoto, K. THE HEART OF EXPERIMENTAL HYPERTHYROIDISM. [Endocrinology, September, 1921.]

This experimental study concerns the histological changes in the heart resulting from artificial hyperthyroidism. Buccal administration of toxic doses of thyroid substance caused, in addition to an enlargement of the heart, the appearance of myocarditic lesions in very many instances. These changes consisted chiefly of dense accumulations of large "histiocyte" cells derived from the clasmocytes present in the interstitial connective tissue, in small circumscribed areas between muscle fibers or not infrequently in the neighborhood of the blood vessels. These cells may be accompanied by a lymphocytic exudate in the earlier stages, while in later stages they are associated with fibroblasts which gradually increase in number and eventually prevail over other types of cells. Muscle fibers may thus be destroyed in areas adjoining. These cells may also show diffuse degenerative changes occurring independently of these interstitial changes, together with slight disintegration of their nuclei. Hearts showing such changes are functionally inferior to normal hearts and

these changes are attributed directly to thyroid intoxication. Thus thyroid administration can cause not only tachycardia or hypertrophy, but also myocarditic lesions. All of these simulate the functional and anatomical changes found in the hearts of patients suffering from goiter. The evidence presented lends support to the theory that the cardiac disturbances associated with goiter are due to thyroid intoxication.

Nobécourt and Janet, H. MYXEDEMA. [Bulletins de la Société Médicale des Hôpitaux, April 7, 1922, p. 608.]

Basal metabolism measurements in children under thyroid treatment for myxedema according to these observers showed clearly the effect of the organotherapy. The weight declined and the basal metabolism increased.

Labbe and Stevenin. BASIC METABOLISM IN EXOPHTHALMIC GOITER. [C. R. Soc. Biologie, May 13, 1922.]

These clinical laboratory studies were carried out with a view to determining the changes which occur in the basal metabolism. The numerous results obtained recently by American workers they report were confirmed. The number of calories given out per square meter of surface per hour in the normal individual varies from 35 to 40. In mild cases of hyperthyroidism this figure is increased to an average of 51, while in fully developed cases of Graves' disease it rises to a mean of 66. The basal metabolism is unaltered in simple goiter, except occasionally in recent cases, when a slight rise may be met with. They generalize and say that the estimation of the basal metabolism is of considerable value, not only from a diagnostic point of view, but also from that of prognosis. In a second study the authors record their findings relative to Graves' disease from the administration of 45 grams of glucose. The blood sugar was estimated every half hour for five or six hours. In the mild and in the advanced cases the increase over the normal content is distinctly marked. The reaction appears to be constant, and they argue is of value in the diagnosis of doubtful cases of exophthalmic goiter.

Maranon. EMOTION AS A FACTOR OF HYPERTHYROID STATES. [Annales de Méd., 1921.]

Although in exophthalmic goiter hyperfunction of the thyroid glands is the essential factor—and upon this point there seems now to be no question—the author considers that theories in respect to the pathogenesis do not attribute sufficient importance to emotion as a causative factor. Only the most recent works—especially A. Kocher's article in Kraus and Brugsch's "Spezielle Pathologie und Therapie"—expressly mention violent emotional shock and prolonged emotional states, besides physical traumata, as factors. In a study of 159 cases of Graves' disease, Maranon has attempted to discover the determining cause of the affection, and he has found that in forty-eight cases an intense emotion coincided with

the outset of the morbid disturbances. This observer, however, is categorical in his statement that emotion only was not the causative factor, but was the cause of the outburst of a preëxisting latent hyperthyroid state, because he expressly states that in the vast majority of the cases (forty-one) the patients presented a marked predisposition, viz., emaciation without any manifest cause with exaggerated affective and neurotic tendencies, paroxysms of gastric hypersecretion, etc. The emotional factor is hence not in itself sufficient other than in a small proportion of cases; in the others a constitutional element is in play. As to the mechanism of the relationship between emotion and the hyperthyroid state the action of the endocrine glands must be admitted, and Maranon refers to Cannon's experiments and his own in which a glycosuria or hyperglycemia was noted following an emotion. Upon injecting small doses of adrenaline— $\frac{1}{4}$ to $\frac{1}{2}$ milligram—exaggerated reactions ensue and it may be supposed that the hyperthyroid state produces a condition of sensibilization of the vegetative nervous system which at least partially constitutes the emotive predisposition, and the adrenaline suddenly secreted on account of the emotive outburst, gives rise to the appearance of the characteristic changes depending upon the emotion. It is probably because of this that patients with Graves' disease are so sensitive to emotions and why a latent hyperthyroid state may become converted into a serious condition from an intense emotive attack, while less frequently a violent emotion or a series of emotions may transform a normal individual into a hyperthyroid subject.

Prolonged depressing influences, far more than a single violent psychic shock are the cause and this fact may explain why the recent war did not give rise to as many cases of exophthalmic goiter as might have been anticipated. On the other hand the frequency of these depressing causes increases after the age of forty years, especially in women, and the so-called "climacteric hyperthyroid state" is, in reality an argument in favor of the importance that should be attributed to emotions in the genesis of exophthalmic goiter. [Ed.]

Cameron, A. T., and Carmichael, J. THE COMPARATIVE EFFECTS OF PARATHYROID AND THYROID FEEDING ON GROWTH AND ORGAN HYPERTROPHY IN THE WHITE RAT. [Am. Journ. Physiol., LVIII, 1, 1921.]

Thyroid feeding partially or completely inhibits growth in the young white rat, and produces marked hypertrophy of such organs as heart, liver, kidneys, spleen, and lymph gland. A small percentage of young rats fed moderately large thyroid doses (1 : 5000 or 1 : 2000 of body-weight per day) develop typical tetany in about ten days; this is almost certainly connected with the increased respiration which is a marked factor in such cases. Feeding much larger doses of parathroid produces no effect on growth, no organ-hypertrophy, and no tetany. [Author's Abstract.]

II. SENSORI-MOTOR NEUROLOGY.

1. PERIPHERAL NERVES

Wheeler, W. I. de. COMPRESSION NEURITIS DUE TO NORMAL FIRST DORSAL RIB. [Dub. Jour. of Med. Science, April, 1920.]

This clinical report of compression neuritis in the arm is of one case in which Wheeler removed the first rib. An incision was made above the clavicle, as if for ligature of the subclavian artery. A second limb was added, running parallel to the fibers of the trapezius muscle. The segment of rib removed extended from the posterior edge of the insertion of the scalenus medius to the scalene tubercle.

Bower and Hawkins. TINEL'S SIGN. [Arch. of Neur. and Psych., Dec., 1920, IV, No. 6.]

These authors confirm in part Tinel's observations. They state that there is a definite relation between the return of deep sensation and the advance of the tingling described by Tinel. When deep sensation begins to return there is a daily advance in formication of approximately one-tenth inch.

Enghoff, H. STUDIES IN ZOSTER. [Acta Med. Scand., 1921, LIV, Nos. 468-91. Med. Sc.]

Enghoff's records of several cases of herpes zoster are discussed with special reference to (1) the condition of the cerebrospinal fluid and (2) the hypothesis, advanced in 1907 by Petrén and Bergmark, that a considerable sensory disturbance at the time of a zoster eruption is of ill omen as foretelling a subsequent chronic neuralgia. With reference to the first point, lumbar puncture revealed in one case numerous mulberry-shaped red blood corpuscles, and in another a slight lymphocytosis. The conclusion is drawn from these and other cases recorded by French writers that Head and Campbell are right in regarding zoster as an acute infectious disease. With reference to the second point, Enghoff's findings are inconclusive. One of his cases was certainly confirmatory of Petrén's and Bergmark's hypothesis. The patient was a man of 48, whose zoster dated five years back. The eruption was spread over a 10 to 15 cm. wide area on the right side at the level of the umbilicus. There were also occasional eruptions on the penis, the nose, and the temples. In spite of acute pain one night, he went hunting next day. On the following day his temperature was over 40° C. He was febrile for two weeks and was confined to bed for about five months. The vesicles, which became as large as grapes, did not heal till the fourth month. Though relieved, the pain did not cease altogether, and after five years was still violent whenever he performed certain movements or placed himself in certain positions. In another case, however, cervico-thoracic zoster was accompanied by considerable sensory disturbances

manifested by hypoalgesia, analgesia, and relatively slight neuralgia. In spite of the patient's age (63) and the considerable sensory disturbances, complete cure was effected by diathermy in a short time. In one case zoster on the right side of the back and abdomen immediately above the umbilical region was followed by sciatica on the right side, and Enghoff refers to a similar case recorded in 1911 by Tinel.

Sicard, J. A. NEURALGIA AFTER HERPES ZOSTER. [Méd. Paris, Feb., 1920.]

Lymphocytosis in the spinal fluid often accompanies herpes zoster, showing a reaction on the part of the ganglia, nerve roots and meninges in the region involved. Occasionally the pains become chronic and surgical interference seems called for. Traction is useless and dangerous while severing the posterior root alone is liable to entail motor paralysis. Excision of the spinal ganglion and resection of the two adjacent posterior and anterior roots is the technic advised here. The ligature includes both roots between the dura and the ganglion, and then the ganglion is torn out. Gangliectomy has to be done on four segments. This extradural procedure causes comparatively little trauma, and is all under direct inspection. Intradural section of the posterior roots entails loss of spinal fluid. This latter method was successful in one case, and one patient died. In three cases the extradural gangliectomy cured two of the patients immediately, but the pains persisted in the other case. One patient with chronic neuralgia after herpes zoster, involving the ophthalmic and superior maxillary nerves, died after gasserectomy.

Wells. BERI-BERI. [Phillip. J. Med., July, 1921.]

The author accepts the decorticated rice hypothesis and describes a method whereby the rice polishings can be treated in such a manner as to yield a liquid containing a large proportion of the vitamine, which can then be used for cure. The general technic is to extract the polishings of white rice with alcohol, to separate off the inactive substances obtained at the same time, and to concentrate the fluid to the consistency of a syrup, in which form it is finally collected and dispensed in bottles. The action of this preparation would appear to be highly favorable. It has been used in the Philippine Islands since 1914 in the treatment of beri-beri in children. It will be remembered that a similar extract prepared from yeast, and distributed under the commercial name of Marmite, was employed with considerable success amongst the troops in Mesopotamia during the World War.

Lindstedt, F. SCIATICA. [Acta Med. Scandinavica, May 6, 1920.]

The author adopts the present day attitude that it is impossible to draw the hard and fast lines between neuritic, muscular and neuralgic symptoms in sciatica, and states that in practically all of his 100 cases he found abnormal conditions of inflammatory, traumatic, neoplastic or

varicose nature in the bones, joints, or soft parts of the legs, back or pelvis, usually near the course of the sciatic nerve, or else deformity of some kind or static anomalies. Exhaustive analysis will reveal the chronology, the nature, the localization, and the frequency of changes of these kinds in sciatica. They show that causal connection can be proved for the irritation from these conditions which in time brings about a functional overexertion of the segments involved, until the "neuralgia habit" is present. This conception of sciatica which is found in some of our advanced treatises opens new horizons for treatment of sciatica and lumbago, and explains the benefit from empiric measures, also takes into consideration the neurotic or psychic factor which may be present.

Zimmern, A. ELECTRIC AND ROENTGEN TREATMENT OF SCIATICA. [Journ. de Radiologie et d'Electrologie, Jan., 1920. J. A. M. A.]

In this conventional article Zimmern assumes that true sciatica can be traced to irritation or compression of the roots of the nerve, not severe enough to arrest the motor impulse. It may be amenable to direct irradiation or to indirect revulsion by a faradic or high frequency current or jet of hot air. Other physical measures seem to have only a symptomatic action. His experience warns against trying to combine roentgen-ray treatment with electric revulsion; the latter seems to undo the effect of the former. He usually gives 2 H units at a sitting. Relief may be obtained at the very first, but the second or third is generally followed by the subsidence of all the pain. Sometimes there is an exacerbation of the pain the evening or the day following each sitting. This exacerbation always proved a sign of favorable omen. If three sittings do not accomplish the result, he waits eight or ten days, to save the skin, and then repeats the course with doses of 3 instead of 2 H. The Achilles tendon reflex seldom returns, or not until very late.

Souques, A., and Bertrand, I. van. CONTRIBUTION TO THE ANATOMO-PATHOLOGIC STUDY OF FAMILIAL HYPERTROPHIC NEURITIS. [Annales de Medicine, May, 1921.]

A. Study of the peripheral nerves. The myelitic degeneration presents absolutely nothing special, whereas the reaction of the sheath of Schwann is intense, pathognomonic and seems to precede the myelitic degeneration. The "Schwannite" we might say is here primitive. 1. The peritubular connective tissue hypertrophies early, but very distinctly. 2. The sheath of Schwann assumes such a development that its interpretation and its delimitation sometimes become an extremely delicate task. It preserves on the whole a disposition concentric to the myelin sheath, but its thickness reaches 8.10 and even in places 20 μ and more. That is to say that its thickness has increased a hundred fold at certain points. One may explain thus the hypertrophy of the nerve-trunk. In its massive hypertrophy the sheath of Schwann as a hyperplasia comes to present certain

nuclear and protoplasmic modifications. The nuclei are extremely numerous. The structure sheath of Schwann and the myelin sheath continue their development in an inverse direction, a true see-saw histogenesis. The result is vast nucleated plaques nonmyelinated yet rich in axis cylinders more or less moniliform. The ultimate phase of the hypertrophy of the sheath of Schwann gives place to a very complex histological aspect inexplicable if one has not followed the preceding phases. These are the vast multinuclear plaques having the tendency to dispose themselves in vortices like an onion bulb and enclosing in the interior (a) myelin sheaths more or less degenerated; (b) the nuclei of Schwann often stretched and presenting some direct mitoses; (c) a number of axis cylinders for the most part completely destitute of the entire myelin sheath and of extremely variable size; (d) a number of collagenous bundles particularly thrown back to the periphery and belonging to the primordial sheaths of Key and Retzius. There is therefore produced here this remarkable phenomenon, that of the confluence of the sheath of Schwann. We would add however that this confluence is far from being the rule, that it is perhaps in accordance with the phenomena which take place at the same time and which have their origin in the interstitial tissue of the endoneurium. In the degree in which one descends the length of the nerve-trunks the lesions of the sheath of Schwann diminish progressively without ever becoming annihilated. The "Schwannite" diminishes from the center to the periphery so far as one can state an anatomical law. It does not appear that the Schwannite predominates over certain nerve fasciculi. In resuming, one cannot attribute to the distribution of the lesions of the structure of Schwann any other rule than the law of the paraganglionic centrifugal maximum.

3. The myelin sheath. The sheaths are almost completely present but almost all are altered and show great masses of degeneration stainable by the Marchi method. 4. The axis cylinders are always extremely numerous and easily visible by means of silver impregnation. 5. The connective tissue. The endoneurium is the element most seriously affected. It is that which at section of the large nerve trunks, the roots of the brachial plexus for example, presents upon the edge of the section a gelatinous appearance, brilliant, which one finds nowhere else. This is essentially formed of connective cells fixed or wandering and of collagenous fibers.

B. *Examination of the spinal ganglia.* The size of the cervical and the dorsal ganglia is normal. On the other hand two or three lumbosacral ganglia are abnormally large. Lesion of the sheath of Schwann produces its customary effect at the level of the capsule of the ganglion cells. There is a multiplication of the eccentric nuclei and a hyperplasia of the capsular lamellæ which especially come to attach themselves to the sensitive ganglionic cells and smother it if already it has suffered in itself a slight process of atrophy. Vacuoles appear among the plates of

Schwann which have undergone hyperplasia. Of the axis cylinders the part forming the glomerate masses appear divided in every direction. It is very strange to compare the figures of the hypertrophied plaques of Schwann and of the degenerated ganglionic cells. The analogy is absolutely striking. Here is the Schwannian hyperplasia with its convoluted appearance, its vacuoles, its many nuclei in the depth of which multiple axis cylinders circulate.

C. *Examination of the spinal cord.* 1. Degeneration of the posterior spinal columns. As one would suspect in consequence of the lesions of the spinal ganglia the posterior columns are degenerated. The degeneration is not complete; it attacks a great number of fibers of different origin in the columns of Goll and Burdach. Here briefly the topography is that which one may assume for degenerated areas. 1. The conus and the entire lower extremity of the sacral cord. 2. In the lumbar region one may see persisting rare endogenic paramedian fibers; the cornu-radicular and cornu-commissural zones, although rather faint, contrast clearly with the almost completely degenerated zone of the rest of the posterior columns. 3. In the dorsal region as far as concerns the cornu-commissural zone, all the rest of the posterior column is faint. 4. Finally at the level of the cervical segment, conformably to Kahler's law, the degenerated fibers are pressed back toward the median line where they constitute the bundle of Goll. But more important than the topography is the nature of the degeneration. It is a degeneration from fiber to fiber. One does not find macrophagocytic granular bodies stuffed with myelinic debris. This degeneration is not accompanied by retraction or atrophy of the posterior column. The degeneration of the posterior column of the cord may be followed as far as the nuclei of Goll and Burdach. But beyond the bulbar relays the path of deep sensibility is absolutely normal.

II. The motor cells of the anterior horns are greatly diminished in number and present all the signs of an intense cytolysis.

In summary, familial neuritis, primitive "Schwannite," attacks both peripheral neurons of the motor and sensory paths in all their intra- and extra-medullary extent. [Author's abstract.]

Paisseau, Schaeffer, and Alcheck. MALARIAL NEURITIS. [Bull. et Mém. Soc. Méd. des Hôp. de Paris, November 24, 1921.]

This is a clinical report of a case of paralysis of the deltoid in a man aged twenty-two which developed during an attack of benign tertian malaria, malarial neuritis. Twenty-five cases were collected by Sacquépée and Dopfer in their classical paper in 1900. As a rule the neuritis develops during or immediately after a malarial attack, but the writers have found five cases on record in which it appeared independently. It is usually supposed that the complication is peculiar to pernicious attacks, but this is by no means invariable, as out of the thirty-seven cases col-

lected by the writers only nine occurred after pernicious attacks. In most cases the patients are the subjects of chronic malaria, but as a rule there is no cachexia. In one case the neuritis occurred at the onset of the disease. The variety of the malarial parasite is not always stated in the cases recorded, but the writers' case shows that the neuritis is not always due to *Plasmodium praecox*. Malarial neuritis is remarkable for the variety of its manifestations, as it may affect the eyes (accommodation and oculomotor muscles), larynx, tongue, and face. In some cases there may be a polyneuritis associated with psychical disturbance of the type of Korsakoff's syndrome. Of the thirty-seven cases collected by the writers all four limbs were affected in twelve and the face as well in two, in thirteen the lower limbs alone were involved, in eight the upper limbs only, in one the upper limbs and the face, and in one the face only. The onset is sudden and the course variable but always protracted. Reaction of degeneration is almost constant. Recovery is possible but rare, so that the prognosis is serious as regards restoration of function.

Veyrassat. ARSPHENAMIN IN SCIATICA. [Revue Méd. de la Suisse Romande, May, 1920.]

In certain extremely obstinate cases of sciatica this author gives arsenic. Prompt benefit obtained, he was encouraged to try this treatment in four other cases in which compression of the nerve could be excluded. In one of the cases the cure was explained by the suspicion of syphilis; in two others tuberculosis was probable. Arsphenamin has an unmistakable action on tuberculous adenitis. Whatever the relation of cause to effect may have been the rebellious sciatica subsided after injection of 15 cg. of nearsphenamin in one man of forty with a family history of tuberculosis.

Villaverde, Von José M. de. LAS NEURITIS POSTGRIPALES. [Archv. de Neurobiol., 1920.]

This is a clinical study of postgrippal neuropsychiatric complications. In Spain the nervous complications of the grippe have been numerous, especially the peripheral ones; the mononeuritic types being quite prominent. Facial and trigeminal neuralgia were prevalent. One side hypoglossus palsy is noted. In the upper extremities the radialis was oftenest involved; in the lower sciatica was frequent, peroneus less so. Polyneuritis was observed and one interesting pseudotabes was observed in a postgrippal case with complicating alcoholism.

2. SPINAL CORD.

McLean, S. CEREBROSPINAL FLUIDS IN INFANTS AND CHILDREN. [N. Y. Acad. Med., November, 1921; Sect. Pediatrics, November 10.]

This paper consists of an analysis of the findings of 250 specimens of cerebrospinal fluid obtained from the records of the Babies' Hospital during the past four years. All bloody fluids were discarded, as well

as fluids from all types of meningitis and poliomyelitis. The records of the fluids were grouped according to clinical diagnosis, many of which diagnoses were controlled by autopsy. There were 35 cases in which the discharge diagnosis indicated some intestinal disturbance. In four of these fluids the cell count showed over 20 cells per cubic millimeter. There were five counts of 20 or more cells; one of these was 90; another 70; a third 62, and a fourth 60. While it was true, as shown by this table, that the usual cerebrospinal fluid in active respiratory infections was clear and colorless with a cell count of 10 or less, with a positive Fehling's test and a negative globulin, it was not uncommon to withdraw a clear fluid which contained over 50 cells per cubic millimeter. Among 21 cases of defective cerebral development the fluids were all clear and colorless and in only one instance did the cells number more than 12. In 16 cases of hydrocephalus two fluids showed xanthochromia; the others were clear. In one case with 91 cells the autopsy demonstrated hemorrhagic staining of the dura, flattening of the spinal cord and hydrocephalus. In four cases of status lymphaticus proved by autopsy there was nothing of special interest in the spinal fluids. Among four neuropathic children the number of cells in the spinal fluid was 2, 10, 15, 30, respectively. In 26 cases of tetany the spinal fluid was clear and colorless in every instance. The highest cell count was 30 cells per cubic millimeter. In seven cases of primary otitis media the highest cell count was 10 cells per cubic millimeter. Lumbar punctures were done in six cases presenting symptoms commonly expressed as meningisms, although Dr. McLean did not consider this term acceptable. In all six cases the spinal fluid was clear and colorless. In five instances it was under increased pressure, and in these fluids the cell count numbered 15, 20, and 70 cells, respectively. Among 11 cases of congenital lues, five of which were autopsied, the fluid was clear and colorless in every instance and the highest cell count noted was 48. Many other cases classified in groups were reported, which Dr. McLean said would be reported in detail later.

Guillain and Laroche. THE DANGERS OF LUMBAR PUNCTURE IN POTT'S DISEASE. [Bull. et Mém. Soc. Méd. des Hôp. de Paris, June 2, 1921.]

That evidence is slowly accumulating relative to the dangers of lumbar puncture witness the report of these observers on five cases which show that the spinal symptoms in Pott's disease may be aggravated by lumbar puncture, although apparently only a small amount of cerebrospinal fluid is withdrawn. This occurrence is explained as follows: Lumbar puncture modifies the tension of the cerebrospinal fluid, the amount of which removed is certainly more than is supposed, because the fluid continues to escape into the epidural space after the needle is withdrawn. Even when the puncture is made at some distance from the tuberculous lesions the diminution in tension of the cerebro-

spinal fluid may cause an aspiration of the caseating substance, mobilize the bacilli, and produce circulatory disturbances in the congested and edematous spinal cord. Although examination of the spinal fluid in Pott's disease may sometimes furnish valuable information, the results are not always indispensable for diagnosis, which may be established by clinical examination accompanied by X-rays, while the therapeutic value of lumbar puncture in Pott's disease is nil. Under these conditions the writers are of opinion that in a patient with spinal symptoms the probable existence of Pott's disease is a contraindication to lumbar puncture.

Guillain. TENDON REFLEXES AFTER LUMBAR PUNCTURE. [Bulletins d. I. Soc. Méd. des. Hôpitaux, June, 1921, Vol. XLV, No. 22.]

Guillain's experience with lumbar puncture is very extensive and he is emphatic in his protest against the belief that lumbar puncture is a harmless procedure. The simplest and most normal lumbar puncture may entail disturbances, painful at least, if not grave. A case of syphilitic paraplegia with exaggeration of the tendon reflexes and retention of urine is here reported. The syphilitic nature of the partial paraplegia was made evident by the puncture fluid but the procedure was followed by exaggeration of the paraplegia while the reflexes were completely transformed. This modification proved transient; in five or six days the abolished tendon reflexes returned to the hyperactive type.

Moore. THE CEREBROSPINAL FLUID IN TREATED SYPHILIS. [Jour. A. M. A., March 19, 1921.]

The cerebrospinal fluid of 642 syphilitic patients in all stages of the disease, but without demonstrable physical evidence of neurosyphilis of any type, was examined by Moore after from two to six months of antisyphilitic treatment. Of thirty-four patients with primary syphilis in which treatment was begun before the appearance of secondary symptoms, only one (2.9 per cent) showed an abnormal spinal fluid. After the appearance of secondary symptoms, the incidence of abnormal spinal fluid findings was about the same (from 12 to 15 per cent), no matter how long the disease had existed, or by what lesions it was apparent. Only 12.7 per cent of these 642 patients showed spinal fluid abnormalities, showing that the amount of treatment administered had been successful in clearing up at least half of the early changes noted by other workers in untreated cases. As minor signs of value in predicting the probability of neurosyphilis are a persistently positive blood Wassermann reaction after treatment, slight pupillary abnormalities, and certain complaints of the patient, namely, headache, nervousness, lassitude and generalized neuralgic pains. Of 173 patients who showed such signs, the spinal fluid was abnormal in 49, or 28.3 per cent. On the other hand, of 469 patients in which neither these nor other more serious

neurologic damage was demonstrable, only 33, or 7.03 per cent, showed abnormal spinal fluids. In general, the serologic evidence of asymptomatic neurosyphilis can be caused to disappear by prolonged, intensive, routine antisyphilitic treatment. Moore urges that study of the spinal fluid should be carried out as a routine in all syphilitic patients, as an essential to intelligent treatment. Spinal puncture should be performed after the first or second course of arsphenamin, and should be repeated at least once before the patient is discharged as presumably cured. If this is done in every case of syphilis, and treatment intelligently administered according to the results obtained, the incidence of clinical neurosyphilis may be reduced to an absolute minimum.

Duhot, E., and Crampon, P. BENZOIN REACTION IN SPINAL FLUID.
[Bull. de la Soc. Méd. des. Hôp., March 4, 1921.]

These authors have experimented with this test of Guillain's and state that they never obtained precipitation of the colloidal benzoïn suspension by the cerebrospinal fluid in 52 normal persons. It was constantly positive, however, in 32 cases of general paresis and in 84 per cent of 45 cases of neurosyphilis. Tincture of tolu can likewise serve for the test.

Barré, J. A., and Schrapf, R. PRESSURE IN THE CEREBROSPINAL FLUID.
[Bull. Med., January 19, 1922. J. A. M. A.]

From study of the pressure at lumbar puncture in 310 cases, Barré and Schrapf estimate that the normal pressure, measured with the Claude manometer, is 20 cm. when the subject is reclining, and 40 cm. seated, with the head drooping. Raising the head in the second position sends up the pressure from 5 to 10 cm. They consider every pressure pathologic which is over 25 cm. reclining, and over 45 cm. seated. In order to estimate the pressure in a given case, the position of the patient during the puncture must be specified; also whether he is tranquil or agitated, and whether the pulse varies in frequency or force during the puncture. Their observation suggests further that the difference between the initial and the terminal pressure and the absence of synchronous beats in the arterial pulse might aid in the diagnosis of hypertension in the cerebrospinal fluid. Subarachnoid injection of even relatively large amounts of certain drugs modified very little and only transiently the pressure at lumbar puncture, whether any of the fluid had been withdrawn beforehand or not.

3. CRANIAL NERVES.

Mans. TREATMENT METHYL ALCOHOL AMBLYOPIA. [Münch. med. Woch., August 25, 1922.]

Mans reported before the Rostock Medical Society two cases of methyl alcohol amblyopia which were markedly improved by lumbar puncture. The complete report is to appear in the *Klin. Monatsbl. f. Augenheilkunde*.

Morlet, C. HEREDITARY OPTIC ATROPHY AS A POSSIBLE MENACE TO COMMUNITY. [Med. Journ. of Australia, December 3, 1921, II, No. 23, J. A. M. A.]

Morlet fears that this disease may become of dreadful import. He studied one family, in which there are four generations at present living—22 males and 31 females. Of these 22 males, 10 are boys under nineteen years and 12 are adults. Of the 12 adults, only one has so far been spared his vision, the remaining 11 being all partially blind men. Eight of them became so about the age of puberty and 3 in later life, between the ages of thirty-five and fifty. So that the one who has so far escaped, cannot, therefore be declared safe, but may also become a victim at any moment. Of the 31 living females, seventeen are still children, while 14 are adults. Of these 14 adults, 11 are already married and 9 of them have children. Only one female has ever suffered from the disease.

Bérard. PARALYSIS OF THE RECURRENT LARYNGEAL NERVE AFTER THYROIDECTOMY. [Lyon Chirurgical, January–February, 1922.]

In this paper the author points out that the nerves most liable to injury, in operations on the thyroid, are the recurrent laryngeal. These may be damaged at two places and at two distinct times during the operation. The nerve trunk or its branches are sometimes caught during ligature of the inferior thyroid artery, whilst these same branches may be damaged or cut during the dissection of the posterior border of the gland, as they lie alongside the trachea and thyroid cartilage. Besides the effects of crushing or pulling on the nerves, one has seen lesions produced by strong antiseptics, and less often their compression by scar tissue. This may result in a localized paralysis of the muscles of the vocal cords or extend to the whole larynx, including the epiglottis, when the trunk of the nerve has been cut. Rarely the pharynx and esophagus may be involved in the paralysis. These nerve lesions were common before the technique of the operation was properly carried out. As far as the post-operative paralyses are concerned, without division of the nerve, they depend on the exposure of the nerve trunk, of pulling on it, or its compression between forceps where there is injury to some of the nerve fibers only. The constrictor muscles are usually affected, and these muscles are generally the last to recover after wounds of the nerve. It is impossible to tell immediately after the operation what the ultimate result will be. In order to avoid injury to the nerve, some tie the thyroid artery close to the gland so as to escape the nerve. Others always find the inferior thyroid artery at the point where it passes behind the carotid and tie it with a single ligature. The writer thinks enucleation of the gland within its capsule is the best method of avoiding injury to the nerve. In cases where paralysis of the nerve appears after operation laryngoscopic examination should be carried out. Some cases which appear to undergo spontaneous cure are due to a marked displacement of the unaffected cord towards the middle line.

Werne, Th. B. RAILWAY NYSTAGMUS. [Ueges. f. Laeger, November 17, 1921.]

The expression "railway nystagmus" has been used by Barany as a description for the nystagmus which arises when passengers during railway driving look at the passing surroundings. Barany has diagnostically used the phenomenon to demonstrate hemianopsy. By means of a rotary roller, the curved surface of which is divided into alternately light and dark longitudinal fields, the scenery from the running train with concurrently darkening shadows of the fleeing telegraph poles is imitated. If one turns one's eyes towards the curved surface of the rotary roller the nystagmus appears—from one side to the other if the rotation takes place in a horizontal plane, upwards and downwards, if the rotation takes place in a vertical plane. The reflex can be determined both in men and higher animals, both in young and older individuals. The nystagmus is like the vestibular one. The short phase is directed contrarily to the direction of motion. Barany has used it to demonstrate hemianopsy, as the reflex fails to appear, when the roller is placed in the hemianopical field of sight.

In this ward I undertook the examinations in another way and with another purpose. Instead of the roller a ruled rotary paper-round hung up in a horizontal plane is used, as this is more convenient to work with than the roller. Besides the examinations have been made with neurological patients in order to decide from the resulting symptoms the reflex ranges' localization and then form an estimate of the clinical adaptability of the method.

About 700 patients have been examined. In healthy individuals it hardly ever causes difficulty to produce the reflex. This is, however, of varying liveliness, in most cases it is livelier in women than in men, livelier in young than in old people. The condition for the reflex being able to start is that the experimental individual has visual nerve ranges capable of action and motory eye-muscle nerves and that the eye is attentively fixed on the experimental object. The fact is that it is not sufficient that the patient looks at the object. The reflex demands that the attention (the eye of the mind) is turned on the sight impression. This may be proved by the following experiment: An intelligent individual is asked to turn his eye on the rotary object; a lively nystagmus immediately appears. The individual in question is now told to think acutely for instance on one of his hands. Immediately the reflex stops, although the individual still looks at the object. One might think that it was only a case of deficient accommodation; but this is not the case, for the same experiment can be made with individuals whose accommodation has been suspended through atropine being poured in; the sight irritation is the same, the direction adjustment of the eye unchanged, the centrifugal ranges intact. Nevertheless the reflex stops, consequently a central transmission interruption must have taken place.

The light reflex of the pupil is not discontinued through the attention diversion, consequently the transmission interruption must be found centrally for corpus quadrigemina and corpus genic. lat.

The next point to come in question is thalamus, but here, also, the interruption must take place through cell activity of the central neurones' thalamic ganglion cells; the fact is that capsular hemorrhages cause as a rule suspended nystagmus reflex, even if the injury does not entail hemianopsy, hemiachromatopsy or reduced sight-field, *i.e.* that the reflex and the sight ranges are separated in capsula interna, which means that the reflex arc is going off in thalamus. Consequently the ganglion cells of the sight ranges' central neurones must possess an ability to interrupt and adjust the peripheric ranges to the central ones. Above the interruption place the reflex arc must go off through capsula interna and from there up to the cortical motory eye muscle centers; the fact is that cortical injuries which entail motory aphasy, are almost constantly accompanied by a nystagmus suspension as far as the left N. opticus is concerned. (By these examinations it must be remembered to place the rotary object out to the side, so that it is possible at the examination of n. opticus sin. to get thoroughly out in the right temporal sight-field; the case is reverse as far as n. opticus d. is concerned.)

The reflex range should then be as follows: n. opticus—thalamus—capsula interna through centrum semiovale to the cortical motory centers and further through the pyramid ranges to the spinal motory eye muscle centers, from there through the peripheric range to the eye muscles. Should it now be considered which diagnostic possibilities the method contains, it must be remembered that the reflex requires 1. centripetal ranges capable of action, 2. attention (*i.e.* thalamus-adjustment), 3. intact reflex arcs, 4. preserved motory apparatus. In case of no anomalies with regard to 1, 3 or 4, the method can be used as an attention trial for distinguishing between real stuporous and pseudostuporous patients. The first ones do not react, whereas the latter react, even if they are apparently lying with a far and staring glance and even if a stolen glance is the only obtainable fixation.

If 1, 2 and 4 are present, the suspension of the reflex is due to a sufferance of capsula interna, centrum semiovale or the frontal region.

If 2, 3 and 4 are preserved, a one-sided reflex suspension is due to hemianopsy. The positive reflex shows that 1, 2, 3 and 4 are intact. Even for this reason the method is well adapted for exposing blindness simulators; if the patient reacts, you know that he is able to see and that he is attentively observing the sight image. Thus I have had occasion to practice the method with a middle-aged married woman, who in connection with matrimonial disagreements had suddenly turned blind in both eyes. During the examination the patient reacted, however, with a lively nystagmus. There was consequently made an absolutely good prognose, which proved to be correct. The blindness disappeared at the same time as the matrimonial harmony was reëstablished.

In consideration of the fact that the examination technics are so simple, the method certainly deserves to be remembered when examining the above-named factors conditioning reflex, that is:

1. examination of hemianopsy, 2. attention trial, 3. sufferances of capsula int., centrum semiovale, the frontal region, 4. unveiling of blindness simulators. [Author's abstract.]

Poulard. DIPHThERITIC PARALYSIS OF ACCOMMODATION. [Paris méd., July 16, 1921.]

In diphtheria loss of accommodation is due to paralysis of the ciliary muscle, whereas in presbyopia it is caused by a change in the lens, which loses its elasticity and becomes hard and rigid and resists the contractions of the ciliary muscle. In both instances the visual disturbance is the same, except that the loss of accommodation in presbyopia takes place slowly and progressively in elderly persons, whereas the loss of accommodation in diphtheritic paralysis takes place suddenly in young subjects. Myopic subjects suffer least from paralysis of accommodation because they have no need to accommodate for near vision. Hypermetropic subjects, on the other hand, suffer most because they have to accommodate more than persons with normal vision for near objects, and have also a greater or less amount of disturbance of distant vision according to their degree of hypermetropia. Presbyopic subjects are little affected because they have become progressively accustomed to dispensing with accommodation. Unlike the paralysis of accommodation met with in syphilis, diphtheritic palsy is bilateral and appears simultaneously in both eyes. It is exclusively confined to accommodation, and does not affect the iris. It is incorrect to state, as is done in some textbooks, that diphtheritic paralysis is characterized by loss of the pupillary reflex to accommodation and by preservation of the reflex to light, as the pupils react both to light and accommodation. In syphilis, on the other hand, each eye is involved separately, and if both eyes are affected there is a long interval between each attack. Moreover, the iris is also implicated at the same time, and often the other motor muscles of the eye. Diphtheritic paralysis of accommodation is not a serious condition, and always clears up in a few weeks without leaving any trace. Injection of serum is unnecessary. While the paralysis lasts the patients may be given glasses to correct the visual defect.

Rich, Arnold Rice. INNERVATION OF THE PALATE. [Bull. Johns Hopkins Hospital, September, 1920.]

The innervation and action of the *tensor veli palatini* and *levator veli palatini* muscles are here discussed in detail. The author believes that the fifth nerve is the only cranial nerve which supplies motor fibers to the *M. tensor veli palatini*, while the *M. levator veli palatini* is innervated by the so-called bulbar portion of the eleventh nerve or, to speak more correctly, by the inferior rootlets of the tenth nerve, since the bulbar

portion of the eleventh has been shown to be really an integral part of the vagus. These results are based on experimental work done on dogs. The author was not content with observations of the movements of the soft palate. By an ingenious and careful technique he rapidly exposed the *M. tensor veli palatini*. When stimulating electrically the nerves in the interior of the cranium, he took care to prevent diffusion of the current by using a weak current with unipolar electrodes and by drying the part of the nerve stimulated. In every experiment stimulation of the mandibular branch of the fifth nerve caused definite vigorous contractions of the *M. tensor veli palatini* on the side stimulated. The presence of a relay station in the otic ganglion was also excluded. After painting the ganglion with nicotine, he observed no appreciable difference in the contraction which followed stimulation of the fifth nerve. The writer points out that paralysis of the palate is rarely observed clinically in cases of disease of the fifth cranial nerve. Under anesthesia the raphé on the palate of a dog was marked with indian ink. The tendon of the *M. tensor veli palatini* was then cut and while the swallowing reflex was being set in motion, the palate was observed. Not the slightest dragging of the palate to the nonparalyzed side could be detected. Finally, the case of a patient under observation in the Johns Hopkins Hospital is recorded. This patient had a unilateral affection of the fifth cranial nerve. Nasopharyngoscopic examination showed that the pharyngeal orifice of the Eustachian tube on the affected side remained quite stationary during deglutition, offering in appearance a striking contrast to the normal reflex opening of the orifice on the unaffected side. This and other observations would indicate that the main function of the *M. tensor veli palatini* is to open the Eustachian tube. In the case of the *M. levator veli palatini*, direct observation of the muscle was also the basis of experiment.

III. SYMBOLIC NEUROLOGY.

1. PSYCHOLOGY—PSYCHOANALYSIS—NEUROSES.

Stern, Adolph. NEUROTIC SYMPTOMS IN A CHILD OF EIGHT. [N. Y. Med. Jour., May 22, 1920.]

Adolph Stern reports this case because he finds wishes, some conscious, others not, which are identical with or very similar to those which we find in the unconscious of the adult. The findings in this child furnish added proof, if any is still needed, to demonstrate the accuracy of the deductions made by psychoanalysis as to the causal relation between unconscious mental processes and neurotic symptoms, and also that what we call the unconscious in the adult had its origin in the child, and is in the child quite conscious before the period of repression sets in. The case also furnishes points of interest in regard to the relative value of heredity and environment in the causation of symptoms in the neurotic constitution. The writer shows how the neurotic constitution may be formed so early

in the life of the individual, owing to the fact that parents or those in the immediate environment, show neurotic manifestations, that one may be led astray and ascribe it to an hereditary origin. What are inherited, so far as the emotions are concerned, are the primary emotions that accompany the instincts. The neurotic constitution may perhaps be viewed as a secondary characteristic, and as such generally recognized as an environmental attribute rather than an hereditary one. In this sense all individuals are neurotically inclined. The early environment has much to do in deciding the manner of reaction of the individual to these primary emotions, and what enters into this decision one may view as factors forming a neurotic constitution in case these factors tend in that direction. This the writer considers an important field, which will yield much information that can be used from a therapeutic point of view with great benefit.

Zondek. VASOMOTOR DISTURBANCES IN THE MENOPAUSE.. [Zeits. f. Geburt. und Gynäk., June 22, 1920, Vol. LXXXII, No. 3. J. A. M. A.]

Zondek's tests confirmed the instability of the vascular innervation at the menopause. The vasomotor center is in a chronically irritated condition, which he ascribes to the internal secretion of the modified ovaries. This is responsible for hot flashes and the disturbances in the respiration rate which accompany them, as also the pathologic changes in the distribution of the blood. He explains this by active contraction of the vessels innervated by the splanchnic nerves under the influence of the vasomotor center. This contraction forces large amounts of blood into the peripheral vessels. As suddenly as it occurs, it is ended by stimulus directed elsewhere. Then follows active vasodilation of the abdominal vessels, which aspirates the blood into them, and this is aided by contraction of the peripheral vessels. It is easy to understand that these paroxysmal shiftings of the blood are liable to induce symptoms, palpitations, sweating and a feeling of distress. In the course of his extensive research he noted that mental work, counting, picking out certain letters, etc., influenced the vasomotor center in an unphysiologic way, but this did not occur with physical work. The vasomotor center at the menopause responds abnormally to heat and cold at times.

Taylor, A. ABDOMINAL NEURASTHENIA. [Arch. of Neur. and Psych., December, 1920, Vol. IV, No. 6.]

Four cases are partly analyzed by Taylor selected from a larger series, to illustrate varying phases of the problem. One patient had had a prolonged history of abdominal pain and digestive disturbance, on which the neurasthenic condition had been engrafted and finally became the predominating feature in the minds of many of the consultants. The second patient who had had little digestive disturbance beyond flatulence and that without constipation, suddenly developed a neurasthenia, appar-

ently idiopathic, which was greatly increased by influenza. For a year he had had various treatments without result. The third patient also had few symptoms relating to the digestive tract, except flatulence and occasional constipation. Her neurasthenia came on gradually during several years, was associated with lack of mental balance and probably with disturbance of the endocrine system. The fourth patient had never been robust and developed a profound neurasthenic condition following a simple herniotomy. In her case the neurasthenic and abdominal symptoms developed simultaneously and were about equally prominent over a period of eight years. A painstaking examination of the digestive apparatus indicated what proved to be, in these cases, the chief underlying cause of the illness. The nerve exhaustion was apparently secondary to the absorption of toxins from the digestive canal, and it is Taylor's belief that the formation of these toxins largely resulted from mechanical interference with the normal motility of the digestive canal. The obvious deduction from the facts presented is that a complete examination should be made of the digestive tract of every neurasthenic. In a certain proportion of cases surgery would offer a short cut to recovery.

Golla, F. THE OBJECTIVE STUDY OF NEUROSIS. [Lancet, 1921, II, 115, 215, 265, 373. Med. Sc.]

There is no aspect of neurology which has been more discussed and disputed, or which has been the excuse for such a locust plague of books within the past few years, as that comprehended by the neuroses and psychoneuroses. This is not an opportune moment to discuss the merits of much of what has been said and written on the subject, but it may be remarked with some reason that not a little of it has been unnecessary and wearisome reiteration, of no more value than to indicate the unquenchable apostolic zeal of its devotees. Into the stale and heated atmosphere thus engendered, these lectures come as a welcome breath of fresh and independent thought. Golla has applied to the study of neurosis the physiological method advocated by Pawlow, and used by him with such brilliant results in the production and investigation of "conditioned reflexes." In reading Golla's methodical study of the psychogalvanic reflex, one cannot help contrasting it with some recent writings on this subject by clinical psychologists, which savor more of the musings of some medieval alchemist than a scientific statement of a physical phenomenon. Admittedly the phenomenon is a reflex reaction, and it is therefore capable of precise description. The nature of the adequate stimulus, the time relations of the response and the various factors which modify it, its facilitation and inhibition, should all be capable of definition. For the first time, as far as we are aware, a thorough investigation on these lines has been carried out for the psychogalvanic reflex. Golla shows clearly that it belongs to the class of what Sherrington has called "nociceptive reflexes," that is, reflexes which result from the application of stimuli of noxious character, which threaten the well-being of the

organism in some way. The psychogalvanic reflex is no longer a conjuring trick in the hands of the psychotherapeutic mystagogue, but a physiological reaction comprehensible to the plain man.

The object of the simple and fascinating experiments described by Golla has been to analyze the specific and general bodily reactions which accompany the processes of thought and feeling, with a view ultimately to determine the mechanism of production of the neuroses. The lectures are too concise for us to detail these experiments, but they include the study of the tonic muscular reaction to mental effort, the psychogalvanic response and its relation to affective states, and other objective bodily reactions to noxious stimuli, both mental and physical. In considering the relation of an affective state to the bodily reaction associated with it, he finds that the stimulus is perceived, differentiated, and acted upon before the sensory concomitant of the bodily reaction can be experienced as an affective state. This is an interesting commentary upon the James-Lange theory of emotion, which has been so hotly contested by psychologists who have never troubled to put the matter to experimental proof. The author's discussion of instinct and instinct reflexes is a refreshing variation upon much of the imaginative psychological lore which has recently accumulated round the subject. In his final lecture, Golla indicates the bearing of his observations upon the genesis and treatment of the neuroses. We wish he had given us more than this attractive glimpse into a field in which it may be hoped he is continuing to work. In any case, we cannot be too grateful to him for this charmingly recorded attempt to rescue the subject from the wordy morass into which it has been plunged of late years. [F. M. R. W.]

Wernstedt. RUMINATION IN INFANCY. [Acta Paediatrica, 1921, Vol. I, fasc. 1.]

This author says he thought when, in 1916, he published his first case of rumination in a ten months old infant that this condition was rare in infancy. He could then find records of only fourteen cases published by eleven writers. But he has come to the conclusion that this condition is not rare, for during 1918 and 1919 he has seen six other cases, and he notes that eighteen cases have been recorded since 1916 by various writers. In his more recent cases the rumination was not so obvious as in his first case, and he might well have overlooked it had he not been on the lookout for it. He distinguishes between rumination proper and the simple regurgitation of food which is unaccompanied by any of the characteristic movements of mastication and which is exceedingly common in infancy. He notes, however, that certain authors are apt to confuse the one process with the other and to label every case of simple regurgitation as rumination. In a typical case the rumination begins with the infant opening its mouth and drawing its tongue backward and forwards. After a few such movements the abdominal wall suddenly hardens, and as the contents of the stomach pass into the mouth there is a characteristic clucking

sound, which continues during rumination. The infant continues to move its tongue backward and forward, and after the food has been masticated for a short time it is again swallowed. The author has achieved considerable success in suppressing this act by giving the infant dry instead of liquid food and by psychic treatment, the aim of which is to keep the infant's mind distracted. This is done by a nurse, who draws its attention to something else whenever the infant begins to ruminate. At first it may be necessary to watch the infant for a considerable time after each meal, but as it gradually forgets to ruminate the period of supervision after meals can be considerably reduced.

MacKee, G. M. NEUROTIC EXCORIATIONS. [Archives of Derm. and Syphil., March, 1920, Vol. XXXVIII, No. 3. J. A. M. A.]

The term neurotic excoriations is limited to traumatic lesions produced by a person without intent to deceive. At times, the excoriation may be produced by the habit of picking at every slight elevation of the skin. This picking or digging may be quite unintentional and, in mild cases, it is limited to an unconscious habit of passing the hand over the face (and the scalp, if bald) while deeply absorbed in study, locating a little follicular plug and digging with the finger nail until an excoriation is effected. In the same way, the reparative crust is repeatedly removed, healing is retarded and the lesion may persist for weeks or months, becoming, perhaps, indurated or infected, and finally, when left alone, disappearing spontaneously, often with scar formation. The question of diagnosis—differential diagnosis—is important. The illustrative cases reported by MacKee show that neurotic excoriations may markedly simulate syphilis, tuberculosis, radiodermatitis, dermatitis herpetiformis, acne varioliformis, and other dermatoses. Care also must be taken to differentiate clearly between neurotic excoriations and malingering, and to exclude excoriations produced in attempts to relieve severe itching by individuals who are not neurotic.

The cases reported by Pusey and Senear are essentially of the same character as the cases of neurotic excoriations reported by Fox and Wilson.

Stärke, J. FORGETTING. [Int. Zeits. f. a. Psychoanalyse, Vol. IV, Nos. 1 and 2.]

The author describes a series of instances from his personal experience in which he traces the forgetting of names and the replacing of certain names with others to the active agency of repressed wishes. He gives elaborate diagrams showing detailed associations but these latter are mostly of word sounds and do not therefore admit of translation into another language. Examples of accidents are also given in which the missteps or faulty movements amounted to symptoms and were clearly the expression of repressed wishes. One example is that of a woman who was expecting to become a mother. The time for her confinement

was overdue and she was looking forward to the ordeal with anxiety. Wishing to stir the fire in the stove she seized, instead of the handle for shaking down the ashes, the one intended for lowering the grate, with the consequence that the fire fell from the body of the stove—a symbol for the unconscious wish to expel the contents of the womb. Other examples of similar nature are cited. [J.]

Valdizan, H. PSYCHOLOGY OF THE SICK. [Rev. de Psiquiatria, July–October, 1920, Vol. III, Nos. 1–2. J. A. M. A.]

Valdizan begins his study of the psychology of the sick child by saying "From the United States of North America from which come so frequently so many and such fine suggestions for the psychiatrist, came not long ago an article that every physician should know and ponder. . . . I refer to the article by Patrick in the Journal of the American Medical Association, January 10, 1920, 'The Patient Himself.'" Valdizan discusses the child patient, and comments on the psychology of children in general and the influence on it of sickness.

Sierra, A. M. EXPERIMENTAL EMOTION. [Temana Médica, August, 1921, Vol. XXVIII, No. 32. J. A. M. A.]

Sierra comments on the instructive phenomena that follow injection of epinephrin in certain persons. Not only the physical phenomena of intense emotion may follow, the subject growing pale and trembling, panting, the pulse becoming accelerated and the pupils dilated, the blood pressure dropping, with albumin in the urine, and the mucous membranes feeling dry—not only this train of physical phenomena follow, but Maranon has noted the psychic phenomena of emotion accompanying the positive response to the epinephrin test. We thus have a means of inducing experimental emotion in certain subjects, and Sierra has obtained a positive response in many persons inclined to asthma, in others with manic-depressive psychosis or essential melancholia; in the catatonic form of dementia precox; in persons with even latent hyperthyroidism, and in those giving a positive response to the oculocardiac, Goetsch and dermatographic tests. Sierra describes three cases to illustrate the principal types, and demonstrate how the peripheral, somatic element blends with the psychic element to form the emotion. It may start either at the periphery or in the cortex. He obtained a positive response to this experimental emotion in 6 of 18 women tested but only in 8 of 75 men.

Schulte, E. PROHIBITION OF HYPNOTIC EXHIBITIONS. Berl. klin. Woch., November 24, 1920. J. A. M. A.]

Schulte deplors that hypnotic exhibitions are becoming so frequent, as he has seen great harm result to subjects who have been hypnotized. He recites in detail the case of a young woman who after being hypnotized one evening by a traveling hypnotist presented marked mental disturbances. As she started for home, she insisted that she must go back,

again and again, and at home she ran about with fixed eyes and outstretched hands, apparently insensible to her surroundings, though she recognized her friends. The hypnotist was finally sent for at a late hour, and he succeeded in quieting her. After a restless night she went to her work, but was unable to attend to her duties and had to be sent home. She felt compelled to return to the hypnotist, and complained that she could not think clearly. After a week of this, Schultze hypnotized her in presence of a colleague, and impressed on her that in future only Schultze and his assistant could hypnotize her, and that after this she would have no more trouble. She was then very slowly and cautiously brought out of the hypnotic state and in a few days had entirely recovered. He emphasizes that hypnosis cautiously applied is the best means to cure the effects of hypnotism improperly carried out. Before the war, some of the German states had laws prohibiting exhibitions of hypnotism, but they are not being enforced now. Austria and Italy have also passed laws of the kind.

Marie, P. and Léri, A. SPASTIC OR MENTAL TORTICOLLIS. [Bull. de la Soc. Méd. des Hôp., March, 1920.]

Marie and Léri give the details of seven cases of what is called mental torticollis as the head can be passively straightened. In each case stereoscopic roentgenograms showed irregular outlines of the vertebræ in the neck, excrescences and hooks like those seen in chronic rheumatism of the spine.

Dana, C. L. WOUNDS OF HEAD AND COMPENSATION LAWS. [Am. Arch. Neur. and Psych., November, 1920. J. A. M. A.]

Dana suggests that there should be such a modification of compensation laws that the patient receives early expert advice, not only surgical but neurologic; that treatment and reëducational and reconstructive measures be employed early and actively; that the closest possible study be made early to determine the existence of local brain and cord injuries.

Mills, C. K. PSYCHOANALYSIS WANING. [Arch. of Neur. and Psychiatry, December, 1921, Vol. VI, No. 6.]

In this article filled with errors and misconstructions the author attempts to fabricate a straw man called by him psychoanalysis and then proceeds to demolish it by clever ridicule. Like other pseudoprophets he would forecast the future and give psychoanalysis five more years to live.

Prince, M. CRITIQUE OF PSYCHOANALYSIS. [Arch. of Neur. and Psychiatry, December, 1921, Vol. VI, No. 6. J. A. M. A.]

Prince maintains that the great majority and general body of Freudian doctrines reached by this method of free-association have not only been confirmed by other and more exact methods of research, but have also been contradicted by the results so reached. The failure of the psycho-

analytic method is due to the fact that the findings require and depend on too elaborate, intricate, and, however ingenious, debatable interpretations, which themselves depend on debatable theoretical mechanisms and forces, and the method itself is not only inexact and inadequate but open to artefacts of the most subtle kind, particularly in the selection of the data. The conception of the subconscious and the theoretical structure built upon it approaches more nearly a philosophy than a science. [This abstract is a travesty of Prince's really thoughtful and careful paper.—Ed.]

Dana, C. L. ANATOMIC SEAT OF EMOTIONS. [Archives of Neur. and Psychiatry, December, 1921, Vol. VI, No. 6. J. A. M. A.]

Dana inclines to the opinion that the James-Lange theory of emotion is true only in part; that is, that the peripheral visceral stimuli are only later and contributing factors to emotion, and that the skeletal muscles and sympathetic system do not play an essential part. He believes that emotion is centrally located and results from the action and interaction of the cortex and thalamus. The bodily sensations which accompany emotion are produced by stimuli from the automatic centers in the brain-stem (acting on heart, blood vessels and glands), but they only coöperate to extend and perhaps intensify the emotion.

Jones, E. JAMES JACKSON PUTNAM. [Int. Zeit. f. a. Psychoanalyse, Vol. V, No. 4.]

In this article Jones reviews Putnam's works from his first contribution to clinical psychiatry in 1904 to his last articles on psychoanalysis, after he had come under the influence of Freud, Jung, Ferenczi, Adler and others. Analyzing Putnam's attitude to psychoanalysis he calls attention to those special features of Putnam's theory which must be understood in order to form a true estimate of his service to psychiatry. Putnam, says Jones, was fully convinced of the soundness of the principles of psychoanalysis, but foresaw the necessity of broadening its foundations to include certain philosophical views, more especially those having to do with the relations of the individual to society and to the universe. Putnam's estimate of the various attempts to give new meanings to the results of psychoanalysis were always in keeping with this general attitude. Jung's rejection of Freud's views was incomprehensible to him. He understood very well Jung's claim that the foundation of psychoanalysis should be broadened, but not the abandonment of the theories of regression, infantile sexuality, and fixation. Putnam had more difficulty in making plain his attitude toward Adler's views, perhaps, Jones suggests, because Putnam himself possessed many characteristics of Adler's principal type. However, he lent a favorable ear to Adler's theories and in the year 1915, discussing these theories before the New York Psychoanalytic Society, acknowledged the great value of Adler's early idea concerning organ inferiority, but emphasized that this

view was in no way incompatible with psychoanalysis and expressed regret that Adler had later renounced it. Jones pays high tribute to Putnam's personality, his broad mindedness, his high ethical principles, his amiability, his patience and perseverance. A full bibliography of Professor Putnam's writings, forty-six separate articles and books, is appended.

Laignel-Lavastine. SEXUAL INSTINCT AND EROTOMANIA. [Le Prog. Méd., January 14, 1922, Vol. I, No. 2.]

Laignel-Lavastine states, following Freud, that the libido is the psychic phase of the sex instinct. In psychiatry the rôle of the latter is considerable. Sexuality colors delirium; its manifestations may become pathological from their intensity alone and may also be perverted. In connection with delirium with sexual content the author mentions the jealousy delirium of the alcoholic, which is known to the laity. "Erotic drunkenness" is the term used for the man who becomes infuriated by resistance to his approaches. This behavior has nothing in common with sadism, although suggestive of it. Satyriasis and nymphomania are hardly deserving of the term "excess of sexuality," being purely an expression of the much narrower genital instinct. Sexual perversion may be of so elastic a conception as to include concupiscence and everything outside of the desire for offspring. It may be conceived as making a game or sport out of a solemn function. The author gives his conception of erotomania, a term which is used very loosely. He means by it a psychosis in which a fixed idea predominates. It agrees in general with reasoning mania, which would have been a sufficient diagnosis to some of the older alienists, and the term monomania would have covered the condition with others. The cases cited by the author are complicated. One was that of a widow who had a supposed suitor. She conceived the fixed idea that a certain servant girl had been recommended only to keep her under observation and finally that the girl, the suitor, and others were conspiring to force her into marriage. In time she desired to spite the suitor for his supposed cowardly treatment of her and eventually shut herself up. She was finally interned. In other words, this woman, although she may be said to have had "love on the brain," had no desire for any object of love and no love contacts of any kind, yet she had woven a most complicated systemized delusion about the supposed passion of a man for her.

Jones, E. THE THEORY OF SYMBOLISM. [Int. Zeit. f. a. Psychoanalyse, Vol. V, No. 1.]

This article has already been published in full in the "Papers on Psychoanalysis," 2d edition, London, 1918. All psychoanalytic experience, the author states, goes to show that the primitive ideas are the only ones which find symbolic representation. The ideas belonging to the body itself, the relations to the family, birth, love and death, retain their

original meaning throughout the entire life span, and a great part of the secondary interests of life has root in these ideas. As energy is ceaselessly streaming forth from them and never flows toward them, and as they constitute the strongest repressed portion of our psychic life, it is clear that all symbolism is formed in one direction. Only that which is repressed is represented symbolically; only that which is repressed demands symbolic representation. This is the touchstone of the psychoanalytic theory of symbolism.

Pfister, O. DIFFERENCES IN THE PSYCHOGENIC ORIGINS OF WAR NEUROSES. [Int. Zeit. f. a. Psychoanalyse, Vol. V, No. 91.]

The author describes a case of war neurosis analyzed by him. A young man had acquitted himself bravely at the front, but later, when he was sent to a hospital in Switzerland, he developed a decided neurosis characterized by extreme anxiety during the day and pavor nocturnis. In dream he nightly fell into a state of rigid helplessness from fright and called out wildly. Through analysis of the content of the patient's dreams and of his early experiences elements came to light which led to the conclusion that the anxiety represented resistance to the necessary conditions of life in a hospital, where the soft-hearted soldier, though not really deprived of his liberty, had no adequate outlet for his affections. He was troubled by the idea that he was "misunderstood" by his comrades and that they did not share his interest in outdoor life. He disclaimed nostalgia, regarding such a feeling as unmanly, but nevertheless confessed a longing to see his father and mother and to be under their care. There being no prospect of a fulfillment of these wishes, the result was a symbolic realization of them in dream. The author calls this a "transference neurosis of the purest type." From the author's explanations in a brief analysis covering only two sessions, the young man seemed to obtain a good understanding of his difficulties. Left to take his own attitude toward his latent wishes and his infantile memories, he came to a realization of the vanity of seeking gratification of his wishes in dreams, and that, to regain health, it would be necessary to renounce desires which could not be fulfilled and to assume a different attitude toward his comrades. He was particularly impressed with the futility of taking the passive rôle of a petted child. The task of the analyst in this case was to demonstrate to the patient the greater value of behavior in keeping with his environment and his adult years. The lesson was thankfully received. The patient's anxiety ceased; he attained a state of happiness and contentment and found a companion who could share his love of nature. After a few weeks of absence from the young man, the author learned that instead of being too obedient and passive as formerly, he had become somewhat revolutionary in his views, an attitude which Pfister interprets as a phenomenon of reaction. This case is cited by the author to show that all war neuroses do not arise from the instinct of self-preservation, but that, on the contrary, there is a

distinct "transference neurosis." One sort originates in resistance to service at the front and its accompanying dangers; the other from the hardships attendant on internment or imprisonment. The two forms are sometimes mingled, and resistance to service at the front is often reinforced through transference—to the family or to others. The author states that, from a prognostic point of view, it may be of importance to distinguish between the two forms.

Bolten, G. C. HYSTERICAL EDEMA. [*Psychiat. en Neurolog.*, Bladen, January–April, 1922, Nos. 1 and 2, p. 81.]

The clinical picture in cases of hysterical (psychogenic) edema is by no means a constant one, but varies greatly. Usually the edema is hard and elastic and does not pit on pressure. Its color may be blue, or white, or reddish-blue. It is usually very obstinate, lasting for weeks, months, or years. It may occur with hysterical motor-palsy or contractures, or without any motor palsy, as in a case of the writer. It occurs in neuropathic persons, but hysterical stigmata are often absent. There are many transitional and intermediate forms of edema between it and the chronic idiopathic or neuropathic edema, and also between it and the transitory cutaneous edema of Quincke and trophedema. The hysterical edema may occur spontaneously or after a trauma. Bolten regards it as not a sign of hysteria as such, but as the sequel of an accessory factor, namely, a slight vasomotor insufficiency. In his own case artificial production was excluded; although there was no motor palsy nor any hysterical stigmata, yet there was pharyngeal anesthesia and sluggish abdominal and plantar reflexes. Pitres has shown that the hysterical edemas depend on palsy of the vasoconstrictors and a permanent dilatation of the capillaries. Bolten holds that there is an inborn vasomotor insufficiency in these cases, which leads to a lowering of metabolism and thus to a slight chronic autointoxication, and that this factor plays a very great part in the mechanism of the occurrence of this hysterical edema, as well as of the other permanent forms (trophedema, neuropathic edema), and also of the fleeting angeioneurotic edema of the skin. [Leonard J. Kidd, London, England.]

Stern, A. REMARKS IN A DREAM. [*Internat. JI. Psychoanalys's*, September, 1921, Vol. II.]

In my experience it has not often occurred that a dream should contain material in barely disguised, yet symbolic form, material that was in the main readily interpreted on superficial associations. The dream elements contained the chief factors of the patient's illness. An interesting feature is that of the two important wish (repressed) elements in the dream, one was present in the conscious of the patient from the time of its origin as a wish, while the other became evident to her only when well along in the analysis. It may also be of interest that though the dream is short and the associations to the dream elements few in number,

yet they disclose the most important sets of impulses concerned in the neurosis of the patient.

The dream to be described was that of a patient thirty-six years of age, married thirteen years, sterile. The condition for which she sought treatment was an anxiety hysteria, some of the symptoms being an easily aroused anxiety and apprehension, gastric disturbances and constipation. The most pronounced characteristics were obstinacy, inordinate regularity in all things, and a desire for cleanliness, psychological difficulty in regard to money matters, but not miserliness. A well pronounced feeling of envy in regard to boys existed from her very early childhood, being later in life transferred to men. These scanty details may aid in the appreciation of the dream, which is as follows:

"I was up on the roof, standing against a fence; a hole in it. Some boys inserted something into my rectum; it was of wood. I knew that it belonged to a boy. I ran away; they stood and laughed at me. It was a joke on me. The wood was colored red and green. I was so ashamed, because I knew it belonged to a boy, and I was a girl."

Addenda: "I was small and young."

The patient had met a woman the day preceding the night of the dream, whom she had not seen since the second year of the patient's marriage. The woman on the day of the meeting had told the patient that a sister of the former had wished very much to have a child, and that after seventeen years of married life she had developed symptoms which had been diagnosed as a tumor, but which turned out to be a pregnancy, which, however, had terminated in an abortion, to the great disappointment of the woman.

On the day preceding the dream, the woman had also asked the patient if she had any children, to which the patient with mingled feelings of regret and shame, had answered in the negative, adding "and I do not know why."

Associations: "Fence with hole in it." Suggests fence in the yards of houses in which patient lived in childhood; the intense pleasure derived from sitting on a fence, swinging her legs, like boys do; the great pleasure in climbing fences, like boys do. Further associations to "fence with hole" disclosed that though the patient had for many years, on account of a vaginal discharge, been making frequent vaginal douches, she still had more difficulty in finding the vaginal orifice than the anal, though she rarely took an enema. Further associations brought out that her husband had often referred to the patient as "a piece of wood with a hole in it," on account of her sexual frigidity. This group of associations indicates the patient's desire to do what boys do, her envy of boys, and the apparent transference of the libido to the anal, from the vaginal region. Associations to other parts of the dream contain references to the same material from more repressed sources. Associations to "wood" inserted into rectum, the patient stated that when

speaking to the acquaintance on the day preceding the dream, she had had a very strong desire to have a child herself, and that it was really the first time she had consciously wanted a child and regretted her sterility. Associations to "red and green" color of the object, are red in the blood, the bleeding that took place when the woman aborted. Red and green suggest little dolls that children play with. About two years ago the patient saw just such a doll in the hands of a child that was with its mother, who at the time was pregnant. The reference above to one of the important dream elements indicating the existence of material conscious to the patient from the time of its origin, concerns what the patient stated at this point; namely, her recollection that she had since early childhood, between the ages of four and five, she thought that babies came from the rectum; nor had she forgotten having seen, around the age of five or six, the sexual act in animals, and had based later sex conceptions on this incident; at about the age of eight years, the patient saw a cat give birth to kittens, and thought that they came from the rectum. This tended to strengthen the previously formed anal theory. All this material had always been conscious to the patient. The patient also recalled that at the time of witnessing the birth of the kittens, she saw blood issue with them. "Green" in the dream is reinforced by the association of green with jealousy-cats, for which animals patient has a very strong aversion. As she puts it, she "hates cats."

This group of associations has reference to the anal birth theory, and explains in a measure why the anal region is more familiar to the patient than the vaginal. The following will also help explain the patient's ignorance concerning the latter region.

Further associations to the red and green object recall the patient as a child, how she thought that boys laughed at her for being thin and small; witnessing at the age of three or four a circumcision, and after the people had left, examining with great interest and in secret, a small object on an ash tray which she thought was the cut off penis, but which she later decided was a heap of cigar ashes. At about the age of eight, on one occasion she examined the genitals of a younger brother, and missed the absence of an organ such as his. In the dream the patient remarks that she is ashamed, because she knew it belonged to a boy, and she is a girl. The patient also recalled that in her family there was always a great "fuss" made when a boy was born, but the birth of a girl was passed over as of little account. The general feeling in the family was that "boys were something," while girls were relegated to the background.

In all this the great envy on the part of the patient for boys because they possessed a penis is very evident, though this as such was not conscious to the patient. It is the other of the repressed elements of the dream above mentioned as not being conscious, while the former was from the time of its origin.

It is likely that this incident took place at a somewhat later age, but

other incidents recalled by the patient seem to fix this one somewhere between the years mentioned in the text. I wish to mention that the sequence of the associations as given in this report has been varied in places for the sake of clearness. [Author's abstract.]

Vinson. HYSTERICAL DYSPHAGIA. [Minn. Med., February, 1922, Vol. V, No. 2. J. A. M. A.]

Vinson states that the prolonged unbalanced diet gives rise to enlargement of the spleen and secondary anemia. Normal deglutition can be restored by passing an esophageal sound. Recurrences are liable to occur, but can be relieved by further passage of sounds and by constantly reassuring the patient. When normal deglutition is restored, the blood picture returns to normal and the splenic enlargement subsides. Hypothyroidism may develop after the patient begins to swallow freely, due to the inability of the thyroid to furnish secretion enough to care for the increased food intake.

Crile, G. W. THE EXHAUSTION PRODUCED BY EXTREME EMOTION. [J. A. M. A., March 4, 1922, Ed.]

That the emotions play upon our physiologic reaction is a thesis that scarcely needs to be defended. The digestive secretions, for example, are influenced by psychic states in striking ways to which the Russian physiologist Pawlow has forcefully directed attention. The idea of food may become a stimulus for the flow of saliva or even gastric juice, whereas such emotional states as anger, fear and sorrow may succeed in inhibiting the normal secretion. Strong emotions are attended by more or less well defined changes in the circulation which, in turn, cannot remain without some influence on the tissues reached by the altered blood supply. It is by no means easy, however, to define the part the emotions *per se*, and exertion that accompanies them, respectively play in producing the consequent exhaustion. Recently Crile¹ has summarized the results of his extended experiments in this field. Like some of his predecessors, he has observed profound changes produced by fear in the cells of the brain; they are most marked in the cerebellum and cerebrum, though the medulla and even the spinal cord may show the untoward effects. Histologically, the brain cells may show increased activity manifested by hyperchromatism followed by a progressive chromatolysis if the activation is continued. The Purkinje cells in particular are severely involved, and may largely disappear when the degree of exhaustion is extreme. Furthermore, it is asserted that extreme emotion causes demonstrable histologic lesions in the liver and suprarenals also. In view of the current disagreement as to the effects of emotional factors on suprarenal function, conservatism demands that these be not stressed in this connection. Crile boldly maintains that emotion causes a more rapid

¹Crile, G. W.: Studies in Exhaustion, II, Exertion, Arch. Surg. 3: 116 (July) 1921: III, Emotion, *ibid.* 4: 130 (Jan.) 1922.

exhaustion than is caused by exertion or by trauma, except extensive mangling of tissue, or by any toxic stimulus except the perforation of viscera. In a recent issue of *The Journal*,² the probable involvement of toxemia in some of the most severe forms of shock was pointed out. As intoxication of a similar sort is less likely in cases of emotional exhaustion, unless the toxic substances are identified as products of fatigue, it may be that shock and "nervous exhaustion" must be more clearly differentiated in the near future. Because prostration is the end-result in either case, it by no means follows that precisely the same causes are at work.

Benzon and Kerbrat. THE POSTTRAUMATIC CEPHALALGIC SYNDROME. [*Arch. Suisses de Neur. et Psychol.*, Vol. VIII, 184.]

The authors summarize the knowledge of posttraumatic headache gained from the history of three typical cases. The headache, located chiefly in the occiput, appeared directly after the injury to the head and continued almost without interruption. Sometimes it increased to paroxysmal crises, it grew worse with every strenuous effort. The persistent unbearable pains were of a purely functional character followed usually by asthenic, depressed or excited states. [J.]

Lellis, Areobaldo. ANGUISH NEUROSES. [*Brazil-Med.*, January 22, 1921. J. A. M. A.]

Lellis emphasizes the predominance of the subconscious in neurasthenia, and of anxiety, worry and dread, while this triad is not found in hysteria. The Freud conception of anguish neurosis is merely a badly interpreted neurasthenia, acute, with almost continuous attacks, or subacute, with intervals between attacks. He describes a case in a young woman who presented all the symptoms of the Freud anguish neurosis, and as her physician had told her it was time for her to get married, the condition seemed to bear the Freud sexual stamp. A recent attack of influenza had probably saturated her with toxins and the physician's words had diverted her morbid ideas in this direction. Lellis decried the idea that marriage was absolutely indispensable for her; he combated the intoxication and anemia, and as the physical condition improved, the trio, anguish, anxiety and fear, gradually subsided and normal conditions were restored.

Muralt, A. v. WAR NEUROSES AND PSYCHOANALYSIS. [*Arch. Suisses de Neur. et Psych.*, Vol. VII, 323.]

The writer explains war neuroses as a result of imperfect psycho-sexual development in the lives of the individuals in line with the theories set forth by Freud. The good soldiers are those who as individuals have left the narcissistic stage to make free attachment to real objects. They have sublimated family love into love of the native land. They can

² Shock as a Result of Toxemia, editorial, J. A. M. A. 78: 585 (Feb. 25) 1922.

without difficulty reanimate old youthful sadistic tendencies for the performing of the tasks to which they are called. The dangers of neuroses lie at either pole away from this median line. Perhaps development of the affective life is so incomplete that the libido is repressed because of complexes so that the soldier cannot make the sacrifice demanded of him and the neurosis is then the escape from this sacrifice. This is the more common form. On the other hand the affective life is so highly differentiated that the return to the primitive life is too difficult and this is in turn increased by the fact that the social feeling has developed by way of a narrow patriotism to general humanitarian feelings so strong as to forbid the killing of an enemy. Here the neurosis brings a solution of the conflict arising between the claims of the external world and those of one's own conscience. [J.]

Schnyder, L. A CASE OF PSYCHASTHENIA WITH GRAVE ALTERATION OF AFFECTIVITY. [Arch. Suisses de Neur. et Psych., Vol. VII, 92.]

Schnyder gives a detailed report of the lack of normal feeling tone evinced in this case. This disturbance shows itself in the conscious processes, ideas, sensations, perceptions. There is little impulse to action and the patient can be roused only through her reason. The condition has developed slowly and is considered traceable to the efforts of a fearful, scrupulous patient to adapt to an unfavorable environment. Especial care was exercised in making the differential diagnosis as regards hysteria. The writer (who does not discuss unconscious factors at all) seems to think that the Freudian theories, which deal chiefly with unconscious processes, would not apply to such a case. [J.]

2. PSYCHOSES.

Boye, Bengt A. CONCUSSION PSYCHOSIS. [Hygiea, Stockholm, 1921.]

The author gives a short abstract of the pathogenesis and symptomatology of concussion psychosis. Among other things he points out that mental disease follows serious cases of trauma of the head, according to several investigators. If less conspicuous functional disturbances also are counted, up to 20 per cent of the cases do not completely recover. In regard to the pathogenesis, he asserts that it is not yet fully known inasmuch as the psychic symptoms which appear quite infrequently may occur with less serious trauma but are absent from apparently serious ones. It must, however, be considered as proved that a diffuse injury of the brain cortex is present and that predisposition is not necessary. He then describes the following case:

A., aged fifty years, driver, was admitted on December 24, 1919, at the Insane Asylum of Stockholm. During the first week he was confused, restless and incontinent. He had fallen from a ladder, apparently hitting the back part of his head with injury to the soft parts. There was no fracture. The patient had previously been healthy and had not

abused liquor. When he entered the asylum he was quiet but perfectly without conception of time, place and his situation, and remembers only vaguely, and the trauma itself not at all. The patient had no subjective symptoms, and there were no physical symptoms. He was good natured and obedient but somewhat apathetic. He was not conscious of being sick, and very indifferent to his relatives. He asserted without hesitation that his wife was twenty-two years of age, and he twenty-six, and that they had been married twenty-two years. His father was alive and was twenty-two years of age, etc. He had no understanding of where he was and believes that he had his horses in the barn outside, that he has been driving during the day and often thinks that he is among military men, speaking of his military superiors of twenty years ago. His bearing is, however, surprisingly assured and unembarrassed. He quickly answers questions put to him, filling out with uncritical confabulations his great lapses of memory without self-consciousness as soon as they are exposed, without observing that his statements are often fantastic and conflicting. He forgets almost immediately what he hears and says. His speech, however, is almost intact. He reads slowly, letter by letter, with evident difficulty to comprehend synthetically. He writes at dictation fairly well but often repeats the same word several times. In mental arithmetic he is able to solve only the simplest problems, *i.e.*, 2×3 and 3×7 . He quickly shows psychic fatigue. It is remarkable that the patient at times is clearer and at times more confused.

The agnosia is particularly noticeable in the fact that the patient cannot name objects shown to him and usually cannot make the correct use of them. Of a collection of various objects he is unable to take the desired one. In these tests the patient's perseveration is very conspicuous. He is particularly partial to naming all objects "camphor liniment" and often forms new words with this as a stem. A knife, for instance, he calls "camphor-liniment-machine experiment." If he has learned another subject he afterwards calls all objects by that name. He can make simple actions such as buttoning clothes, fill a glass with water, tie a knot in a handkerchief, etc., but he cannot light an electric lamp. He attempts it with a burning match but also by laying various objects against the globe and continues with this, even after the lamp is lit. He is able, though awkwardly, to light and snuff a candle, but afterwards he also makes attempts to blow out the electric lamp. The experiment in its entirety points to a tendency to ideatory apraxia (Lipmann). During the following weeks and months the patient slowly improved. His memory began to be clearer about the time before his accident, and his ability to retain impressions became better. He can often call objects by their right name, but the perseveratory and agnostic phenomena remained in a diminishing degree for several months. He likewise has difficulty in naming objects and therefore prefers to use circumscriptions. After four and a half months the patient was discharged in May, 1920.

He is able after a month to begin again as a driver but shows unmistakable signs of traumatic dementia, diminished labor power because he tires more easily, great forgetfulness, lacking initiative, diminished mental powers, unstable moods and strong intolerance for alcohol. His prospects for a complete recovery are naturally poor because of his age and the long convalescence. The author suggests that the optical comprehension, so evidently difficult to repair, may in some way depend upon the position of the blow at the back of the head, with consequent injury to the center of visual projection in the occipital cortex. In its entirety the case is worth notice because of the unusual wealth of group symptoms. One year after, the author heard that the patient was confined at an insane asylum, after having an epileptic attack. In the beginning he was unquiet and confused just as he was immediately after the trauma. After a week or two he became quiet but was without his bearings in all respects about the same as the year before, although in a lesser degree. He had no subsequent epileptic attacks at the asylum. After a month and a half he was discharged recovered to about the same extent as the year before. Since that time the author has heard nothing from him. [Author's abstract.]

Raphael, T. and Parsons, J. P. BLOOD SUGAR STUDIES IN DEMENTIA PRECOX AND MANIC-DEPRESSIVE INSANITY. [Am. Archiv. Neur. and Psych., June, 1921, Vol. V, pp. 687-709.]

A study was made with reference to the blood sugar tolerance reaction in a series of eleven dementia precox cases including nine in the acute phase of the disorder (including all four of the principal types), and two showing more or less chronic changes of a deteriorative nature, and eleven cases of manic-depressive insanity, including four hypomanics, one agitated depression, six purely depressed cases. The technique employed was essentially that devised by Lewis-Benedict and the sugar was administered according to the procedure recommended by Janney and Isaacson. The findings indicate practically no deviation from the normal in the chronic precox cases. In the acute cases there was very definitely indicated a delayed tolerance with indication of initial hypoglycemia. Among the cases of the manic-depressive group the agitated depressions and the hypomanic subjects also showed a tendency toward initial hypoglycemia with practically a flat tolerance curve, that is, practically no response in point of rise above the fasting level following glucose injection. The depressed cases on the other hand showed indication of relative initial hyperglycemia with definite indication of delayed tolerance more marked even in most cases than determined in the acute precox patients. These findings are borne out in main by the findings of Kooy and later Lorenz, seeming to indicate definite change as obtaining in these psychoses on the physiological level, the exact significance of which, however, seems as yet more or less conjectural. [Author's abstract.]

Raphael, T. and Gregg, S. REACTION IN DEMENTIA PRECOX TO THE INTRAVENOUS ADMINISTRATION OF NONSPECIFIC PROTEIN. [Amer. Jr. of Psych., Vol. I, No. 1, July, 1921.]

In this study, a series of seven cases of dementia precox (male) was utilized including representatives of the four principal types of dementia precox and various stages of the progression of the disease. The bacterial protein utilized was typhoid vaccine (Parke-Davis) which was administered intravenously in two successive courses of six and four injections, respectively, with an interval of nineteen days. The initial dose 500,000,000 killed bacilli which was gradually increased to 1,000,000,000, the generally recognized therapeutic maximum. The individual injections in each course were made at intervals of from two to five days, and the patient observed carefully from a clinical and laboratory standpoint for eight weeks. On the basis of the result of these observations it seems that in this series of cases no amelioration in the psychiatric status was effected. As a result of the intravenous administration of nonspecific bacterial protein (in general corroboration of the findings of Itten and Kraepelin and in definite variance with those of Donath and Lundval) and that the general constitutional reaction, in these cases, closely approximated that reported as characteristic of nonpsychotic individuals, save, that in the former, there seems to have been, additionally, evidence of transient weight loss, a preliminary leucocytosis period, a late leucopenic period, and a marked persistent reduction in the erythrocyte count with a tendency for increased fragility changes, all of which, upon further study, may be found to be typical of nonpsychotic cases as well. [Author's abstract.]

Baragar, C. A. PSYCHOSIS OF HYSTERICAL TYPE. [Can. Med. Ass. Jour., January, 1922, Vol. XII, No. 1. J. A. M. A.]

Baragar cites the case of a girl, aged seventeen, who exhibited hysterical phenomena in the physical field, the most interesting of which was a complete functional blindness, and in the mental field a psychosis characterized by delusions and simple visual hallucinations at first, but later by an apparent dementia with inaccessibility, defective contact with environment, undue suggestibility, somewhat similar to catatonia, but differentiated by a peculiar variability of depth—a psychosis of hysterical type.

Staercke, A. THE REVERSAL OF THE LEBIDO SIGN IN DELUSIONS OF PERSECUTION. [Int. Zeit. f. a. Psychoanalyse, Vol. V, No. 1.]

In delusions of persecution the image of the loved object may return as the persecutor. What was repressed as love returns as hate, and this projected constitutes the content of the insanity. The foundation of this phenomenon is the ambivalency of the primitive affects. According to the observations of the author (confirmed by those of J. H. W. van Ophuijsen) persecutory delusions often take the form of anal erotic

aggressions. The peculiar manner in which the delusional system is extended to the entourage renders it highly probable that originally there was an identification, in the unconscious, of the loved object with the skybalum and that in this identification the real cause of the ambivalence is given. The skybalum is the primary persecutor responsible for the imagined anal erotic attack. Herewith a pleasurable element is also connected, for the attitude of the individual toward defecation is primitively ambivalent. This ambivalence is later fortified by the praise and blame bestowed by those who had care of the person in early infancy (secondary ambivalence). The libido position is determined positively or negatively by the amnesic foundation in this entire situation, and from the influences of the early experiences connected with defecation results the later predisposition to an identification of the skybalum with (1) the child's own body and (2) the person who has care of it. If more praise was dealt out to the child in connection with the excretory function, the component flowing from the anal eroticism to the narcissism will be positive in nature; if more blame was given, it will be negative. The negative narcissism finds application in delusions of inferiority, which very often have a decided anal erotic coloring. For delusions of grandeur Freud's formula is that it represents a regression of the sublimated homosexuality to narcissism. The author suggests that Freud's formula should be modified so as to include the results of the author's experience, namely, that a part, at least, of the sublimated homosexuality regresses to anal eroticism. This in so far as it is positive is utilized for reconstruction, in the form of delusions of grandeur. In so far as it is negative, however, it leads to projection in the form of delusions of persecution. The author opposes the view of a fundamental separation of persecutory insanity into megalomaniac, schizophrenic, and paranoiac. He states that the discoveries of Freud have shown the impossibility of definite divisions of this sort. In every case there is a mingling of all sorts of syndromes, in all sorts of relations; the recognized clinical types, or "diseases" represent only a series of typical combinations. [J.]

Lewis, Nolan D. C. THE PATHOLOGY OF INFLUENZA AS SEEN IN THOSE WITH CHRONIC MENTAL DISEASE. [Journal of Laboratory and Clinical Medicine, July, 1921, Vol. VI, No. 10.]

A study was made of the organs from 42 mentally disordered individuals who died from influenza and, as in most instances the acute infection had occurred in structures previously considerably impaired by the chronic processes usually existent in psychopathic and neurologic patients, special attention was given to the histopathological changes in the tissues, particularly in the central nervous system.

The group for study was composed of dementia precox 20, arteriosclerotic dementia 5, senile deterioration 5, manic-depressive insanity 2, neurosyphilis 2, epileptic psychoses 2, imbecility 2, undiagnosed 3, fetus 1,

and it was found that 26 of the number exhibited original brain lesions but regardless of the presence or absence of previous brain lesions the structures were characterized by congestions, acute necroses of vessel walls with rupture and focal hemorrhages, and acute softenings.

The senile and arteriosclerotic brains presenting the usual chronic vascular changes and lack of adequate nutrition showed an acute process which was exceptionally destructive to vessel walls and focal areas of softening were abundant. Only 6 cases of the clinically diagnosed dementia precox group (20) showed original organic brain disease, and this change was usually of a diffuse gliosis, but congestions, petechial hemorrhages, and acute softenings were numerous through the structures regardless of the presence or absence of original lesions. It was thought that while these numerous acute and rather diffuse vascular changes accompanied by minute focal necroses through the central nervous system were seldom localized or large enough to produce gross neurologic symptoms they might account for many of the influenzal and postinfluenzal psychoses described by numerous writers. The marked meningeal and cortical edema, the acute changes in the parenchymatous cells and the vessel alterations may account for early cases of acute hallucinatory disorders, stupors, and depressions, while permanent damage such as thromboses, ruptured vessels, and cortical and subcortical necroses might comprise the soil for the development of latent schizophrenic features. The other tissues of the body presented the usual features resulting from the infection, such as congestion, edema, degeneration and rupture of vessel walls, and focal necroses, all of which were greatly accentuated in areas of previously existing lesions with their increased vascularity and productive activity. [Author's abstract.]

Dupré and Trepsat. PATHOGENESIS OF PSYCHOSES. [Encéphale, January, 1922, Vol. XVII, No. 1. J. A. M. A.]

This is the last work on which Dupré was engaged at the time of his death. He emphasized the importance of emotivity and repressed emotions as factors instrumental in bringing on certain forms of mental disease. He refers in particular to what Janet calls "restriction of the consciousness field," as the abnormally small reserve of psychic energy in such persons is thus absorbed and diverted from its proper sphere.

Rietz, T. NARCOTIC TREMOR. [Surgery, Gynec. and Obstetrics, April, 1920, Vol. XXX, No. 4. J. A. M. A.]

Thirty-three cases of narcosis tremor have been studied by Rietz. With two exceptions only, the patients were men. Most of the patients were between the ages of twenty-five and forty. 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 spasms. Neither the technic used in administering the anesthetic nor the anesthetic seem to make any differ-

ence nor does the position of the head, etc. The part of the body on which the operation was performed was irrelevant to the appearance of the tremor. 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 endeavored to overcome this phenomenon. To eliminate, at least for a moment, the influence of the irritated motor centers, during an operation on a boy, aged sixteen, 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 maneuver had doubtful results or none at all, continued observations still showed that the measure was of value. In the thirty-three cases mentioned the measure was used twenty-nine times; four patients had short spasms which ceased of themselves and did not call for treatment. The other twenty-nine cases fall into three groups as follows: In Group 1, the effect was certain in nineteen cases; in Group 2, the effect was uncertain in five cases; in Group 3, the effect was nil in five cases. In no way does the result vary so far as the degree of unconsciousness is concerned nor does the result bear any relation to the duration of the narcosis. 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. The pressure is applied either with the thumb or the four fingers together.

Repond, A. SOME REMARKS UPON THE TREATMENT OF SCHIZOPHRENIA IN ASYLUMS. [*Arch. Suisses de Neur. et Psych.*, Vol. VIII, No. 190.]

The author brings the results of his own experience to set forth certain hopeful conclusions in regard to schizophrenics and to urge upon physicians and others who have to do with such cases an optimistic view of their relative curability. He believes that the treatment of schizophrenics offers a wide field for very definite activity. The psychotherapy can be direct and intensive as in no other mental disease. In most cases by the use of certain measures patients can be restored to their social surroundings even if in opposition to the will of the relatives and the community and so society be partially relieved of a heavy burden. In realizing this goal the time must be carefully determined when the patient shall leave the institution and in case of remission there should be carefully chosen activity for the patient instituted, not in accordance with any set rule but according to his individuality and his talents. The writer recommends the use of sodium nucleate for the acute stages of the disease. [J.]

BOOK REVIEWS

Sadger, J. DIE LEHRE VON DEN GESCHLECHTSVERIRRUNGEN.
[Franz Deuticke, Leipzig and Vienna.]

As one of the more serious students of the sexual instinct and the modifications which are called pathological, Sadger is an excellent representative. For many years he has been a frequent contributor to the literature of the sexual sciences and as a definite Freudian he has arranged this material in the orthodox psychoanalytic frame. The present volume represents a mature presentation of this material. There are 458 pages of close octavo form. About one hundred are devoted to general considerations such as the Sexual Life of the Child, the Position of the Child in the Family, The Oedipus Complex, The Castration Complex, General Consideration of Sexual Development and of the Perversions. In his special chapters, Sadger deals with Psychical Impotency in Male and Female, Onanism, Homosexuality, Sadomasochistic Complexes, Fetichism and Exhibitionism.

Space does not permit as extended a discussion of Sadger's ideas as they deserve. We can only say this, that of the numerous contributions to the psychopathology of sexual behavior we consider this one to be of real service.

Albrecht, Othmar. DER ANESTHISCHE SYMPTOMENKOMPLEX.
Eine Studie zur Psychopathologie der Handlung. [S. Karger, Berlin, 1921. Abhandlungen aus der Neurologie, Psychiatrie, Psychologie und ihren Grenzgebieten, No. 12. Edited by K. Bonhoeffer.]

This is the sort of study of behavior which brings a real understanding of its pathological character. For it is founded first upon the appreciation of all action as natural phylogenetically and ontogenetically. It appears in its pathological or unethical—"anethical"—form as the expression of psychic movement within an alteration of psychic mood. The anethical action is the breaking forth of the instinctive life when there is an increase of ego feeling which either cannot restrain its impulse or feeling itself endangered by control from another ego reacts with the defense of negativism. There is no place in the writer's conception for an entity of "moral insanity." The anethical symptom complex will be found to be surrounded by psychopathological factors or even be a part of a very evident disease syndrome. The writer does not leave his subject without discussing the social aspect of his point of view, the legal value it has and its psychotherapeutic responsibilities. Therapy as well as investigation should be directed to individual reactions both organic and psychic. Albrecht might have laid greater emphasis

upon the individual factors which go to make up the emotional trends he has suggested as the sources of the anethical action, giving these more interpretative analysis. He looks, however, in the right direction for such understanding. There are illustrations appended from many case histories.

Hingley, R. H. PSYCHO-ANALYSIS. [New York: Dodd, Mead and Company, 1922.]

Hingley has presented in a compact way a broad review of the field of psychoanalysis. He begins with the principles of the older psychology to show where the new psychology in which psychoanalysis claims a place is a necessary progressive development. He also attempts to represent fairly though briefly the distinctions of the various schools which have started out in psychoanalysis in the end to deviate from it. Hingley in the main gives his attention to an exposition of the psychology of the unconscious more completely in accordance with the development of principles for which Freud stands. He has made some unnecessary objections, raising up bogies where they do not exist and then attempting to argue them down. A more correct interpretation of Freud is to be desired as a background for a work which is so sincere as this one in intention and so appreciative of the place of psychoanalysis in psychology as in its practical relation to life. A more careful study of Freud or a more clearly analyzed vision would have convinced the author, for example, that Freud never overlooked the ethical side of psychoanalysis. Only Freud maintains better than his critic that clearer attitude which the latter advocates, the nonconfusion of scientific analysis with the personal application to conduct of the facts discovered. The latter is a problem in a psychoanalytic treatment secondary to the first, not in moral value but in scientific sequence.

Jelliffe, Smith Ely; Brink, Louise. PSYCHOANALYSIS AND THE DRAMA. [Nervous and Mental Disease Monograph Series, No. 34, Nervous and Mental Disease Publishing Company, Washington and New York, 1922.]

Consciousness exists in order to put interrogation constantly before the doings of the unconscious. The exercise of this function should grow with the progress of human experience. In this book conscious question is turned upon the products of unconscious activity of the dramatist, subjecting these through psychoanalysis to a search after deeper meanings and their power of producing their results. In the latter regard, therefore, the question is applied also to the unconscious attention of the audience, the spectator, or the reader of the drama.

The authors might have given an even more thoroughly analytic study of the plays they have chosen. Questions as to the significance of these products of the unconscious might have been discussed in greater detail. Yet their study is a work that points in a fruitful direction. It is suggestive of a rich source of knowledge of dramatic art and its place in the lives of the people. It is fitted to rouse fresh

interest in the plays themselves because of its point of view and therefore to stimulate thought and investigation in regard to these deeper things. It serves to make us conscious of more than superficial values in even the amusements at hand. It leads us to ask why we are at the theatre and what the creation of drama and our contact with it has to do with the carrying out of our lives. This is the relation which the writers see between their study and mental therapy. The drama's large place in life's adjustments justifies its study as a part of mental medicine.

The studies show some of the unevenness of work approached at different times for different occasions. The substance of the plays, dramas not now current upon the stage, is not always given with sufficient clearness. Yet this is a defect which a real interest in the interpretation of the play can soon remedy. The authors have given reference in each instance to the published form of the drama wherever this is available. The style is not always so clear as might be particularly in some of the earlier studies. Yet the book is very readable, renewing our interest in dramas in themselves worth while and stimulating a more thoughtful appreciation of the place both of current and of classical drama.

Mattirolo, G. *DIAGNOSTICA DELLE MALATTIE NERVOSE.* [Torino, Milan, Naples, Rome.]

Mattirolo has presented a very practical work as a ready guide to the anatomical facts of the nervous system and the localization of disease forms which appear in this territory. The book is well ordered, its matter detailed yet concise in statement, its graphic illustrations well selected. Its material therefore is not only readily available but is arranged to catch and stimulate the interest of those who especially need such a guide into the knowledge of neurology. It should be suggestive always of the more complete knowledge to which this is intended as an introduction. Its direct style of presentation makes it so. One thing is missed which the general practitioner like the specialist should have always in mind. There is not that constant implication that there should be of an active psychic background against which anatomical symptoms play and out of which so many syndromes have their deepest if not their exclusive origin.

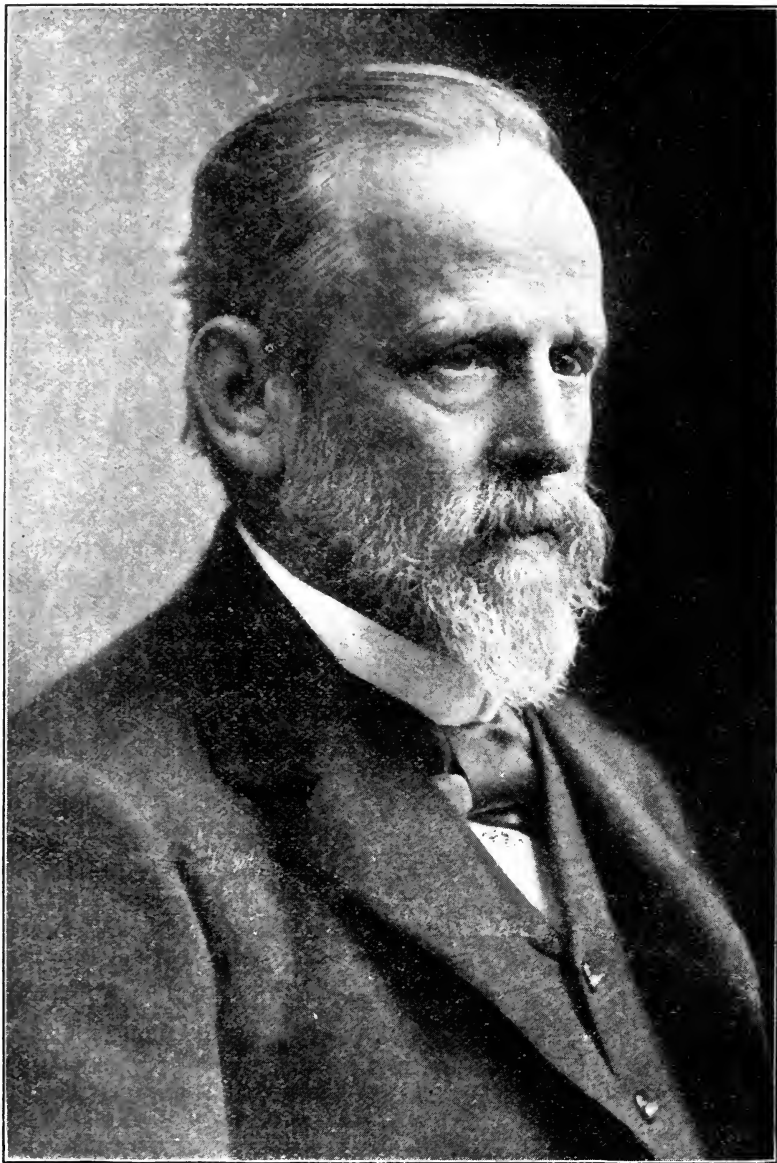
OBITUARY

HEINRICH OBERSTEINER

Heinrich Obersteiner died November 19, 1922. As third in the ranks of famous neurologists of Vienna Obersteiner was a worthy successor of a Türck and a Meynert. The former of these showed us the way to enter the secrets of the brain while Meynert erected a gigantic structure which brought us to the understanding of the central nervous system. But it remained for Obersteiner to make this structure accessible to those also who stood far removed from this special branch of knowledge, making it possible for them to move in it with ease and freedom.

Obersteiner was rooted in the great tradition of the Viennese school of medicine. Born November 13, 1847, as son and grandson to a physician he was irresistibly drawn to medicine. The shining lights of the Viennese school of medicine were his teachers. He began his scientific work in the Brücke laboratory surrounded by a noble circle of friends, Fleischel, Frisch, Winniwarter, and foremost of all, Sigm. Exner.

His parents' partial proprietorship of the Döbling hospital and his closer sympathy with the distinguished clinician Leidesdorf brought him near to problems which in his time were not understood. Thus his field of work is seen to have developed in two directions. On the one hand are the problems of practical psychiatry and neurology, on the other high scientific studies concerning the structure and function of the nervous system. Thus he was one of the first to approach the problem of general paresis and to establish its relation to syphilis. He recognized the serious harm in the abuse of morphin and opposed such abuse in a large number of writings. This led him on to the intoxication psychoses which he set forth rationally for the first time. The problem of tabes found in him and in his pupil Redlich a far reaching advancement because he placed in the foreground diseases of the posterior roots. He sought to understand the question of epilepsy from the experimental side and came to the valuable discovery of the transmission of acquired diseases. We owe to him the first representation that is free from objection of the concussion of the spinal cord, the substratum of which he saw in a molecular



HEINRICH OBERSTEINER

alteration of the nervous substance. It is well known that he first discovered the symptom of allochiria.

In the anatomic field it was the cerebellum that first enlisted his attention. Then it was the structure of the blood vessels of the nervous system, in which he became one of the chief advocates of the perivascular lymph spaces. His studies in pigment are also well known. He found in the bright yellow pigment of the ganglion cells a body which is first formed with the function of the cell and afterward represents a pigment of cell waste. He divided the cells into lipophiles and lipophobes and was able to prove a transformation of pigment not only in the ganglion cells but also in the neuroglia cells. These studies led him also to derive the corpora amylacea from the neuroglia cells. He further accomplished much that was new anatomically as regards the fibers, as he most of all determined the position of Helweg's triangular tract and together with Redlich discussed the association systems of the brain.

At the head of all, however, stands his textbook which appeared as early as the end of the 80's and comprehended everything so far known regarding the central nervous system in so simple and well arranged a fashion that it became the textbook for the whole world. This guide to the study of the structure of the central nervous organs which appeared in 1888, had passed through five German editions by 1912 and had been translated into English, French, Italian, and Russian. In spite of many other textbooks more complete in many ways which have appeared in the meantime it can still hold its own everywhere.

His greatest achievement, however, is the founding of the Vienna Neurological Institute in 1882. Under the greatest difficulties and with the sacrifice of a large part of his own means and the effort of his entire personality, he gradually built it up to its present proportions. Here he succeeded in drawing to himself also a very large number of pupils from the leading countries and in training them in the special work of theoretical neurology whether they themselves wished to carry it on further or were only laying the foundation for their later clinical studies.

His inimitable charm of character and goodness, his goodwill toward every one of his students, resulted in the constant increase in the number of his pupils and made it possible for him in 1892 to collect the works of his pupils in archives, "Arbeiten aus dem Wiener Neurologischen Institute," of which volume XXII had been published up to 1919. The archives include perhaps 500 works produced under his direction. It is astonishing that he still found time for his

own tasks, which he never neglected. Thus in the last years there appeared comprehensive treatises with Redlich upon the diseases of the spinal cord in the Schwalbe-Ebstein Handbuch, on general paresis in the Notnagel Handbuch, studies relative to sensory illusions in the Handbuch der Sachverständigen-Tätigkeit. Finally, there should belong here also his fundamental address to the International Congress in Budapest concerning the functions of the nerve cells. One sees that there is no field of anatomy, pathology or clinical work in nervous and mental diseases in which he has not done constructive work. The stimulus which the reading of his works gives us is still almost greater than the activities which call it forth. So we see in him an investigator, a creative worker and a teacher almost without a rival. The affection which his students and friends brought him and which they will cherish beyond his death proves him a man who embodied the great charm and high culture of Vienna.

OTTO MARBURG.

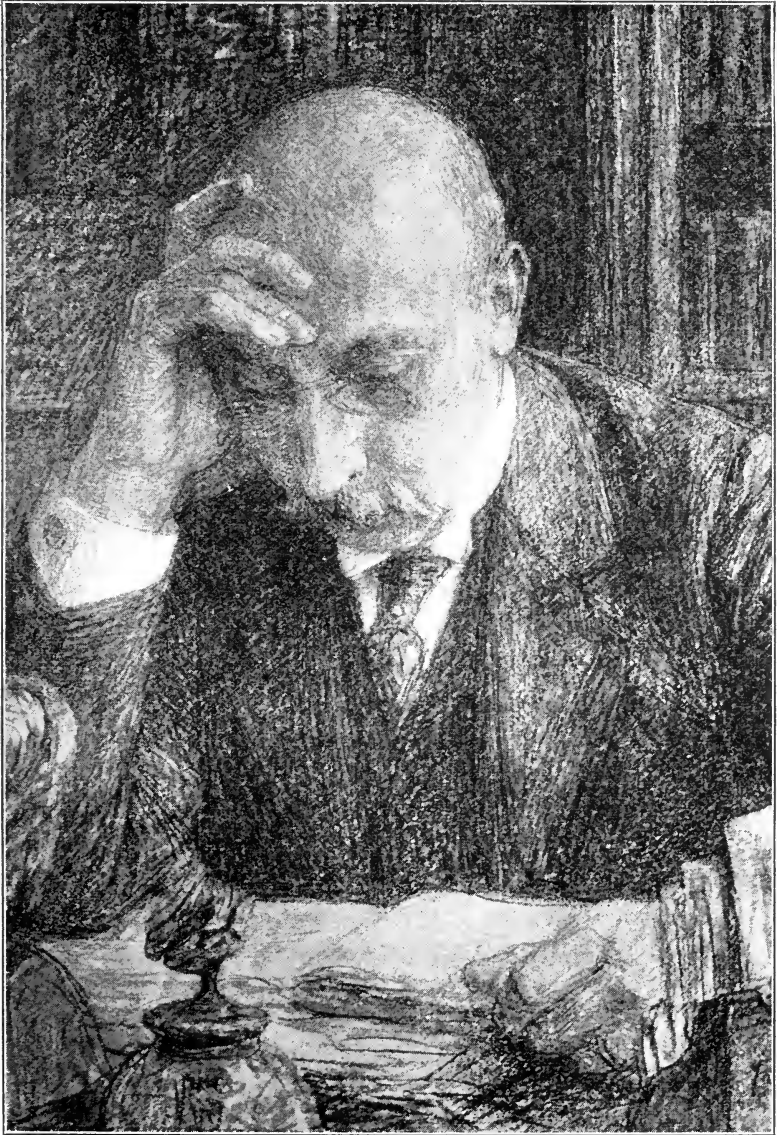
PROF. DR. J. K. A. WERTHEIM SALOMONSON

On the 16th day of September, 1922, Dr. J. K. A. Wertheim Salomonson, rector of the University of Amsterdam, died suddenly of heart disease at the age of fifty-eight. This is a severe loss for science in Holland as well as in other countries, for his research work has been of great value.

Dr. Wertheim Salomonson was a medical man with a special capacity for physics. At the close of his studies at the University of Leyden he wrote a clever thesis on "Stereognosis," in which his love for neurology was already made manifest. After graduation he was appointed assistant at the clinic for internal diseases in the University of Amsterdam, where he worked under Professor Pel. After this he took up a general practice, but his affection for neurology and physics drew him in another direction. He was invited to take charge of the municipal polyclinic for nervous diseases and electrotherapy, where he felt more at home.

The great results of his research work induced the University authorities to found a special chair in neurology and Röntgenology for him. In this position he worked in the clinic of Professor Winkler. When the latter removed to Utrecht he got the leadership of the neurological clinic of the University, where he worked till his death.

Immediately after the discovery of the Röntgen rays was published, Dr. Wertheim Salomonson made with his friend, Prof. E.



J. K. A. WERTHEIM SALOMONSON

Cohen, a Röntgen tube and only a few months later he demonstrated photographs of patients who had been examined with X-rays. This was the beginning of the study of Röntgenology in Holland. He soon got coworkers and in 1901 founded the Dutch Society for Electrotherapy and Röntgenology. He was the first Röntgenologist in Holland and was readily acknowledged to be and remained the first authority in this branch. Owing to his comprehensive knowledge of physics he could give guidance in all theoretical questions; moreover, he has improved many of the instruments used in this branch of science. His research work in Röntgenology was especially devoted to the inductor and the transformer, but he also helped forward in many other subjects. In his fine laboratory he received many Röntgenologists of Holland and other countries and showed them his discoveries. He was made honorary member of the Dutch, English, German, and French societies of Röntgenology and was chosen as a member of international committees.

Neurology, however, had his first love and it was clear that in the last years of his life this branch of science attracted him more and more. His most original work was developed in the field of the electro-physiology and the clinical pathology of the peripheral nervous system. Every neurologist knows his work about the peripheral nervous diseases in the great textbook of Lewandowsky; this work is based on the examination and treatment of a very large number of patients and on many researches of an original character.

The best known results of his studies are connected with the electric degeneration of the peripheral nervous system. I shall only mention here his discovery of the electric degeneration of the third nerve (oculomotorius) and the early appearance of kathode tetanus in degenerated nerves. Much of his work was devoted to the physiology of the nervous system and its application in the clinic. We shall select only a few instances, for example his studies about clonus and tetanus, the psychogalvanic reflex, the shortening reflexes, the measurement of chronaxia. He has given a new law concerning the relation of stimulus and effect and wrote a fine article about electrotherapy. He increased our knowledge of professional neuritis and described many excellent articles about clinical observations.

A short time after the discovery of the string-galvanometer by Einthoven he made a new, original apparatus and studied with it the heart diseases. He also applied this apparatus in cases of neurology and published many articles about subjects examined with this apparatus. Very interesting, also, were his beautiful electro-cardiograms of surviving human embryos. In the last period of his life he

invented a new ophthalmoscope and improved the photography of the fundus of the human eye.

As a clinician he was a man of his own type. When seen at work in his clinic, one could always recognize from his methods that he had a talent for physics. He was constantly measuring, registering, calculating. He was not much interested in the pure psychical state of the patient, but was always devoting his attention to the physiology and physical side of the case.

Dr. Wertheim Salomonson worked very much in science, but he was not a dry scholar. He was a lover of art, had a great aptitude for music and was also a first-rate sportsman. Alike in his person, in social intercourse, and at work, he maintained the appearance of an aristocrat. He trained many neurologists and they had all a high opinion of him and admired his scientific methods. We, his former assistants, and many more shall never forget his brilliant and attractive personality.

DR. B. BROUWER.

Amsterdam, December, 1922.

ROBERT THAXTER EDES, M.D.

Dr. Robert T. Edes, a retired member of the Massachusetts Medical Society, formerly professor of materia medica and Jackson professor of clinical medicine in Harvard Medical School, died at the home of his daughter, Mrs. Annie Gardner, in Springfield, January 12, 1923, at the age of eighty-four years.

The son of Richard Sullivan Edes, a prominent Unitarian clergyman, he was seventh in descent from John Edes, who came from England to Charlestown, Mass., about 1674. Dr. Edes, the eldest of eight brothers and sisters, was born in Eastport, Me., September 23, 1838, spent his early life in Dorchester and Bolton, where his father was settled, graduated from Harvard in the academic class of 1858, and in medicine in 1861. In the September following graduation he entered the United States navy and served during the duration of the war, holding the rank of passed assistant surgeon when he resigned in 1865. In April, 1862, he was stationed in the naval hospital aboard the Brooklyn and was present at the bombardment by the mortar flotilla of forts Jackson and St. Philip below New Orleans.

After taking an extended tour of study in Europe he practised

medicine in Hingham and Roxbury, occupying the chairs of *materia medica* (1875-1884) and clinical medicine (1884-1886) in Harvard Medical School, and serving as visiting physician in the department of nervous and renal diseases at Boston City Hospital. His students found him a scholarly and erudite instructor, his differential diagnoses being models of accuracy and thoroughness. In 1886 he moved to Washington, D. C., where he was visiting physician to Garfield Memorial Hospital, returning to Boston in 1891 to accept the position of resident physician to Adams Nervine Asylum in Jamaica Plain. When he had finished six years' service to this institution he received a few private cases of nervous and mental disease in his house in that suburb while he was visiting physician to the Highland Spring Sanatorium in Nashua, N. H., keeping an office in Boston. About 1903 he moved to Reading, Mass., and opened a small private hospital for nervous diseases.

Dr. Edes' name was placed on the retired list of the Massachusetts Medical Society in 1912, and in 1915 he moved to Springfield to pass the rest of his days. Although handicapped by increasing deafness he wrote for the papers and magazines and was active minded until the last. His literary career began in 1868 when he wrote for Pepper's "System of Medicine," an article on "The Part Taken by Nature and Time in the Cure of Diseases," which had been one of the prize essays of the State Medical Society for that year. Subsequently he wrote for medical periodical literature thirteen articles on brain tumors, five on anemia and allied conditions, five on abdominal cancer, eleven on diseases of the kidneys, and ten on diseases and conditions of the nervous system. The Shattuck Lecture of the Massachusetts Medical Society, in the year 1895, with the title "The New England Invalid," was delivered by Dr. Edes. He was the author of "Therapeutic Handbook of the United States Pharmacopoeia," 1883; "Therapeutics and *Materia Medica*," 1887; "Parson Gay's Three Sermons," and also "The Mortar Flotilla of the United States Navy." In later years he furnished occasional papers for the *Boston Medical and Surgical Journal*, for naval historical journals, and for the Springfield daily papers.

Dr. Edes was a member of the American Neurological Association (he was one of its founders), the Association of American Physicians, the Philosophical Society, Washington, the Boston Society for Medical Improvement, the Boston Medical Library, the American Medical Association, a fellow of the American Academy of Arts and Sciences, and a companion of the Military Order of the

Loyal Legion. At various times he was lecturer on materia medica and therapeutics at Dartmouth Medical School, lecturer on nervous diseases at Columbian University, Washington, and on diseases of the kidneys at Georgetown University.

Dr. Edes was twice married, first to Elizabeth T. Clarke, of Boston, in 1867, by whom he had three daughters and a son; and second, to Anna C. Richardson, of Dorchester, Mass., in 1881. She died in 1921. The son, Richard Edward Edes, a graduate in arts of Johns Hopkins University (1889), and of Harvard Medical School in the class of 1895, a most promising practitioner in Roxbury, died November 25, 1901, at the age of thirty-two, his death causing an abiding sorrow to his father and to a large circle of friends. (*Bost. Med. and Surg. Jr.*)

NOTES AND NEWS

Professor Euzière has been made professor of nervous and mental diseases in the University of Montpellier to occupy the chair made vacant by the death of Grasset.

Dr. Ivan Bloch of Berlin, well known as a writer on the History of Medicine and on the Sexual Sciences, died recently at the age of 56 years.

Dr. Herman Gutzmann, an authority on disorders of speech, died in Berlin at the age of 56.

Dr. Bruno Kisch was appointed Privat Dozent in Psychiatry in Cologne University.

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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ORIGINAL ARTICLES

THE MNEME, THE ENGRAM AND THE UNCONSCIOUS

RICHARD SEMON: HIS LIFE AND WORK

BY SMITH ELY JELLIFFE, M.D.

The recognition of a unity informing the multiple manifestations of life; unwearying search after the nature of this unity in life's detailed manifestations, these characterize the life work of Richard Semon. He might have spoken of himself in the words in which he testified to the scientific spirit of his revered teacher Haeckel: "He was never satisfied to hold the parts singly in his hand but deeply permeated with the unity of the whole of nature he united everything in the bond of his thought and overlooked or rejected no source of practical knowledge as unworthy in itself." So throughout the series of his studies Semon fastened his eye upon the movement of energy which works in and through the living organism. He saw it imprinting upon the organism the capacity for new reactions, changing its nature, creating within it the higher consciousness which is man's. In his search for the inner truth of the nature of life's activities he developed a simple group of energetic concepts by which he was enabled to push his investigation through the many manifestations. Through his concepts he simplified the explanation of life's genetic experience.

Semon's life, too, not his work alone, expressed this multiplicity informed by unity, this "monism," to use his own expression, "of thought, research and life." Yet neither in thought, research nor life was this a monism that boasted an intellectual completeness in itself. His writings are marked by interrogation points which he left just within the entrance to many still unexplored paths. His own most developed concepts were only those tools for research

which he had progressively adapted, refining them by repeated and extended use, and which at the end he could relinquish to the hands of others. These should do with them what they would so long as they followed the path of sincerely questioning research. Thus his own quiet farewell is appended to his last book full of brief suggestions of the work he left uncompleted. The closing chapters also, preserved from penciled notes and edited by Otto Lubarsch, while they fill the reader with deep regret give place to response to the writer's challenge to renewed activity in the field of inquiry.

Semon could scarcely be called old when he laid down his work. His intellect was undimmed, his mental power for clear statement unimpaired. His masterly presentation testifies to this up to the last pages of his book. Yet he was weary. He felt himself unable to work and remained true to his theory that the period arises when engraphic receptivity is seriously diminished so that the flexibility of thought is no longer that of the earlier years. "A loss with which I met personally made further work for me in the last year (1918) practically impossible. In consideration also of the continued unfavorable condition of the times and my advancing age—no investigator who has passed his fiftieth year should dare the wish to conquer entirely new fields of research, even the ontogeny of human memory teaches us this—I may not hope to bring this difficult task to a conclusion satisfactory even to myself. Therefore it remains incomplete." Thus he deliberately closed his last book, his work and his life. In December, 1918, he took his own life lying upon his country's flag in his wife's room, thus testifying to the double grief that had oppressed him. For months he had been borne down by the illness and death of his devoted wife and he was crushed by the impending and finally realized defeat of his fatherland. His final deed, like other decisive steps in his life, was entered upon with calm deliberation according to what seemed to him wise and right. It brought to an end his own personal contact with the multiplicity of paths which he had pursued, but even this determined close of life and work form a concentrating point from which those paths may be entered again by his successors. Semon left them infused with his own vitality and illuminated with the prophetic discernment which saw them as pathways fruitful in the advance of scientific thought.

A brief survey of his own work in the field will reveal something of his contribution to science. The concepts with which he worked and his expressions for them were skillfully devised for himself or modeled from those of his predecessors and contemporaries. For

he accepted his entire work as only part of the greater whole of science in which it belonged. He recognized no entities complete in themselves, only such as are necessary artificial divisions for the purpose of partial observation. He borrowed freely from other workers, accepted, enlarged, criticized freely and offered his own work just as freely to others. He concludes the preface to the third edition of "Mneme" in 1911 with a regret that he had not yet met with sufficient active criticism. "The researches presented here have so far not been subjected to the fire test of a deep, penetrating criticism of specialists, which I myself regret most because such a contest would be only the father of new knowledge."

Semon's own life in its relation to his work makes clearer the vital connection of his concepts with the material which he studied, that of life itself. Lubarsch, to whom fell the immediate task of carrying on Semon's work through the publication of his unfinished book "Bewusstseinsvorgang und Gehirnprozess," furnishes as an introduction to the book such a sympathetic picture of his life.

Richard Wolfgang Semon was a Prussian born in Berlin in 1859 and trained within the center of the best for which Prussianism stood. He knew its weakness with its excesses of power. But he knew also its inner ideals which were his as a man of true culture, iron adherence to self discipline, unswerving search for knowledge. As he stood for the fundamentally sincere so he pressed to the inner realization of that which in any nation lies beneath the treacherous surface of its political life. He was occupied with values older than national boundaries, his actual search was in a world vaster than any of these. Yet he was alive to the preservation of such interests as are bound with the deepest and best of a nation's life. Of such was his loyalty to his own nation and from it arose the grief which in part precipitated his end.

His interest early seized upon those values which were provided by his surroundings and through his education. Music and literature became to him richly familiar fields. Their close connection with all other material in his active mind is revealed by their constant appearance to illustrate his pages of scientific discussion. Politics and religion claimed his interest together in a somewhat formal bond which was part, however, of his intense patriotism. If he manifested in politics and in loyalty to the state religion something of a narrower prejudice he was otherwise a citizen of the world. In science especially not only did his craving for knowledge dissolve any possible barriers between the thought of men of different nations but the authorities whom he followed or whom he disputed in order to

press into new truth were measured by their work alone. Haeckel as his immediate teacher was the object of his enthusiastic respect and exerted a lasting influence upon his thought. But no national feeling modified his estimate of the work of Darwin nor of any of the latter's predecessor's or followers.

Semon's life experiences were also those unlimited by national frontiers. As a student his attention was early drawn to the work of Darwin and of Haeckel. He entered the field of practical research in comparative anatomy where the desire grew to explore for himself the fauna of remote lands. To this end he studied medicine that he might be fitted to obtain a place with an exploring expedition. He had already been a student at Jena under Haeckel when he passed on to Heidelberg for two years of medical preparation, which enabled him to pass his state examinations in 1889. The next year saw him embarked upon a journey to Africa. The expedition, however, encountered such difficulties growing out of international economic jealousy that it was compelled to return in apparent failure. But Semon, though seriously ill with malaria, upon his immediate return had acquired a self reliance and an ability to endure hardships which were later to stand him in good stead.

He studied for a time at the marine laboratory at Naples but took up his more permanent work at the University of Jena. He was first assistant in anatomy, then private docent and finally assistant professor. He remained here until 1897 but early interrupted his work as teacher to enter upon his long desired trip of exploration. The generosity of Paul v. Ritter under the influence of Haeckel made it financially possible for Semon to spend two years in Australia from which he reaped a rich harvest in knowledge of vertebrates, his chief object of study, but also in firsthand knowledge of geography and of the earlier development of the human race. This knowledge of primitive man was gained by actual encampment for a number of months among the natives of Australia. The extensive material which he gathered upon this expedition was received and arranged for him by Max Fürbringer, who, with other collaborators, assisted in the later publication of six folio volumes. "Semons Zoologische Forschungsreisen in Australien und dem Malayischen Archipel."

Semon resumed his work at Jena after his return, continuing there until an event in his personal life necessitated the severance of his professional relationship. This was the forming of a mutual attachment with the wife of an esteemed colleague, an attachment so deep that the dissolving of the first marriage and the remarriage

with Semon seemed inevitable. The newly formed partnership was one which justified itself in the mutual activity and inspiration which played a large part in Semon's future work. As Lubarsch suggests, the university permitted itself the loss of one who could ill be spared and Semon's work had to find for itself entirely new channels. Yet it developed, in Semon's coöperation with his wife, an intensity of thought that gave it the deeply original character by which he has rendered his distinguished service to scientific progress.

An often repeated criticism of Semon's work is that of his invention of special terms for his concepts. They are thought to encumber his writings with unnecessary difficulties. The criticism falls before an actual attempt to make use of his concepts in a sincere understanding of them. One finds that they are carefully chosen with reference to the ideas they are particularly to convey. It requires only a slight effort to become familiar with their significance, especially as their author has been at utmost pains not only to define them clearly, and simply, too, but to reiterate their meaning at the various points of application in his text. He is never averse to such repeated explanations of his terms nor of the ideas which he develops. Thus he carries out in practice his engram theory of learning. The more often a thing to be learned is brought to the receptive organism so much richer is the engram store, potential for revival in service of the organism. Perhaps the reader in a foreign language is better able to appreciate these terms than a student who primarily uses the author's own tongue. The latter might complain that the author could have conveyed his concepts in already familiar German words. Readers in other languages without an already familiar basis of common expression find that the introduction of terms borrowed from the Greek furnishes an intelligible meeting ground for scientific thought. For even a slight dictionary knowledge of Greek, together with a little mental effort, would enable one soon to grasp the significance and appreciate the directness of the terms.

Semon's theory of the "mneme" is that all the organic phenomena of reproduction, repetition of bodily form or of dynamic experiences, are expressions of one and the same energetic process. These mnemonic phenomena are something more than the repetition to be observed in the inorganic world. They represent a reproduction or repetition in which the new conditions are never quite the same as the original ones. This is expressed in the term engram. With patient elucidation Semon reminds his readers first of the stimulus which works upon the organism. Definite results follow when liv-

ing substance is thus acted upon. The reactions may be considered from the subjective point of view as sensations (*Empfindungen*²) or objectively as physicochemical change. This latter effect passing through the stimuable substance when stimulation takes place is the excitement (*Erregung*²). It is an energetic process which, initiated through a variety of stimuli entrances, may manifest itself in many different ways. There is always in consequence within the living substance an energy situation somehow altered by the excitement produced. An "engram" has been formed. An experience has been "engraved," "written in." Expressed in terms of energy this means that the substance henceforth is in a different state as regards reaction than it was before the excitement had passed through it. Semon emphasizes the fact that he speaks of no mystic possession that has come to the organism, only of its alteration in reaction capacity.

It must not be overlooked, furthermore, that a stimulus rarely or never comes alone. Neither, especially in a highly organized being, does it enter only by one gateway nor pass only over one stimuable area. These synchronous stimuli produce, therefore, a simultaneous engram complex. Moreover, the excitement occupies an appreciable amount of time with gradually diminishing effect. This gradually diminishing activity adding something to the immediate effect of the excitement receives the name of the akoluthic phase of the stimulus activity. Since new stimuli are added before the akoluthic phase of the excitement produced by a previous stimulus has run its course the engrams formed have a successive association, the latter joining themselves to the former. Association, Semon insists, rests fundamentally upon the simultaneousness of different engrams or engram complexes of which this successive association is only a subordinate form. It can be seen that the formation of engrams is therefore a complex affair and a continuous one throughout life. The sum of the engrams which the organism possesses Semon names its engram store. "The phenomena which are the result in an organism of the presence of a definite engram or a sum of such I denote as mnemonic phenomena. The idea of the mnemonic capacity of an organism I denote as its mneme." Its *phyletic memory pattern*.

The engram existing after the excitement or stimulus has run its course remains in a state of latency, state of "secondary indifference," but subject to activation again by the repetition in whole or in part of the original stimulus or only by the return of even a small part of the energetic situation which originally produced the

engram complex. The energetic situation which represents the external influence may be designated as the original excitement, while the internal energetic condition which was present at the creation of the engram complex and which in whole or in part is sufficient to revive the engram complex is designated as the mnemonic excitement. Thus also one may distinguish original and mnemonic sensations. This activation of a latent engram complex is denoted by the term *ekphoria* for which we may follow Semon and coin an English verb form to say that the engram complex is ekphoried in the ways that have just been mentioned. This ekphoria, as Semon goes on to show by many investigations of plant and animal life, may take place through motor, plastic or metabolic reactions or through the reactions of consciousness. Because of the association of engram complexes ekphoria of one engram will naturally draw the ekphoria of an associated engram with it. The apparent chronological factor in the revival of the engram manifest in many life processes is explained by the return complete or partial, within the organism at a certain time of the conditions which were present when the engram was formed and which therefore act as the ekphoria of the engram complex. Such may be noted in the return of hunger at a certain time which has become habitual for the taking of food, or the falling of leaves at certain periods of the year. It may be that certain periodic attacks of depression may be better understood, as to their periodicity by means of this concept. Here as elsewhere it is not necessary that the condition of excitement should be associated with a return of sensation above the threshold of consciousness. It may be defined as a metabolic condition which determines the excitement of the stimulative substance which, however, is probably accompanied by sensation even if this is not in superconsciousness.

Semon sums up the fundamental facts so important to the reproduction of the organism in form or in dynamic experience in two chief mnemonic laws: All excitements in an organism build up a simultaneous connected excitement complex which as such works engraphically, that is, leaves behind a connected engram complex which in so far forms a whole; and, second, the partial return of that energetic situation which previously worked engraphically works ekphorically upon a simultaneous engram complex; or, in a more condensed statement: The partial return of the excitement complex which on its part has left behind it the engram complex, a return whether in the form of original excitement or of mnemonic excitement, works ekphorically upon a simultaneous engram complex. He calls these facts "the quintessence of the fundamental mnemonic law. For

through ekphoria the engraphia first comes to our knowledge and without a preceding engraphia there is no ekphoria." Association is thus defined with greater clearness than is usual if these two statements are kept in mind. He explains association as "the belonging together of the individual components of an engram complex. . . . Association briefly stated is a result of engraphia which comes to light on the occasion of the ekphoria."

Another problem presents itself to Semon's attention, that of the homophonia which may occur among various sensations. Among the sensations belonging to a simultaneous complex there will be a sense of their coexistence or of their homophonia. The latter is the name he gives to the simultaneous independent appearance of two sensations or sensation groups in the organism. This agreement of sensations may exist between two original sensations, two mnemonic ones or between one of each sort. Upon this phenomenon of homophonia depends the understanding of recognition and also the importance of repetition in building up memories. When the differences between two components or groups of components, which almost always exist to at least a slight extent, are ignored there is an undifferentiating homophonia which leads gradually along the way of abstraction of ideas. But when the components are felt as differentiated and so brought into opposition a sensation differential is present. There will then be an alternative of reaction, a very important factor in inheritance which explains many of the phenomena appearing there. It is the homophonic working together of a number of impulses of excitement upon which the vividness of a manifestation will depend. Homophonia of original sensations is subjected to an extensive experimental study for that of mnemonic sensations must depend in part upon it. Semon has subjected the problem to a detailed proof in the earlier part of his "*Mnemonic Empfindungen*" and then continued in the latter half the extension of his proof to the field of the mnemonic sensations. Here he describes the working of homophonia and points out its significance in the development of superconscious sensations, which are individually acquired mnemonic.

Not the least fascinating portion of Semon's work is that in which he has turned the light of his theories upon the subject of the inheritance of acquired characters. Nowhere does he show himself more engrossed in the energetic concept by which he observes processes as the product of the working of vital energy through the stimulative substance. He dismisses the terminology of any "ism" attached to the name of Darwin, Lamarck, or any other investigator. He accepts the approach to the question which Darwin and Lamarck have each

made but simplifies the question by bringing it directly into the form of his engram theory. He asks them whether "the action of the stimuli, respectively the excitement, which has resulted in the parent generation and which, certain exceptions being taken into account, has manifested itself in them, is inherited in the descendants." He avoids the use of such disputed terms as "inherited characters," "modifications," etc. His point of view is more fruitfully expressed when he enlarges his question to read: "May we accept that under favorable circumstances through excitement released in the bodies of the parents the hereditary potentialities of the germ cells and with them the reaction norms of the descendants can be altered? Whether, if these impulses of excitement have already produced perceptible alterations in the parents, the changes will appear in the direction of similar alteration in parents and offspring?" Here he puts the physiological energetic action in the foreground and at the same time avoids certain possible misconstructions.

The influence upon the germ cells in this sense is far other than the alteration of an individual organism by some external influence with an expectation or a denial of the actual copying in the offspring of the condition produced in the parent. His point of view, on the other hand, gives room for the inclusion of certain instances of the process of induction of the germ cells which do not, however, produce a manifest effect in the parent body. It takes account also of a fact the overlooking of which has given rise to hasty conclusions, a fact which Semon finds frequently attested in the investigations which he reports. There are only certain favorable conditions, temporal or otherwise, under which the germ cells are susceptible to the influences reaching them through the parent body. A glance back to his discussion of the time factor in the ekphoria of engrams gives explanation of this dependence upon "favorable conditions."

According to the engram theory changes, in the form of engrams, are produced in the stimuable substance of the germ cells as well as of the parent body. The question arises whether a change is produced in the germ cells by the process which the stimulus set up in the parent or whether the external stimulus acts separately upon each. This latter theory of "parallel induction" Semon believes unlikely. He cannot accept Weismann's earlier theory of the unchanged continuity of the germ plasm but believes that under favorable conditions at its "period of sensitivity" engrams may be formed within the germ plasm by impulses of excitement which have been set up in the parent body if these be of sufficient strength. Observations by which he tests this theory of "somatic induction"

seem to show that morphologic changes in the parent practically never have strength enough to produce an induction of the germ cells. On the other hand the impulses of excitement produced by repeated stimuli from without which set up functional changes are those which reach the germ cells. Even this frequently observed fact does not deny the possibility of a direct influence upon the germ cell of the external stimulus, a matter for future experiment. The changes produced by the somatic induction are produced so gradually that they give the appearance of a continuous process of alteration yet it may be true that a greater external stimulus produces such a marked somatic excitement that a much more evident alteration takes place assuming even the appearance of a saltation. As a matter of fact all effect of stimulation in the stimuable substance proceeds not by a continuous movement but by a succession of minimal leaps, likened by Semon to the unobserved briefer movements of the hands of a clock. Paleontology and comparative morphology as well as experimentation testify to the rare occurrence of the greater saltations as compared with the gradual alteration of species.

Semon's last work, the book left incomplete, is a study of the correlations of energetic action according to the engram pattern with the conscious states in which the action is subjectively manifest. His entire earlier work prepares for this in two directions. For he has insisted upon the unity of the process of the building up of the mneme whether in simple engraphic effect upon the simplest form of stimuable cell protoplasm or in the action upon the highly specialized nervous substance. In the other direction he shows the close relation of mind and body as really representing the same group of life processes only viewed from two different standpoints. Now in his last book he seeks to find the correlation for the various characteristics of consciousness in terms of the energetic activity. He examines first original excitement and sensation the characteristics of which prove, however, the same for mnemonic excitement and sensation. The sensations are separated according to their specificness or quality as due to their appearance in a specific sense area and these again manifest finer distinctions, as for example those of red, green, etc., within the sensory sensations. A narrower specialization exists in their so-called "local sign" by which the sensation is recognized as belonging to a definite locality upon the body. Intensity, vividness and feeling tone are nonspecific peculiarities. Are these, then, all correlated with reciprocal characteristics in the field of the physical energetic activity, the excitement?

It is not alone the quality of the stimulus which determines the

quality of the sensation but much is due to the specific quality of the nervous field where the excitement is released, sense organ and sensory field, while within each larger sense organ there are innumerable sensory units with their own specificness. The specific energy of the sense apparatus doubtless results through the history of the race from a gradual limitation of stimulability upon a certain portion of the stimuable substance. This takes place differently in the different spheres through the effect of the energy form of the stimuli which have acted for countless generations upon the nervous substance. The local sign, which Semon illustrates in various sensory apparatus, depends upon the characteristic note which each cell possesses in its own position.

The sensations which succeed in reaching consciousness depend, according to the simplest statement of their energy correlation, upon an increase of intensity of the stimulus which causes increase in the excitement produced, which in turn increases the sensation. Semon relies upon a long series of experiments and careful calculations based upon them to arrive at the conclusion that the excitement here released is in proportional relation with the stimulus and that the sensation is also of the same proportional relation in its intensity. Therefore the excitement is the energetic correlate of the sensation. One cannot measure thus in its correlation the feeling tone, a variable thing accompanying sensation. It is even less dependent upon the external stimulus than is the quality of the sensation. It depends for its appearance in part upon the quality and the intensity of the external stimulus but also upon the homophonic harmony of associatively awakened mnemonic sensations, also upon the entire condition of the organism at a given moment. Pleasure or pain may increase under the intensity of the stimulus, respectively of the excitement, yet under certain conditions either may change to the other. The accompaniment of mnemonic sensations of a certain feeling tone is very important for the origin of the feeling tone of a new experience. Semon touches very suggestively for the future of investigation upon the influence of external substances or those of the internal secretions, the latter especially with their power over stimulus or inhibition over life process, as important for the origin of the feeling tone. They would act, therefore, ekphorically whether the sensations resulting manifested themselves in consciousness or not. The question of the energy correlate is here for the present without answer.

Intensity and vividness as quantitative factors may go hand in hand but are by no means identical. The grade of consciousness

may be considered as the grade of clearness in different components of the content of consciousness. This grade of clearness need have no relation to a reference back to a consciousness of self, for the greatest vividness may be reached by some component of consciousness when one is most absorbed in something outside one's self. Yet on the other hand the feeling tone which may accompany a reference to self may put the sensation into the very center of consciousness, thus increasing the vividness. Intensity of sensation does find its correlate in intensity of excitement. Yet the quantity of excitement may be increased, when the stimulus for example is doubled as by application to corresponding points of two parts of the same sensory apparatus as in corresponding points of the two eyes, but the intensity of the sensation will experience no increase, only its vividness will be increased. Attention is subjected to examination in this relationship to vividness and defined as consisting of an alteration of the vividness of the different elements which form the content of consciousness. It is in fact the relative apportionment of the available vividness upon these different elements of the content of consciousness. The increase of vividness may be said to come to pass also when two or more receptors are acted upon by the same stimulus so that the same excitement takes place in different parts of the stimuable substance. Both these means of increasing vividness rest, therefore, upon the extension of the excitement in the available substance. This is accomplished in a nervous system of definite structure as in the vertebrates, more especially in the mammals and in man, the highest of them.

Here the available stimuable substance seems to lie in the gray matter chiefly in its larger grouping in the cerebrum for this substance is not, like the white matter, exclusively fixed to its functioning. Examination of all knowledge of the cerebrum brings testimony that in it is to be found the correlate in energetic excitement for the content of consciousness. Semon believes that the available substance is spread over the entire cortical surface, perhaps limited to a certain area or to certain layers, perhaps not. He is inclined to believe that it lies not within the cells but in the intercellular substance, but here again he is ready to express no final conviction.

At this point his formal presentation closes. He has added in his farewell words a brief synopsis of certain chapters which he had in contemplation and in partial preparation. They concern the strife of simultaneous excitement for the stimuable substance, further discussion of the problem of localization, of the entrance and outgo of the impulses of excitement, also of the engrams, also the quanti-

tative question of the amount of stimuable substance utilized and the number of engrams resulting. The nature of the brain processes is suggested also for closer examination. The grade of consciousness was to be discussed more fully and here a suggestive material is mentioned which Semon felt was not yet ready for publication. His statement that it requires fuller investigation deepens the regret that he himself could not have pursued the subject further. He touches here more fully upon the needed investigation of the unconscious, stimulus to which he acknowledges from the work of Freud. He expresses himself in disagreement with what he calls the unscientific method of approach of Freud and his followers but one feels that there would have been illumination here upon the problem from both sides could this keen and fair investigator have penetrated the problem more fully. In the examination of the ontogeny of the deposit of engrams and its relation to learning, the variability of the capacity for engram formation at different periods of life, Semon expresses disbelief in the presence of such a store of infantile memories as Freud has emphasized and in the possibility of their revival in such measure as psychoanalysis claims. There is lack of expressed emphasis in Semon's work upon the emotional factors in the forming and reviving of engrams, only suggestions of this emphasis here and there. These suggestions lead one to believe that with a fuller investigation of this side of the mental life Semon and Freud might have found themselves closer in that illuminating union of thought which would make even clearer the correlations of energetic processes with the subjective experiences of consciousness.

Semon's work has advanced a long way in this direction. His was a spirit of earnest inquiry and a breadth of vision which checked hasty conclusion before unanswered questions or unexplored territories. He has therefore left open a way which no sincere investigator need fear to follow. To proceed in his manner could bring only fuller knowledge of the life of man and of the race to which he belongs.

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² For simplicity we have adhered to the translation of "Empfindung" by "sensation" and of "Erregung" by "excitement" or sometimes "impulse of excitement," although the German terms might be used to cover a wider conception than such literalness might denote, *e.g.*, "Empfindung" more than the immediate primary sensation.

TUMORS OF THE UPPER CERVICAL CORD *

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A spinal cord tumor is a foreign body in an inextensible bony canal, compressing the adjacent structures which that canal contains in the order of their compressibility.

Variations in the pressure of the cerebrospinal fluid may occur without symptoms, indicating that a considerable alteration of pressure may take place within the bony canal without detectably affecting the function of the contained structures. But beyond a given point increase of that pressure is accompanied by diffuse pain, which is relieved by withdrawal of the fluid, and is, therefore, attributable to its pressure. This pain is not a root pain; it affects sections rather than root areas, and is probably of sympathetic origin. In tumors of the cervical cord this pain occurs in the neck or over the occiput. The pain is relieved by lying down, for the pressure of the fluid increases with the angle of the vertebral column to the horizon.

Besides such general increase of intraspinal pressure, spinal tumors cause a local increase of pressure at their site. Where this local pressure occurs the structures are primarily affected; in part according to their proximity to the pressure area, in part according to their immobility, and in part according to their compressibility.

The more immediate the application of the pressure the greater the compression. But to this axiom several exceptions must be made. The cerebrospinal fluid constitutes a fluid protective system surrounding the cord. The pressure in such a system tends to equalize itself so long as there is fluid continuity throughout the system. Local pressures of extradural tumors will therefore tend to be diffused and minimized until the pressure of the tumor exceeds the pressure of the cerebrospinal fluid, and obstructs the system at the pressure area.

When the tumor obstructs the system, the fluid below the obstruction may decrease in quantity and increase in albumin content; it may become a low pressure fluid rich in albumin and may contain xanthochroms.

* A Report of Cases Read at the Forty-Seventh Annual Meeting of the American Neurological Association, Atlantic City, June, 1921.

Above the obstruction the fluid may accumulate to such an extent as to produce a secondary pressure area continuous with the pressure area of the tumor. The existence of this fluid extension may lead us to errors of localization. Errors from this source may project the tumor a segment or more above its site, toward the cranium. The development and variability of the upper level symptoms needs to be studied carefully if this error is to be avoided.

To the degree to which the tumor compresses the cord structures, the cord structures compress the tumor. If the pressure of the tumor be greater than the resistance of the cord structures pressed on, these cord structures are either displaced or deformed. The fluid contents of the lymphatic and vascular systems are eminently displaceable. As soon as the tumor pressure exceeds the lymphatic pressure in the cord, the volume of the contents of the lymphatics is reduced. In the same way the volume of the capillary, venule and arteriole contents of the cord is decreased. Other things being equal, the lower the pressure of the circulating lymph or blood, and the thinner the containing wall, the less is the pressure needed to displace it, the less the pressure needed to arrest its circulation. And when the pressure reaches the point of arresting the circulation sufficiently to cause ischemic changes in the cord, signs of such changes arise.

In arteriosclerotic cases as well as in cases of syphilitic vascular disease accompanied by low blood pressure, such changes tend to occur early from tumor pressure. Likewise when the tumor grows quickly or extensively so that collateral circulation is imperfectly established, edema, thrombosis and degenerative changes affect the compressed area. But in slow growing tumors at vascularly favorable sites, in otherwise healthy people, considerable pressure may occur without serious circulatory interference.

In these cases the absence of interference with the circulation is due, at least in part, to the mobility of the spinal cord. The primary local effect of lateral pressure on the cord is to distort the cord on its long axis. The degree of distortion which the spinal cord can suffer without structural injury probably varies. It doubtless depends in part on the relative capacity of the vertebral canal to the volume of its contents. But in the process of displacement the movement which at first is free soon entails tension on the dentate ligaments, nerve roots, and other structures which serve to fix the cord and to limit its mobility. These structures become tense and are dragged on. The nerve roots may of course also be directly implicated in the tumor growth or fall within the pressure area. In either case root signs occur. But signs also arise from roots which

are not immediately related to the tumor area, and such signs are due mainly, I think, to the dragging on the roots in the displacement of the cord.

When the fixation structures anchor the displaced cord, the compression of the cord itself begins. This point varies greatly with the rate of growth of the tumor. If the tumor grows slowly, the fixation structures stretch, and for a long time there may be no other symptoms than fugitive root pains. Sometimes the tissues adjust themselves so that even root pains are absent. But a time comes when the contour of the cord is encroached on, and deformity results; the cord tends to flatten at the pressure area. Then circulatory changes develop. We cannot too strongly insist on the fact that these changes affect not segments but vascular areas.

As the compression increases, even the circulation in the cord area contralateral to the tumor site may be impeded to the point of physiologic change. And after all of the displaceable contents have been displaced, giving rise in the process to sensory and motor disturbances, which may be conspicuous by their evanescent character (for certain factors of the pressure which induces them are, as we have mentioned, variable, and the disturbances vary with them); when this stage has passed, a more permanent stage arrives in which the signs change only for the worse—the stage of structural disintegration of the cord.

It is in this early stage of what one may call mechanical adjustment of the contents of the vertebral canal to the intruding tumor, that we make all our mistakes in diagnosis; that we mistake cord tumors for neuritis and rheumatism and other things which cord tumors use to protect themselves from the surgeon's knife. And we whose business it is to discover the camouflaged tumor pay tribute to its low visibility by devising schemata, which are built both out of our failures and out of our successes in detecting tumors. If one may change the metaphor, it might be confessed by all of us that we early cease to seek a master key to the lock of the door behind which the spinal cord tumor lies hidden. It is a combination lock. The numbers are represented by the signs of motor, sensory and autonomic disturbance. No one sign is indispensably present, although several are rarely absent together. No sign is pathognomonic although the occurrence of one from each of several groups is highly suggestive. It is of vital importance, however, to reach a definite conclusion early; while the tumor is still operable. If we wait for certainty, until voluntary paralysis occurs, the tumor may then be

inoperable, or if it can be removed, no benefit follows owing to the permanent nature of the cord destruction; or acute softening of the cords occurs after the operation, and death follows. These disasters occur especially in tumors of the cervical cord, and in this region also difficulties of early diagnosis abound. We propose to refer briefly to some of the symptoms which have aided us in the detection of cervical cord tumors, particularly the high cervical ones, and to indicate especially such combinations of symptoms which have helped to establish an early diagnosis.

Among the motor signs some are due to lower and some to upper neuron lesions. The lower go through the stage of irritability into palsy. They thus differ in no wise from analogous lesions elsewhere. But the neck is a region of cricks and tics and rigidities, which we tend to regard cursorily. Yet they may be signs of tumors. In tumors irritative signs are usually on the same side, and have a root distribution, although they may implicate isolated muscles or radiate widely. Such irritative signs are sometimes subject to remarkable remissions and exacerbations and may be wholly absent. When suspicious of a tumor, it is well to examine meticulously the several cervical roots, not omitting to seek for signs of recurrent laryngeal, spinal accessory and phrenic involvement.

Fibrillation, cramps or rigidities in the muscles of the neck should be carefully investigated. Head, shoulder and scapular attitudes, if abnormal, should be analyzed. A laryngoscopic examination should be made; the action of the diaphragm should be studied by means of the X-ray and percussion.

The superficial skin reflexes, which are in part subserved by the anterior roots, may at first be exaggerated and later diminished in root pressure. The erect posture, coughing, sneezing and other expulsive efforts tend to increase intraspinal tension. They therefore enhance root irritation and may be useful in identifying it.

If the source of the muscular disturbance can be traced to a spinal root or anterior horn, other signs corroborative of pressure on the roots, should be sought. This is the stage in which the patient has a right to expect the detection of the tumor, for after this stage paresis occurs. Three or more roots must be implicated before marked weakness appears. Tone disturbances precede the atrophy of the affected muscles and the electrical changes. This weakness occurs in the muscles of the neck or arms.

But even in tumors of the anterior aspect of the cord, especially if the tumors be soft and slow growing, the roots may be displaced without evident interference with their function. Lower motor

neuron lesions occur usually but not invariably in tumors of the cervical cord. It is likewise noteworthy that extreme muscular atrophies sometimes develop, in cases where the tumors are found to be situated posteriorly—a phenomenon explicable by anomalies of adjustment to pressure.

When pressure in the anterior horns or roots is detected, we can sometimes differentiate between these two sites. The paralysis tends to follow earlier in tumors of the horn than of the root. Fine fibrillary twitching suggests horn involvement, whereas myoclonus and contractures suggest root. But as I have mentioned, there may occasionally be no lower neuron signs.

All signs of upper motor neuron lesions in cord tumors tend to become bilateral. At first they are homolateral, although occasionally heterolateral. The initial sign of motor tract involvement is hyper-tonia below the level of the tumor, accompanied by exaggeration of the deep reflexes. Then the superficial or skin reflexes diminish or disappear. Next voluntary weakness occurs. This weakness usually appears first distally and gradually steals upward to the level of the tumor. The X-ray may reveal a supranuclear implication of the diaphragm.

In high cervical tumors the palsy, commonly at first homolateral, may be flaccid; if the palsy spreads, the flaccidity remains greatest at the site where it first appeared. In this palsy there are no fibrillary twitchings and no reaction of degeneration. Sometimes involuntary or decerebrate movements occur in the upper extremities.

In high cervical tumors the nature, site, and rate of growth, together with the capacity for adjustment of the canal contents, may give rise to no tract lesions, or to lesions which develop with great rapidity. And pressure conditions analogously lead to accentuation and mitigation of the pressure signs. The circumstances which increase intraspinal tension, already enumerated in relation to motor tract irritability, increase also the upper motor neuron signs.

Besides motor, sensory signs occur from tumor pressure. It is needful to distinguish carefully root from tract pains, for the accurate localization of the root pains permits us to fix the pressure level, the proximate tumor site. Tract pains can occur at diverse levels and are false guides to tumor localization.

Root pains are usually homolateral and correspond in level with the roots directly implicated or dragged on by the tumor. In the upper cervical region tumors give rise to root pains complained of in the mastoid region, in the nape of the neck, or in any part of the area between the shoulder and the vertex. These early pains usually

persist for some time before they subside. But during this painful period considerable changes in the severity of the pain may occur. And the pain passes, so that if the patient is not seen early, he may not complain. Even interrogation discloses root pains in not more than two-thirds of these tumor cases.

The absence of pain leads to the surmise that the tumor is of such a nature and locality that the spinal roots are neither compressed nor dragged on, in other words, that the tumor is small or the contents displaceable and situated anteriorly between the roots. Then the other signs are reviewed, to make choice between the various possibilities.

Objective sensory disturbances may take root or tract forms. In the sensory root disturbances the qualities common to such disturbances from other causes are unchanged. In the tract disturbances the signs vary according to the tract or tracts implicated. As with the motor, the sensory tract weakness begins usually distally and gradually spreads upward to the tumor level. The particular tract implicated depends on the part of the cord which the tumor compresses. Lateral pressure gives rise to dissociated sensory loss. Posterior pressure affects the pain and temperature tracts later than the ascending fibers which conduct the impulses which subserve posture and coordination. From the nature and distribution of the sensory loss we speculate on the position of the tumor, and particularly as to whether it is intramedullary or extramedullary in origin. Such speculation sometimes permits a probable diagnosis of the tumor site. But extramedullary tumors may as a late manifestation give rise to intramedullary signs and vice versa. For the pressure effects of the tumor may be dominated by factors other than the site at which the tumor originated. In this connection, I would emphasize again the influence of mobility, and especially the consequences of the displaceability of the contents of the blood vessels in determining the site of the lesion. Vibratory sensation is affected early.

In high cervical tumors the ascending fibers of the fifth nerve are said to be involved sometimes. In two cases of intramedullary tumors compressing the spinothalamic pathways, I could find signs of fifth nerve involvement. These cases were complicated by lesions higher up.

When tumors press on the posterior aspect of the cervical cord, marked astereognosis, disturbance in vibratory sense, and ataxia may develop, particularly in the upper extremities.

Besides sensory and motor consequences, tumor pressure of the cervical cord may disturb the controlled autonomic mechanism of

respiration. This disturbance arises when the tumor pressure affects the second and third cervical roots from which the phrenic nerve arises. The disturbance is manifested in paresis or paralysis of the diaphragm, following an irritative stage in which singultus, cough, dyspnea or vomiting may occur. Percussion and X-ray examination reveal the amount of diaphragmatic movement. Oppenheim detected the reaction of degeneration in the diaphragm by stimulating the phrenic in the neck, and examining the effect on the diaphragm by means of fluoroscopic screen. In supranuclear phrenic compression similar respiratory difficulties may occur. Such respiratory signs are of great value, for although they commonly occur late, when the stage of tetraplegia has arrived, sometimes they occur early, and may even precede by a considerable interval all other signs of cord compression.

Another early sign, frequently the first sign of cervical tumor, is bladder and rectal disturbance. This is a supranuclear disturbance, which diminishes voluntary control of the excretory sphincters. Urination is at first delayed, interrupted and difficult. Later retention occurs. Defecation is similarly affected. In both incontinence may follow retention.

Cervical tumors likewise affect the sexual mechanism. Sometimes priapism occurs; sometimes the power both of erection and of ejaculation diminishes and may disappear.

In the uncontrolled autonomic system the pressure of cervical tumors causes many disturbances. Transient or permanent bradycardias, due to vagal irritation occur; sometimes a typical Stokes Adams syndrome is evident, culminating in convulsive seizures. Irritation of the ciliospinal arc may dilate the pupil, widen the palpebral fissure, and cause exophthalmos on the same side as the tumor. And this irritation may be followed by paralysis, manifest in miosis and enophthalmos. Irritation of the vasomotor and secretory nerves of the face by cervical tumors may produce heat, redness, and hyperhidrosis, paralysis-cold, cyanosis and anhidrosis.

In addition to these signs, hyperthermia and hypothermia are occasionally noted. Nystagmus may be observed.

If the cervical tumor be situated at the uppermost segments, papilledema may be found. Such tumors lie within the foramen magnum or the fluid accumulation above them extends their pressure effects into the cranial cavity.

In diagnosing a spinal cord tumor, we have three primary problems: (1) the detection of the pressure it causes; (2) the localization of the level of that pressure, and (3) the situation of the tumor at

that level. As evidence of intraspinal pressure, the tension of the cerebrospinal fluid is valuable and its composition also. I have already referred to them. I would like to emphasize the dangers of spinal puncture in tumor cases. Death may immediately follow the withdrawal of spinal fluid in tumor cases, or acute swelling or hemorrhage may be induced in the tumor, giving rise to tetraplegia. So this aid must be used sparingly and cautiously in diagnosis. The initial sign of the cervical tumor may be a sphincter, sensory, motor or respiratory disturbance. The characters of these several disturbances have been briefly outlined. The presence of any one of these leads to the examination and discovery of its characters. Thence we establish one of the combination numbers which leads us to the search for the others. A sphincter lesion with cervical root pains with or without motor signs raises the presumption of the presence of a cervical cord tumor. Likewise, a characteristic respiratory disturbance with phrenic implication with or without sensory signs, leads to the search for vagal or cilio-spinal, or motor disturbance, and the finding of any one of these again raises the presumption of a cervical tumor. And so we proceed, from the suggestive sign to the corroborative. And remembering always that the presence of no single sign is essential, we establish the presence of the tumor and look for root signs, either motor or sensory, to locate its level. Having fixed the level, we next seek to infer the site of the tumor with reference to the various aspects of the cord, by deducing the cord area compressed from the symptoms of the compression. At the same time we may reach some appreciation of the size of the tumor. Then, from the history of the development of the symptoms, we speculate on the nature and rate of growth of the tumor. In all this, we are interpreting in terms of tumor qualities, the pressure exerted by a foreign body in an inextensible canal on contents of varying mobility and fixation. The accuracy of our interpretation depends on the careful and just weighing of all the discoverable evidence; and after that there still remains to keep us humble before cervical tumors the fallibility of our individual judgment.

The following cases will illustrate many of the points discussed in the body of the paper:

Case 1. F. C., a Russian, housewife, entered Montefiore Hospital March, 1900. Her family and past history have no bearing on her present illness. Two and one-half years ago the patient began to suffer from severe neuralgic pains over the left mastoid and occipital region. These pains were intermittent and after persisting for a few months disappeared. She then began to have numbness and slight weakness in the left lower extremity. Six months before

admission here her left leg became stiff and she began to have difficulty in walking. Soon after the right lower extremity became stiff and weak. Three months before admission, the left upper extremity became weak, and one month later the right arm became involved. There was some difficulty in her bladder control (partial retention). She also began to have difficulty in respiration.

Physical Examination—The patient was bedridden. There was a complete quadriplegia, and only slight movement of the head was

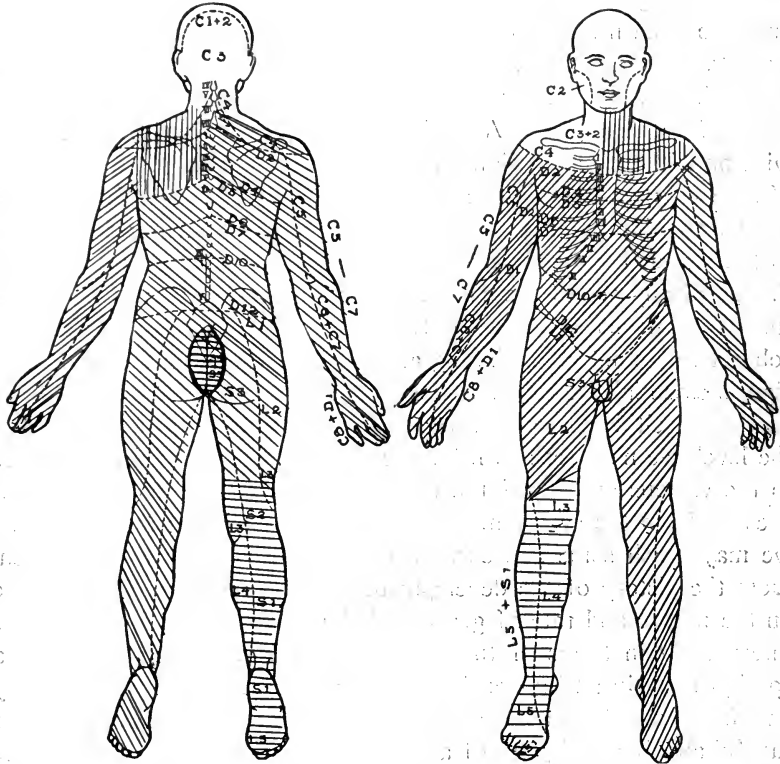


FIG. 1. || Hyperalgesia and hyperesthesia. // Hypalgesia. = Analgesia.
Touch and thermal disturbance in same areas.

possible. The breathing was labored and at times agonal. The movement of the diaphragm was limited. The pupils were equal and regular, and reacted to light and convergence. There was nystagmus in the lateral planes. The fundi were normal. The other cranial nerves were normal. The upper extremities showed a generalized atrophy. There were no fibrillary tremors. The deep reflexes were exaggerated on both sides. The abdominal reflexes were not elicited. The lower extremities were extremely spastic. Intense bilateral pyramidal signs were present. Sensory disturbances were most

marked on the right side and involved mainly pain and temperature. (Fig. 1.) An extramedullary tumor of the cord at the level of C 5 was suspected.

Operation—Under local anesthesia Dr. J. Erdman operated over this area, but no tumor was found. The patient died of respiratory paralysis about ten weeks after entering the hospital. Necropsy revealed a neuroma of the left occipital nerve. It extended anteriorly into the foramen magnum. It was attached by a frail pedicle and compressed the upper three cervical segments. Had the neuralgic pains along the course of the left occipital nerve been properly evaluated in localization, the tumor would have been found at operation.

CASE 2. I. L., aged fifty years, a Russian, a carpenter, a widower, first seen September, 1909, died July, 1910. His family and past history were negative. At the age of eighteen he fell from a scaffold. He landed on his head and lost consciousness for about half an hour. He remained in bed for six months, being unable to move his head. The condition was diagnosed as dislocation of the neck. Thirteen years ago he again fell from a ladder, having been well during the interval since his first injury. Four or five months following the second accident, while at work, he suddenly felt marked weakness in both hands and in the right leg. He lost sensation in the affected parts. He stated, however, that one year before his second injury, he noticed that the right index, middle and ring fingers felt as if they were frozen. This sensation also extended to a lesser degree over the right arm and right side of the chest. It disappeared in a few months. Shortly after his second fall he began to have girdle sensation about the waist, paresthesia in both legs, more marked on the right side. He also became impotent. Sensation in the right hand became impaired, and he began to walk with a spastic gait. Eight years ago he again fell from a ladder; he landed on his feet. He felt a sensation of heaviness in both feet. He could not walk or sit down. A few hours later he was able to walk with difficulty, and felt as if he were walking on carpet. He had a sensation of a tight band around his abdomen. He became incontinent. He remained in bed for ten months and gradually improved. One year ago he slipped on the ice and struck his right hip. He could not sit down or move his right side. He lost control of his bladder and rectum. He had a sensation of tightness about the chest. He has paresthesia in the right leg. He suffers occasionally from priapism. He also complains of weakness in both arms, more marked on the right side.

Physical Examination—The patient was a well nourished man. His musculature was poorly developed. The left pupil was irregular; both were equal; the right was somewhat sluggish to light. Accommodation and convergence reaction were good. The other cranial nerves and fundi were normal. The gross motor power was fairly good in the upper extremities, being slightly weaker on the right side. In the lower extremities the left was fair, while the right

was poor. The deep reflexes were present and active on both sides, the right more so than the left, in both the upper and lower extremities. The abdominal reflexes were not obtained. The cremasterics were present. There was bilateral inexhaustible ankle clonus and the Babinski sign was present. The sensory changes are shown in Fig. 2. There was decided wasting of the muscles of the right arm and small muscles of the right hand.

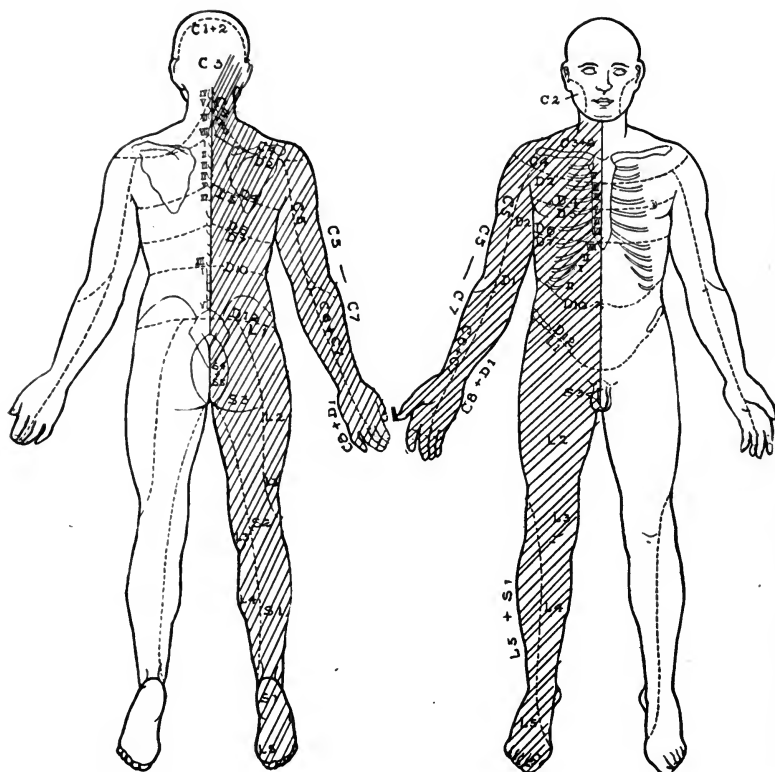


Fig. 2. Hypalgesia, hyperesthesia and slight disturbance in thermal sensibility.
// Deep muscle sense disturbed in right hand.

Course of Disease—About eight months after he entered the hospital, while being put to bed by an orderly, the patient's head was bent so that the neck was put on a stretch. Immediately following this the patient felt very weak, could not speak for a few minutes, and was unable to move any of his extremities. He remained in bed for about two months. He developed bedsores, became septic and died. Postmortem examination showed a fracture dislocation of the odontoid process, a new articulation having been formed, and a purulent meningitis.

CASE 3. D. C., aged thirty-seven, married, an Italian, came under observation January 7, 1911. His family and past history have no bearing on present condition. He is married and has two healthy children. His wife has had no miscarriages. He uses tobacco excessively. About thirteen months ago he began to have a sensation of numbness on the left side of his face; this numbness gradually extended and involved the head, neck and upper extremity. Shortly after he began to have weakness in his left arm. For the past twelve months he has had shooting pain in the left side of his

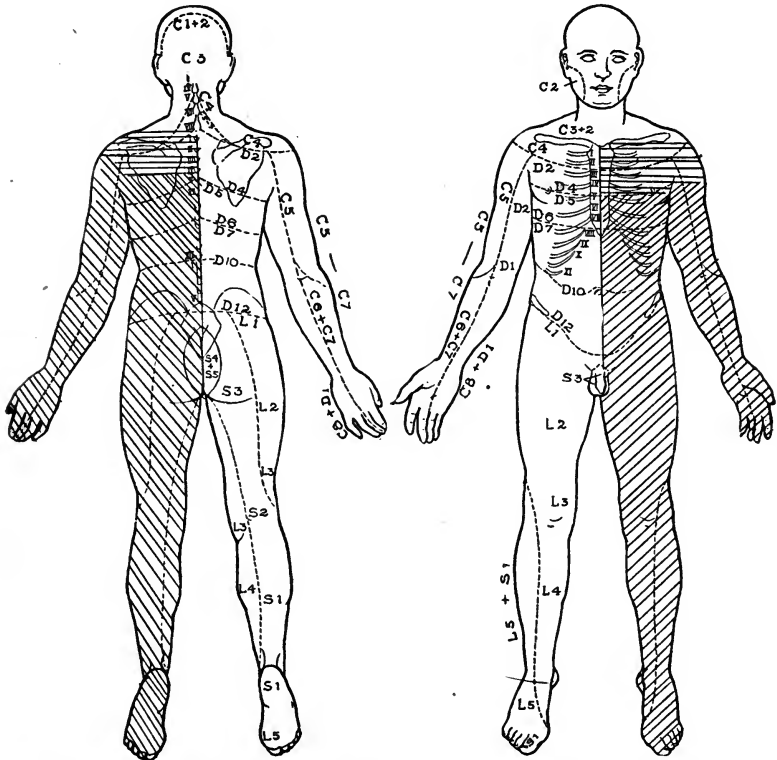


Fig. 3. = Anesthesia. // Hypalgesia. Touch diminished over same area as the hypalgesia.

face and left arm. For the past six months he has had increased difficulty in walking. His feet feel as if they were wooden. He feels as if something were creeping up and down his upper and lower extremities. His right arm has also progressively become weaker. For the past two months he has been impotent. He has had constipation for the last three weeks. He has difficulty in bladder control.

Physical Examination—The patient is a large, well nourished man. He walks with a spastic gait. His left arm is held in a

hemiplegic attitude. The fundi and visual fields are normal. His eye movements are normal in all directions. The motor fifth is normal; sensory fifth shows slight diminution of touch, pain and temperature on the left side; the corneal reflex is diminished on the left side. There is slight left facial inequality and a slight diminution of hearing on the right side. Speech is not disturbed. There is marked atrophy of the left trapezius and sternomastoid muscles and atrophy of the muscles of the shoulder girdle. The patient cannot raise the left arm at the shoulder. There is marked spasticity in the left arm, with marked atrophy of all of the muscles. The deep reflexes are more active and greatly increased on the left side. Muscle irritability is increased. There is no weakness or atrophy in the muscles of the trunk. The abnormal reflexes are diminished on the left side. There is no atrophy in the muscles of the lower extremities. The muscle tone is increased more on the left side. The deep reflexes are lively, the left being greater than the right. Ankle clonus and a well defined Babinski sign were elicited on the left side, and a doubtful Babinski phenomenon was present on the right side. Sensory disturbances were found as illustrated in Fig. 3.

The blood Wassermann reaction was negative. Eight c.c. of spinal fluid were obtained. The globulin content was normal and the Wassermann reaction was negative. The X-ray examination was negative. The electrical responses were less vigorous on the left side, but no reaction of degeneration was obtained.

Course of Disease—At operation an intramedullary tumor was found at the level of C 3 extending upward. The patient died of respiratory paralysis three days after the operation. Postmortem examination showed that the tumor extended into the medulla.

CASE 4. E. G., aged fifty-two, a Russian, widow, was admitted March 21, 1913, and died June 6, 1914. Her family and past history were negative. Fifteen months ago the patient began to suffer from severe temporal headaches. These headaches were intermittent in character. Six months ago the right arm and hand became painful and swollen and gradual loss of power was noted. Four months ago the right leg gradually became weaker. For the last two months the left arm and hand have also become weak and at times swollen and painful. For the past few months the patient has complained of precordial pain and has suffered from dyspnea.

Physical Examination—The patient is a poorly nourished woman. She is unable to stand or walk. Slight dyspnea is present. Her pupils are equal and regular and react promptly to light, convergence and accommodation. The fundi and other cranial nerves are normal. There is marked weakness in both the upper and lower extremities. On the right side the paralysis is almost complete. The tone is diminished on both sides. The deep reflexes of the upper extremity and the abdominal reflexes were not elicited. The right knee jerk is more active than the left. Ankle clonus is present on the right side. The left Achilles reflex was not elicited. The Babinski

response was obtained on the right side. The sensory changes are shown in Fig. 4.

Course of Disease—The patient died on June 6, 1914. At necropsy an intramedullary neoplasm in the upper cervical region was found. It was reported to be a gliosarcoma.

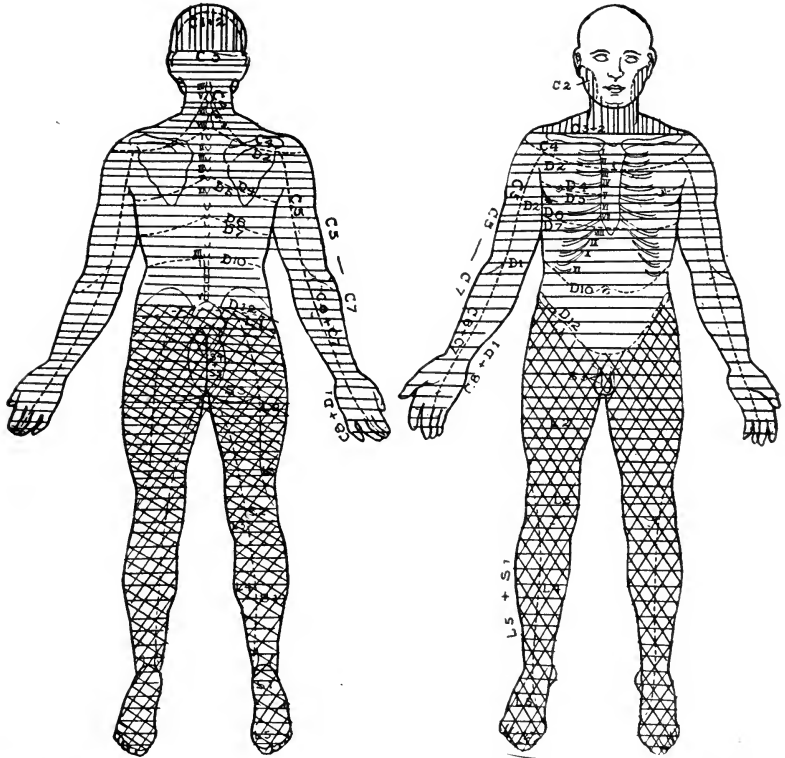


Fig. 4. || Hyperalgesia. = Analgesia. × Disturbances in thermal sensibility.

CASE 5. I. B., age twenty-four, came under observation October 2, 1914. The family and past history has no bearing on the patient's illness. About two years ago he began to complain of epigastric pressure and a feeling of fullness soon after eating his meals. He was nauseated but never vomited. These gastric symptoms persisted up to the time he came under observation. In April, 1914, the patient began to complain of sticking pains over the right acromioclavicular region. This pain gradually extended and within four weeks the interscapular region and the right shoulder were involved. The pains were severe and still persist. Six weeks ago the patient noticed that when his bowels moved the pain extended to the small of his back on the left side and radiated to the left iliac

region. He had difficulty in passing his stool. When standing, the patient complained of sticking pain in the inner part of his right thigh, and sometimes a less severe pain in his left thigh. For the last six weeks there has been a feeling of heaviness in the right forearm below the elbow. The right hand became swollen at times and the power has greatly diminished in it. He did not recognize objects placed in the right hand. His feeling was diminished and he had a sensation of coldness in the right upper extremity. He had cramps in the muscles of the left hand. On account of pains in his thighs, he had not walked for the last six weeks. He had difficulty in raising

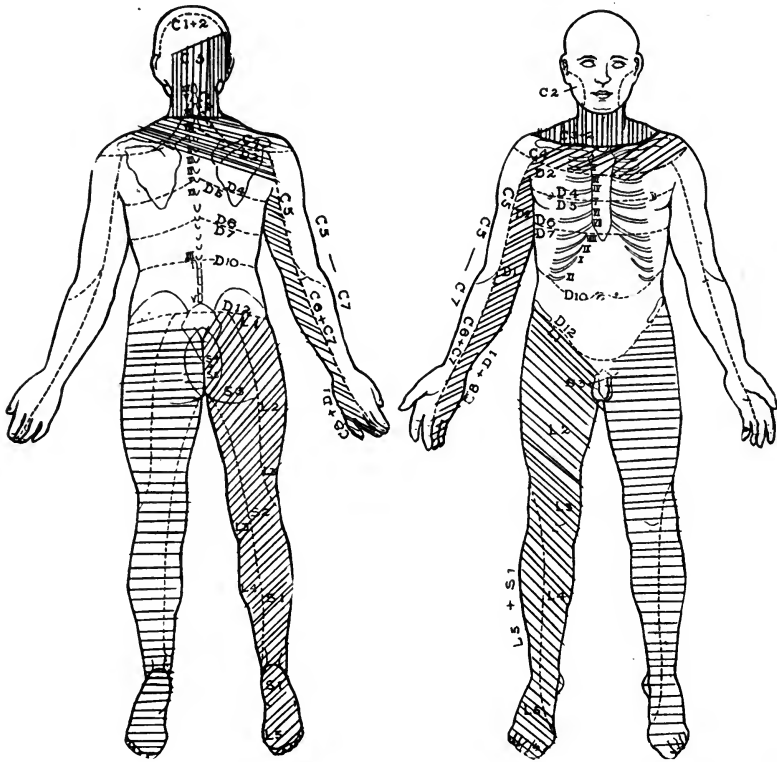


Fig. 5: || Hyperalgesia. // Hypalgesia. = Analgesia.

himself from a recumbent to a sitting position. He complained of a sensation of coldness in his spine from the upper dorsal to the sacral region. He had lost fifteen pounds in the past nine months. His bladder control had not been disturbed.

Physical Examination—The patient is a fairly well developed and well nourished man. He walks with a spastic gait, worse on the right side. His head is held rigidly. His pupils are equal, regular and react promptly to light and convergence. There is a nystagmoid movement present on looking in the extreme lateral planes. There

is a slight facial asymmetry. The jaw deviates to the right, and there is weakness of the right temporal and masseter muscles. The fundi and other cranial nerves are normal. There is marked wasting of the shoulder girdle muscles on both sides, also in both pectorals and the intrinsic muscles of both hands, more marked on the right side. The deep reflexes at the elbow and wrist are present and more active on the right side. There are fibrillary tremors in the muscles of the right arm. The upper abdominals are present, the middle are less active, while the lower ones are not elicited. The lower extremities are spastic, the muscles are hypertonic, and the deep reflexes are exaggerated, the right being greater than the left. No ankle clonus was obtained, but the bilateral Babinski was elicited. Muscle power is diminished in the right arm and leg. The head is held rigidly but can be moved in all directions. The sensory disturbances are shown in Fig. 5.

The blood Wassermann was negative. The first lumbar puncture showed a clear spinal fluid. The second was lemon colored, and was under considerable pressure. The Wassermann reaction was negative. Electrical reaction of the muscles did not show any reaction of degeneration.

Operation—At operation a tumor was removed from the posterior surface of the cord. It was extramedullary, intradural and extended from the foramen magnum to below C 6, which was the lower lamina removed.

CASE 6. F. G., age sixty, came under observation April 30, 1917. Her family and past history have no bearing on her present condition. She has been married for the last thirty-four years, and has six children living and well at the present time. Three years ago she suffered from an acute attack of pain on the right side of her neck and in the occipital region; this pain lasted for three weeks and has not recurred up to the time of the onset of her present illness. In November, 1916, about six months before the patient came under observation, she began to have a pain in the neck and in the occipital region on the right side. She next noticed that her right arm felt numb, and that it was progressively getting weaker. About two months after the onset of her illness she suffered from bladder disturbance for which she had to be catheterized for one week. During the next month she suffered from "drawing pains" over the entire body, followed by a feeling of stiffness and a smothering sensation in the chest. At the same time she began to feel numb over the entire body, most marked in the right arm and in the trunk. About the middle of March the right arm had become completely paralyzed, and she noticed that her left arm began to get weak. This weakness has also become progressively worse. For the past month she has had to be catheterized. The pain in her neck and in the occipital region has become constant and boring in character, with occasional sensations of numbness over the neck and occiput. Since January she has not been able to stand on account of weakness in her legs. Since the onset of her illness she has lost forty pounds

in weight. Her bowels are regular. She sleeps well. She has become anxious, fearful, timid, apprehensive and very irritable.

Physical Examination—The patient is a well nourished and rather obese woman. She is unable to stand or walk. She lies in bed without moving the head or body because of pain. Her left pupil is larger than the right, both are regular and react promptly to light and convergence. The fundi are normal. Other cranial nerves are intact. There is marked weakness in both upper extremities; in

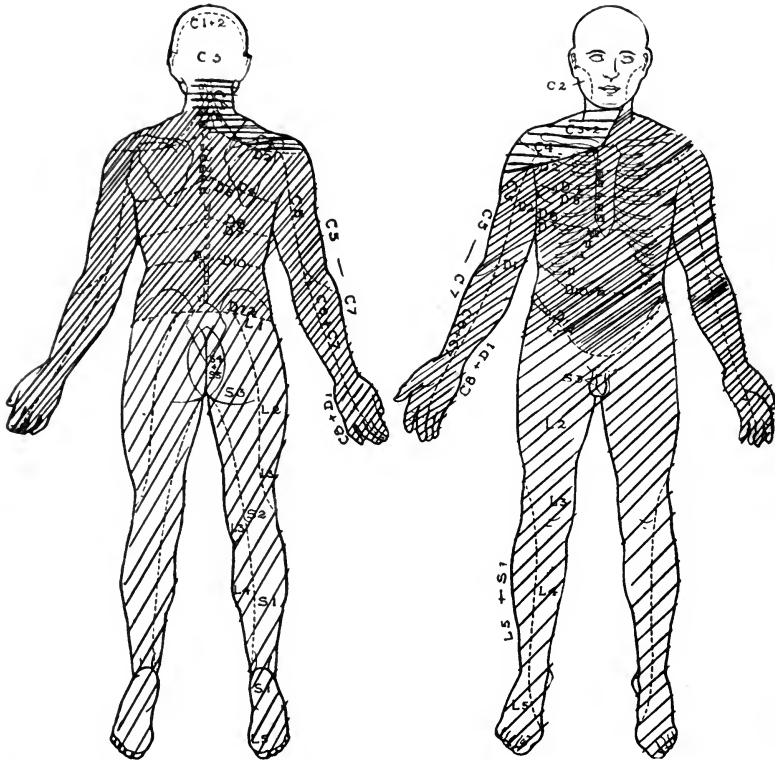


Fig. 6: = Almost anesthesia. // Hypalgesia and hypesthesia. // Hypalgesia and hypesthesia less marked. Temperature disturbed over entire area. Deep muscle sensibility lost in both hands.

the right arm only flexion and extension to a slight degree is possible. The grip on the left side is poor and nil on the right side. The deep reflexes at the wrist and elbow are present and about equally active on both sides. Deep muscle sensibility is lost on the right side. The abdominals were not elicited, possibly on account of flabbiness of the abdominal wall. The lower extremities show moderate spasticity and atrophy in some of the muscles. The muscle power is fair. All signs are more marked on the right side. The knee jerks are exaggerated on both sides, while the ankle jerks

are very much less active but equal on both sides. There is no ankle clonus, but a suggestive Babinski response was obtained on the right side. There is marked tenderness to percussion and deep pressure over spines C 2, C 3, C 4, cervical vertebrae. The sensory changes are illustrated in Fig. 6.

Her blood Wassermann reaction was negative. The spinal fluid showed a cell count of two cells; the globulin was normal and the Wassermann reaction was negative. The roentgenogram of the spine was negative.

Operation—At operation a large cyst was found impinging on the upper part of the cord and extending into the posterior fossa. It was evacuated, and at a later date two dermoid cysts were removed from the posterior fossa.

CASE 7. I. B., age fourteen, born in the United States, entered the hospital December 27, 1920. His family history was negative. He had measles at the age of three years, scarlet fever at the age of four, diphtheria at the age of six, and chickenpox at the age of ten. On account of poor physical development the patient was sent to camp in October, 1918. In June, 1919, he returned. A few days later he lost control of his bowels. He worried a great deal about it and refused to leave his home that summer. In September, while at school, he again lost control of his bowels and noticed there was urgency in micturition. He also noticed that he was gradually losing power in all his extremities. This weakness was more marked in the lower extremities. His knees turned in and he walked on the borders of his feet. Owing to the urgency of micturition and the uncertain rectal control he had to leave school. The weakness in his extremities gradually became worse. In July, 1920, he began to have marked dyspnea. He also noticed that his hands became stiff, and that he occasionally had jerking movements in the legs. There was occasionally priapism just before passing his urine, or sometimes by mere handling in the act of micturition. Nocturia, but no definite polyuria, was present.

Physical Examination—The patient is pale, poorly nourished, and chair ridden. There is slight torticollis, the head being tilted toward the right, and the chin pointed toward the left shoulder. The respiratory movements are performed with the aid of accessory respiratory muscles, and are jerky and spasmodic in character. Occasionally there is a deep sighing respiration. The head shows evidence of an old hydrocephalus. The pupils are equal, regular, and react promptly to light and convergence. There is slight nystagmoid movements in both lateral planes, especially on looking to the left. The fundi are normal. With the exception of the torticollis on the right side, all the cranial nerves are normal. Both upper extremities show marked weakness, the left more than the right. The left arm is rigid and shows the cogwheel phenomenon. Muscle tone is increased on the left side. There is no distinct atrophy, tremor or ataxia. The deep reflexes of the upper extremities are increased on both sides and are slightly more active on the

left than on the right side. The abdominals are present on both sides and somewhat more active on the right side. Both lower extremities show some diminution in power. The knee and ankle reflexes are lively on both sides, the left being more so than the right. Ankle clonus, the Babinski sign and its modifications are present on both sides. There is tenderness to pressure over the spines of C 1, C 2, and C 3, cervical vertebrae. Sensory disturbances as in Fig. 7.

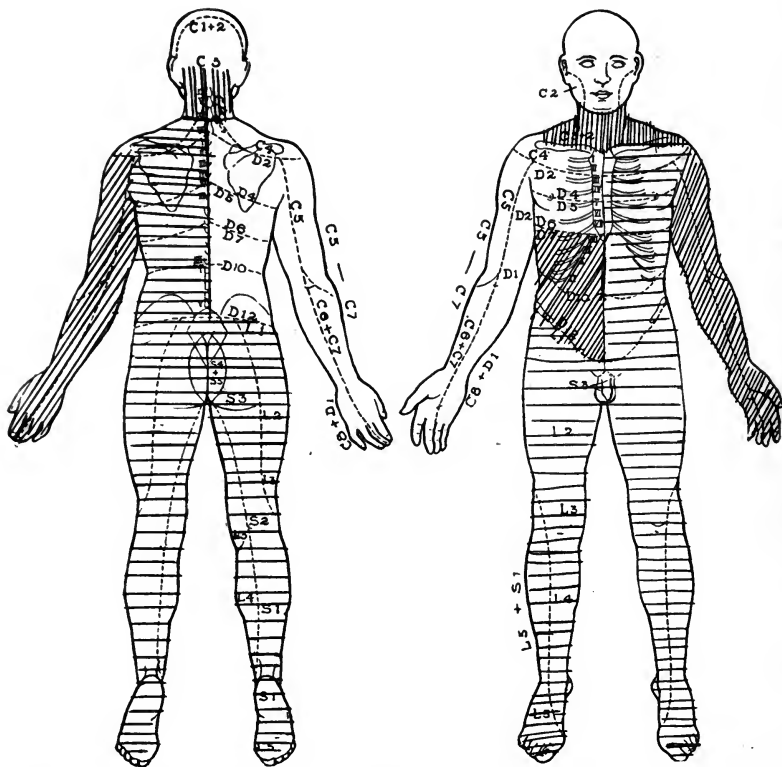


Fig. 7: || Hyperalgesia. // Hypalgesia and hypesthesia. = Analgesia.

Operation—Operation was suggested but consent refused. The patient gradually grew weaker, decubitis developed. He died suddenly of respiratory paralysis about three months after admission to the hospital. At postmortem examination an osteoma of the odontoid was found.

CASE 8. F. S. entered the hospital January 4, 1921. Her family and past history have no bearing on her present illness. About one and one-half years ago the patient began to have pain in the occipital region. This pain was sharp and cramplike and radiated up toward both ears. Following this she noticed a sensation as if something

was pressing on her head. When lying on a pillow she states that she felt as if she were lying on a stone. About this time she noticed that her right arm and her right leg became weaker and that she would drop things from her right hand. Her symptoms gradually grew worse. About four months ago she began to have difficulty in urination. She would have frequent desire but was unable to void her urine. She became obstinately constipated. Gradually the left side became involved. She began to suffer from drawing sensations in all her extremities.

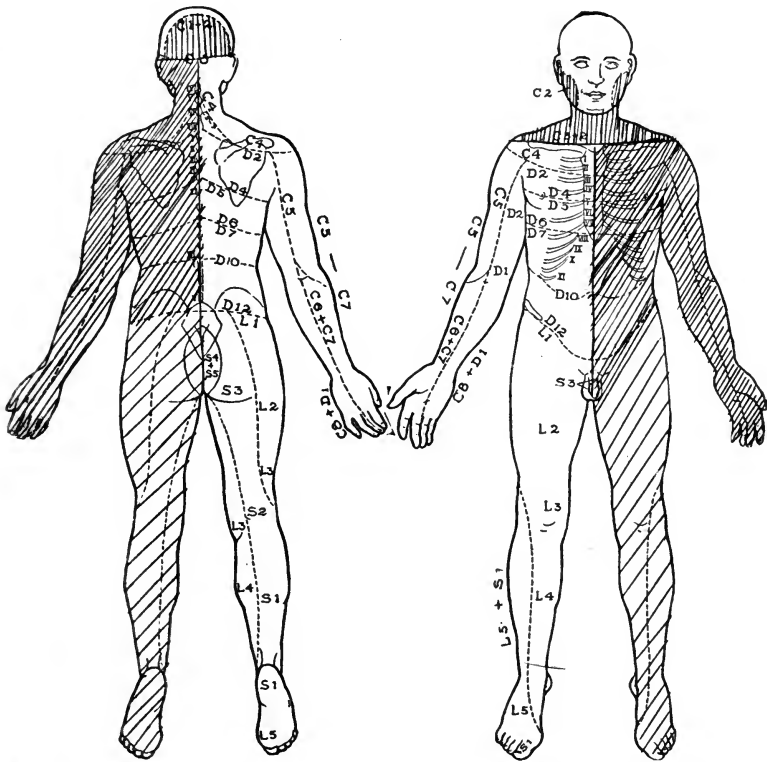


Fig. 8: || Hyperesthesia and hyperalgesia. // Hypalgesia. // More marked hypalgesia. Thermal sensibility altered in the same areas.

Physical Examination—(By Dr. Abrahamson) The patient is a well nourished woman. She cannot stand or walk on account of weakness and extreme spasticity of her lower extremities. Her pupils are equal and regular and react promptly to light and convergence. The fundi are normal. There is a marked nystagmus in both lateral planes. The sensory and motor branches of the fifth nerve are normal. The facial enervation is equal on both sides. The tongue deviates slightly to the right and shows some fibrillation. The jaw reflex is lively. Pharyngeal anesthesia is present. There

is wasting of the left sternomastoid and trapezius muscles. The neck is held rigid and there is tenderness to percussion and deep pressure over the upper cervical spine. The movement of the head is limited; at times there is some retraction and tendency to cephalop-tosis. The breathing is labored and diaphragmatic, and at times tends to be agonal in character. There is weakness of both upper extremities, the right greater than the left. There are no muscular atrophies; the tonus is increased in the arms, but the hands and wrists are more flaccid. The deep reflexes at the shoulder, elbow and wrist are exaggerated on both sides. The abdominal reflexes were not elicited. There is marked spasticity of the lower extremities. No atrophy is present in any of the muscles. The knee and ankle clonus are present. The bilateral Babinski sign with all its modifications was over C 1 and C 2. Below this, disturbance in pain and temperature is present on the left side, with a maximum disturbance in the sacral and lumbar region. (Fig. 8.) The diagnosis of extramedul-lary tumor on the right side at the level of C 2 and C 3 was made.

Operation—Under local anesthesia the patient was operated on by Dr. H. Neuhof. An extramedullary tumor was found pressing on the upper cervical cord and extending into the posterior fossa. The patient died four hours later of respiratory paralysis.

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LUMBO-SACRAL PAIN AND SACRALIZATION OF THE
FIFTH LUMBAR VERTEBRA COMPLICATED BY
INVOLVEMENT OF THE SPINAL CORD *

By ALFRED GORDON, M.D.

PHILADELPHIA

Pain in the lumbo-sacral region may originate from various sources. Affections of the soft or bony tissue at that level are very common. Diseases of the spinal cord and especially of the roots emanating from it through the intervertebral foraminae are quite frequently the cause of pain in the back radiating toward the lower limbs. Among the less frequent and less known etiological factors are anomalies of the structures, and among them sacralization of the fifth lumbar vertebra is the most striking.

This abnormal condition consists of an exaggerated development of the transverse apophyses of this vertebra, thus resembling in dimensions and in shape the ala of the sacrum.

As to their relation to the sacrum itself, there are variations: in some cases they are merely in close contact with it, in other cases they form an articulation with it, and finally in a third group of cases they are welded or so intimately united with the sacrum as to give the impression of supplementary sacral ala. In the latter case the lumbo-ilio-sacral space, through which the fifth lumbar nerve passes, is considerably reduced and is transformed into a real sacral foramen.

The symptoms which accompany the malformation under discussion will depend upon the variability in the relationship of the sacrum and apophysis of the fifth lumbar vertebra. There may be no subjective or objective phenomena whatsoever or else the disturbances may be pronounced. According to Aimes¹ in 17 per cent of cases the clinical manifestations are very slight and in 14 per cent quite pronounced.

In considering sacralization of the fifth vertebra in connection with persistent pain in the lumbo-sacral region, one must bear in mind the possibility of other sources of pain when it accompanies a sacralized apophysis of the last lumbar vertebra. Foreign bodies,

* Read and patient exhibited at the February meeting of the Philadelphia Neurological Society.

¹ Progrès Médical, 1921; No. 33, 13 Aout.

tuberculous lesions of the vertebra, may give rise to identical pains. A systematic search for all such causes must be made in every case of a painful back, especially when the discomfort is confined to the lumbo-sacral area.

A complete study of sacralization of the last lumbar vertebra embraces not only the above-mentioned anatomical arrangement but also the mode of its development as well as the clinical manifestations when they are present.

The mechanism of sacralization is dependent on primary and secondary ossification processes of the fifth lumbar vertebra. The classical conception is that the ossification is performed in two periods: primary and secondary. The primary points of ossification appear first during the third month of intrauterine life and terminate in the ninth year. At that time the median and lateral portions of the body of the vertebra become ossified. The second ossification period commences at the age of sixteen and continues until the age of twenty-five. During that period complementary points of ossification make their appearance and the number of the latter varies with the location of the vertebrae, each transverse apophysis has one complementary ossification place. Sacralization of the transverse apophyses of the fifth lumbar vertebra is due precisely to a hyperactivity of the complementary ossification points; under the influence of some exciting cause those processes may assume a pathological course and develop a sacral type. It may also happen that the excessive growth of the apophyses of the lumbar vertebrae may be in inverse proportion with the growth of the first part of the sacrum: while the former grows unusually rapidly, the growth of the latter is delayed.

The age at which the hyperactivity of the osteogenic energy makes its appearance varies from one individual to another and the date of appearance of the clinical symptoms is dependent upon the pathological ossification. Cases have been reported in which sacralization was discovered as early as at the age of five. Quite recently Ledoux et Caillods¹ described a case of a girl of five and one-half years of age who complained of pain in the right hip. She limped slightly while walking. Radiographic examination revealed a very large transverse process of the fifth lumbar vertebra, the outer portion of which was in close contact with the corresponding portion of the sacrum which normally articulates with the ala of the ilium. The latter is diminished in size and its surface of contact with the iliac bone is also reduced. While the average age at which the

¹ Presse Médicale No. 13, 1921, p. 123.

symptom appears is about twenty-six, nevertheless, they may appear even at forty-eight, as some reports testify. Five and one-half, sixteen, thirty-two, thirty-four, thirty-seven, and forty-eight are the ages mentioned by writers.

Various opinions have been expressed regarding the pathogenesis of the painful phenomena in the sacralized fifth lumbar vertebra. The most logical one is that expressed by Bertholotti and Nové-Josserand,¹ viz., that there exists a relationship between the termination of the ossifying process of the transverse apophysis of the fifth lumbar vertebra and the onset of the clinical symptoms. In the case of the infant just mentioned, the ossification occurred at five and one-half years, while in the patient of forty-eight years of age the complementary ossification took place only at that age.

The clinical picture of the affection under discussion presents pain in the lumbo-sacral region as its most conspicuous manifestation. It may be unilateral when only one apophysis is sacralized, or bilateral when both vertebrae are involved. In the former, the pain frequently spreads to the unaffected side, but the seat of the greatest intensity is on the side involved. In the bilateral cases the pain may radiate down in the lower extremities as far as the knees or ankles. The pain itself is continuous, but there are occasional exacerbations when the individual fatigues himself unduly, or else when, particularly in cold weather, the surrounding temperature changes. Sitting or standing for a more or less prolonged time aggravates the condition and the pain is increased when the patient attempts to change his position, from sitting to standing and *vice versa*. The radiating pain of the lower limbs frequently simulates sciatica, but the typical signs of the latter are usually wanting, such as Laségue's sign, etc. In some cases the radiation of pain is directed toward the lower abdomen, in others the pain is strictly confined to the lumbo-sacral region on one or both sides.

The patient's attitude in standing or in sitting, and in walking is characteristic. His body is more or less inclined forward according to the degree and character of the sacralization. The back is kept rigid in any position or during any direction of the body. The lumbar region loses its natural lordosis, appears flat, short and compressed. On the other hand an asymmetry of the sacro-iliac region, a kyphoscoliosis of the lumbo-sacral region, elevation of the postero-superior spinous process of the ilium with elevation of one side of the pelvis, such as may lead to claudication—all these symp-

¹ Presse Médicale No. 13, 1921, p. 124.

toms will lead one to suspect a unilateral sacralization on the concave side of the scoliosis.

Most frequently the pain and the bodily position constitute the entire symptomatology of the condition except perhaps the inability or difficulty of doing manual labor, also the discomfort in walking, the sleeplessness, the loss of appetite and the pallor of the face. Exceptionally one meets with symptoms of a more serious character; they may indicate not only a compression of the roots and nerves passing through the intervertebral foramina which by reason of an excessive enlargement of the transverse processes of the fifth lumbar vertebra became narrow, but also an involvement of certain tracts within the spinal cord evidently secondary in its development.

The following case presents such an occurrence:

N. C., business man, thirty-six years of age, commenced at the age of twenty-six to suffer from pain in the lumbo-sacral region. It would radiate upward toward the cervical spine and downward toward the coccyx, also around the waist on both sides. Gradually stiffness of the back set in. The latter progressively increased. He suffered considerable discomfort so that on many occasions he was compelled to give up his work.

Presently the patient presented the following picture: The trunk was bent slightly forward, which is particularly evident in walking. He was unable to fully display the bending of the knees or the lifting of his feet off the floor. While there was no impairment of power in the muscular group of the lower extremities, nevertheless the patient could not move about very freely because of the rigidity of the back and because of the forward inclination of the trunk. The latter interfered with and limited all movements in which the trunk participated, such as sitting down or getting up, turning around, leaning backward, etc. The pain in the lumbo-sacral region was constant and radiated forward around the abdomen in its lower portion.

About eight months ago pain in both lower extremities also appeared, the latter was not continuous, but appeared in paroxysms especially when the pain in the back became aggravated. The pain was than lancinating in character. It spread over the entire surface of each leg but especially over its external surface where it was most pronounced. Between the sharp attacks there was frequently a sensation of burning and sometimes a sensation of heaviness in the legs. The latter was getting more and more pronounced: the patient had some difficulty in going upstairs, climbing a hill, or walking to an elevated place.

The objective sensibility in the lower limbs was normal: all forms of sensations were preserved and intact. The tendon reflexes were markedly increased and the plantar reflex was of the extension type by both methods—Babinski's and the writer's—all showing an

involvement of the motor tract. The sphincters were normal. The upper extremities were normal. The cranial nerves were intact. There were no pathological eye symptoms.

The patient was pale, he ate very little and his sleep was frequently interrupted because of pain; he experienced a difficulty in changing his position in bed and when he did it, he suffered pain.

Urinalysis negative. Wassermann of the blood negative. A spinal puncture for an examination of the cerebrospinal fluid was declined by the patient.

An X-ray examination of the spine showed clearly a bilateral sacralization of the transverse processes of the fifth lumbar vertebra, particularly on the right side where the apophysis forms body with the ala of the iliac bone. On the opposite side the contact of the two bones was not intimate in toto, but only partially; the process, however, was large.

To sum up, we are dealing here with a case in which painful manifestations commenced at the age of twenty-six. They remained confined to the lumbo-sacral region until the age of thirty-five when gradually the pain commenced to radiate from the back down in the lower extremities. At the same time abnormal reflexes made their appearance, which indicated an involvement of the motor pathway in the spinal cord. The cycle of events clearly showed an involvement of the spinal roots and successive pathological changes in the spinal cord along a system of fibers endowed with a motor function.

In discussing the material osseous changes in cases of sacralized vertebrae it was pointed out that in such cases the roots passing through narrowed intervertebral foramina are bound to suffer from compression and thus cause painful phenomena. After eight or nine years of a state of irritation and perhaps of inflammation a secondary involvement of a certain pathway within the cord occurred. But whether the degenerative changes of the motor tract developed by a process of direct extension from the roots or by intermediary of the cells of the anterior cornua in a manner of a distant reflex action, it is difficult to say, as no postmortem examination of the cord tissue has been made. Other evidences of spinal cord involvement have been reported in the lower extremities by some writers, such as: muscular atrophy of myopathetic type, diminution of the patellar tendon reflexes, diminished electric contractility with reaction of degeneration in the gluteal muscles, hypo- and hyperesthesia.

The present case is interesting from the following standpoints:

First. As an example of sacralization of the transverse processes of the fifth lumbar vertebra. It adds a new case to the few reported in literature.

Second. The sacralization is unevenly distributed, more on one side than on the other.

Third. The onset of the painful phenomena at a mature age, viz., twenty-six, demonstrating a late ossification of complementary points in the transverse processes of the fifth lumbar vertebra.

Fourth. The presence of symptoms referable to the spinal cord.

In considering the latter manifestations a question naturally arises whether the cord symptoms antedated the symptom-group



Radiograph of patient described.

caused by the sacralization of the lumbar vertebra, or the two conditions developed parallel and independently of each other. The fact that during a period of eight years the pain was confined to the lumbo-sacral region and only at the beginning of the ninth year it commenced to extend downward in the lower extremities, favors the

conception of one condition following secondarily another. It is true that no record was kept or given concerning the state of the reflexes during the first few years of the patient's malady, but it is difficult, if not impossible, to assume the existence of a degeneration of the motor pathway in the spinal cord during all the years of the patient's affection in view of the absence of typical symptoms. Eight years are sufficient to present a very pronounced picture of lateral sclerosis, which is wanting now.

The onset of the radicular pain in the lower extremities only recently together with the absence of rigidity in them, indicate that the cord involvement is of a late development and subacute in its pathological process. The entire course of the disease points strongly to an involvement of the spinal cord secondarily to the original involvement of the roots. From the latter standpoint the present case is unique.

1812 Spruce Street.

SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

THE FOUR HUNDRETH REGULAR MEETING, TUESDAY, DECEMBER 5, 1922, THE PRESIDENT, DR. FOSTER KENNEDY, PRESIDED.

CASES ILLUSTRATING SOME ASPECTS OF BRAIN AND SPINAL CORD TUMORS

Dr. Charles A. Elsberg presented this paper:

Case 1. A patient upon whom a laminectomy had been performed, with removal of an extramedullary leiomyoma at the second and third cervical segments, secondary to a tumor of the neck removed eighteen months previously.

The patient, E. H., a civil engineer, fifty-three years of age, was admitted to the Neurological Institute on January 2, 1922. He had had a neuralgia of the left side of the face for a number of years, which was relieved by the extraction of some of his teeth. In 1915 he had a small growth on the right side of the neck, which slowly increased in size and was accompanied by pain in the back of the neck. In 1920 he was operated upon by Dr. John Worcester, of New York. At this time the tumor was as large as a hen's egg, situated in the anterior triangle of the neck on the right side. At the operation the tumor was found to be located underneath the large vessels; it was adherent to the deep muscles of the neck and lay against the transverse processes of some of the cervical vertebrae. The tumor was well encapsulated, and in one spot seemed to extend into an intervertebral foramen. The pedicle extending into the foramen was ligated and cut, and the entire growth removed. The pathological diagnosis was of branchiogenetic origin leiomyoma.

A few months before the operation for the deep tumor of the neck, the patient began to suffer from pain in the back of the neck, on the right side, which radiated up into the head; this pain was very severe at times; it was not much relieved by the removal of the tumor from the neck. Six months after the neck operation, the patient noticed that the right index finger was becoming weak so that he could not move it as well as the other fingers. The weakness gradually involved the entire hand and limb. One week later, there was a beginning loss of power in the right lower extremity, and finally he had little use of the right arm and diminished use of the right leg. At this time he noted that the left lower extremity and soon afterwards, the left upper extremity were becoming weaker. He was operated upon in another hospital in August, 1921; a laminectomy in the lower cervical and upper thoracic region was per-

formed but no tumor was found. The patient was not improved after the operation, and his symptoms steadily progressed. The pain in the neck which he had had continually, became very severe and was most comfortable when in a recumbent position. He has at times complained of an exquisitely cold sensation in the hands and feet, more especially on the right side. The weakness in the limbs has gradually grown worse so that he has been bedridden for two months, with almost complete loss in the power of both upper and lower extremities. For the past month before admission to the hospital he has been incontinent of urine and feces. The pain in his neck has been very severe, so that he could not move his head in any direction.

When the patient was admitted to the hospital, the physical examination showed the following: The patient was a tall, strongly built man who was considerably emaciated; he was delirious at times and complained of great pain in his neck. The right pupil was slightly smaller than the left, but both pupils reacted promptly to light and accommodation; the fundi were normal, although the retinal veins were somewhat overfilled. Right upper extremity: power at shoulder, elbow and wrist, 0. Slight flexion and extension of the fingers were possible but the movements of the index finger were slight. Left upper extremity: slight abduction and adduction at shoulder was possible; also slight flexion and extension at elbow; there was good power at the wrist; flexion of fingers, fair; extension of fingers, weak. Pronation of forearm, weak; supination of forearm, 0. Pectoral reflexes, weak on right, normal on left. The biceps and triceps reflexes were markedly exaggerated on both sides. The radial and ulnar reflexes could not be elicited on the right, and were weak on the left. Complete loss of power of abdominal muscles; abdominal and cremasteric reflexes could not be elicited. The right lower extremity was decidedly weaker than the left, and the power of both limbs was greatly diminished. The suprapatellar, patellar and Achilles reflexes were weak on the right and left; there was double Babinski, but no Chaddock, Oppenheim, Gordon or Mendel.

The disturbance in tactile, pain and temperature sensibility involved the entire body from the second cervical segment downwards. The disturbances in joint and vibratory sensibility involved the greater part of the body. There was marked tenderness on pressure over the upper cervical spinous processes. X-ray examination was negative. Lumbar puncture showed: fluid clear; 6 cells to the cubic millimeter, globulin 3+; Wassermann negative.

On January 7, 1922, a laminectomy was performed with removal of the arches of the second, third, and fourth, and part of the arch of the fifth cervical vertebrae. Incision of the dura exposed a well-encapsulated tumor, firmly adherent to the dura, about 3 x 2 cm. in size, at the level of the second cervical segment. The tumor lay ventrolaterally on the right side and into it ran the third cervical root. The tumor had a projection which extended through the dura

at the level of the intervertebral foramen between the second and third cervical vertebrae, but there was no evidence of tumor on the outside of the dura. The third cervical root on the right side was divided just inside of the dura and the tumor removed in toto with its capsule. The cord was pushed markedly to the left and was much flattened, and the arachnoid was distended above and below the tumor.

Improvement in the power of the upper limbs was noted by the patient as soon as he awoke from the anesthesia, and the return of power and sensation was so rapid that in three weeks he was able to move the right upper extremity with almost normal force at the shoulder, elbow and wrist, and was able to move all of the fingers of the right hand. The power in the right lower extremity was also greatly improved. The left upper and lower limbs could be moved with normal strength in all directions. There was a correspondingly well advanced improvement in the sensation of the body. The joint sense disturbances had not improved, but vibratory sensibility had returned in both lower limbs. The patient left the hospital less than seven weeks after the operation. He was walking freely without any support, and could use both his upper extremities freely and well. The cutaneous sensation over his body and extremities was only slightly disturbed. He has steadily continued to improve up to the present time.

A section of the tumor removed from the patient's neck in 1920 was reported as follows: "The tumor removed measured 4 x 2 x 2 cm. and was well encapsulated; it was moderately firm in consistency and on gross section showed mottling of light yellow with grayish-white translucent areas. Microscopically, the principal elements are smooth muscle cells closely packed in bundles, and fat cells of the embryonal type; there is a moderate amount of fibrous stroma; the cells are uniform in size, do not exhibit anaplasia, and no mitotic figures are to be seen. Diagnosis: leiomyoma."

The intradural growth was also well encapsulated, and showed at its one end a knob-like projection where it had extended through the opening in the dura for the third cervical root. Microscopically, the growth was the same as that of the tumor removed from the neck. The intradural tumor was much more vascular than the growth that had been removed from the neck.

This was a very unusual case of a growth which began in an intervertebral foramen and grew outwards between the deep structures of the neck. When the tumor of the neck was removed, a ligature was placed around its pedicle, which extended into an intervertebral foramen. The scar tissue which resulted prevented a recurrence into the neck, and the growth then extended inwards through the opening in the dura from the third cervical root, and formed an intradural tumor in that location.

Case 2. Dr. Elsberg presented a patient upon whom he had operated for extradural fibrosarcoma who had completely recovered.

The patient, H. C., a girl, sixteen years of age, was admitted to

Mount Sinai Hospital on April 10, 1921, with a history of pain of two years' duration on the left side of the chest, behind and beneath the angle of the scapula. The pain soon became very severe, so that for a time she required large doses of anodynes. Two months before admission her left leg became weak and stiff, and a few weeks later the right lower extremity became similarly affected, and she noticed that the feeling in the right lower extremity was not as good as formerly. The weakness and stiffness of the lower limbs and the diminution in sensibility of the right limb grew rapidly worse, so that the patient could walk only with great difficulty and could not stand without support. For one month she was unable to empty her bladder and had to be catheterized.

Physical examination showed that the abdominal reflexes were very weak on both sides. The left lower extremity was much weaker than the right. Knee jerks were much exaggerated; there was double patellar clonus, double inexhaustible ankle clonus and Babinski on the left side. The fifth thoracic spine was very tender, especially when pressure was made on it from the left. There was a marked diminution of tactile, pain and temperature sensation on the right side below the fourth thoracic segment, and a less well-marked sensory disturbance on the left.

X-ray examination was negative. Lumbar puncture showed clear fluid, five cells to the c. mm., globulin not increased, and Wassermann negative.

On April 11, 1921, a laminectomy was performed, with removal of the arches of the fourth, fifth, and sixth thoracic vertebrae. On the posterior and left side of the dural sac, and adherent to it, was a well-encapsulated tumor measuring about 4 x 1 cm. The tumor was of firm consistency and not very vascular, and did not involve any of the nerve roots. The growth was removed in several pieces, together with part of the transverse process of the fifth thoracic vertebra and a piece of dura. Pathologically, the tumor was a fibrosarcoma which contained a large number of foreign body giant cells.

After the operation there was rapid improvement. Complete control of the bladder was regained within one week. All sensory and motor symptoms disappeared within six weeks. For several months the patient complained of some pain in the back, but this gradually disappeared. She received x-ray treatment at regular intervals. Eight months after the operation she had gained twenty pounds in weight and felt perfectly well. Eleven months after the operation X-ray examination showed a small shadow to the left of the area of the former operation, and this shadow had been increasing in size. There were no subjective or objective neurological disturbances. An incision was made through the old wound with exposure and removal of a bony tumor, evidently callus in the region of the former operation. There was no evidence of recurrence of the growth. Pathological examination of the bone removed showed new formed bone with no evidence of tumor.

At the present time the patient is free from all symptoms.

Case 3. Dr. Elsberg presented a boy who had been admitted to the service of Dr. Tilney at the Neurological Institute in January, 1922. He had been perfectly well up to May of the preceding year, when he had an attack of pain in the right side of the chest extending upward into the head. In June he had a second attack, and with this a sensation as if his right arm was contracting. In between these attacks he had minor seizures of the same nature. During the following month he had four severe seizures, all beginning with a pain in the lower part of the thorax. The case has been fully reported by Dr. H. A. Riley in the *Neurological Bulletin*. The signs pointed to a tumor in the left superior parietal lobule, and at operation a large angiosarcoma, 5 x 6 centimeters in size, was removed from the superior parietal lobule going backward from the Rolandic fissure. The tumor was well encapsulated, but was not clearly differentiated from the cortex in the deeper areas. The patient was presented almost free of symptoms; except for one convulsive attack he has been well since operation.

Case 4. Dr. Elsberg presented a patient from whom he had removed a large endothelioma from the anterior part of the left temporal lobe in August, 1922. The tumor had given her mainly mental disturbances and subjective sensations of numbness in the left hand. At the operation a large endothelioma was removed from the fronto-parietal region. The patient recovered completely and was presented perfectly well.

Case 5. Dr. Elsberg presented also another patient, a left-handed man, from whom he had removed a large tumor of the right frontal lobe eighteen months before with very satisfactory recovery.

In connection with these cases Dr. Elsberg presented a number of very large brain tumors, both cortical and subcortical, which had been removed during the past year from patients on the service of Dr. Tilney at the New York Neurological Institute, all of which cases had recovered from the operation.

DISCUSSION OF DR. ELSBERG'S CASES

Dr. Tilney said: I have very little to add to Dr. Elsberg's remarks. The results speak for themselves. One point to be noted is the large number of endotheliomata appearing in this group of cases. This is surprising if we remember that these represent a collection of cases occurring within the last twelve months. It is rather unusual to see such a number of surface tumors which are accessible. The general tendency of this group is to affect certain parts of the brain, namely, the frontal and prefrontal areas. In the case with acrognosis and astereognosis there was a typical cortical anesthesia. The growth itself extended back into the parietal lobe, but the involvement was mainly in the frontal and prefrontal areas. I would like to speak of the group method employed in the diagnosis, which has proved to be of very distinct value. Each case was thoroughly presented and discussed by the five men who were following

it in its various phases. We did not use ventriculography, but the results without that procedure were satisfactory so far as localization were concerned.

Dr. Foster Kennedy said: I would like to ask a question in regard to the frontal tumor case—the young man who became blind in the left eye. Was there pressure on the optic nerve?

Dr. Tilney said: Some years ago, before he had symptoms, he was examined as to his fitness for a motorman's work. There was found at that time a defect in the left eye, so that this symptom should not be attributed to his neoplasm. He was rejected for motorman's work after that examination. He is left-handed, which, I think, explains the fact that there was no aphasia.

Dr. M. A. Starr said: In the neurological examination of the elderly woman, was there any appreciable mental change, loss of memory, or slowness of thought, in connection with the development of pressure upon the right frontal lobe?

Dr. Tilney replied: There was considerable mental disturbance prior to the operation. That was the most outstanding feature of the case. She had a loss of memory for recent events and some obscuring of remote memory. After the operation there was marked euphoria. She said she was feeling wonderfully well. This gradually subsided. Her husband says that since the operation she has undergone a total change of disposition. She has been able to resume her work as a housewife. Her memory has come back and she has been able to carry on the management of her household efficiently as of old.

PAPER II.

STUDIES IN FOCAL INFECTION: ITS PRESENCE AND ELIMINATION IN THE FUNCTIONAL PSYCHOSES

By NICHOLAS KOPELOFF, PH.D. (by invitation), and
C. O. CHENEY, M.D.

[Authors' Abstract]

The conclusions resulting from this study of the relation of focal infections to functional psychoses may be summarized as follows:

1. The removal of infected teeth and tonsils from twenty-seven cases showing manic-depressive, dementia precox, and psychoneurotic reactions, has been followed by no more mental benefit than was shown by a comparable group of thirty-three patients from whom such supposed foci of infection were not removed. There were no recoveries or distinct improvements other than those prognosticated irrespective of focal infection.

2. The Rehfuß method of fractional gastric analysis is not to be relied upon as a means for determining gastric infection. The bacteria found in the stomach contents by this method may be derived for the greatest part or entirely from the swallowed saliva.

3. Chronic constipation may be relieved by means of milk fermented by *Bacillus Acidophilus* reinforced with lactose.

4. These studies are being continued, not only for the purpose of obtaining further facts regarding focal infection in the psychoses, but as a part of a general plan to afford psychotic patients all available opportunities for benefit.

Discussion: Dr. Henry A. Cotton said: The work of Drs. Kopeloff and Cheney, of Ward's Island, bears striking resemblance to our work in 1916, and with that type of work the results are what might be expected. In the first fifty patients who had their teeth extracted and tonsils removed we got no results whatever. There are two reasons for this: first, the work was limited to the teeth and tonsils; second, as was done by the readers, we selected our cases and were disappointed in the results. It was not until 1918 that we began to examine every case admitted in a systematic, routine manner. At the end of 1918, we found we had produced results. They have had our experience to guide them, but apparently they have not benefited by that experience. I have talked this matter over with them in private, but they seem to ignore the facts and insist upon considering that their work in a way offsets our work of the last four years. The error in their work is evident to anyone who would give the matter consideration. In the first place, in very few patients, especially among the women, is the infection limited to the teeth and tonsils. Eighty per cent of the women patients have gynecological infection, mostly in the cervix, and at least 50 per cent of both sexes have secondary foci in the stomach which must be treated by vaccine or specific serum.

Dr. Kopeloff claims to have made a very exhaustive investigation of gastric infection and is inclined to dispute the results obtained by Rehfuss and by us. The principal point in dispute is the origin of the bacteria found in the stomach. He makes the claim, from insufficient evidence, that the bacteria found in the stomach by the Rehfuss method come entirely from the saliva which is swallowed when the test is made.

In order to decide this point, we made cultures from the saliva in the mouths of 106 patients at the same time that the stomach test was made, and in only 14 cases out of the 106 did we find any relation between the bacteria in the saliva and the bacteria in the stomach. That is, in these 14 cases the bacteria in mouth and stomach were identical and limited to one type of streptococcus. In the other 92 cases entirely different strains of streptococci were found in the mouth and stomach. In some cases the same strain was found in both, but other strains as well.

This would disprove Kopeloff's contention without any question of doubt and would also substantiate Rehfuss' work. Rehfuss is one of the best men doing research work in the gastrointestinal field to-day, and we have no reason to doubt his conclusions. Fortunately, such statements as Kopeloff has made are without any foundation in fact, and we see no reason from our experience to disagree with Rehfuss.

There seems to be little reason for this report by the readers, as

twenty-five cases are entirely too few on which to base an opinion; also the work done on these cases has been entirely inadequate. They report only twenty-five cases treated in the last two years. That for us is hardly a week's work, and it will take many years for them, at that rate, to produce evidence which will satisfy anyone that they are right and we are wrong.

Such work does not explain the success of the methods at the State Hospital, Trenton. In the last four years 1400 cases have been treated successfully and have been considered recovered when discharged. Out of this number only 62 have been returned and are now in the hospital. The question might be asked, "How do we know these cases, some of them after four years, are still well?" The answer is simple, for these cases are visited regularly by field workers and reports obtained at least twice a year. But these cases have been thoroughly detoxicated and all infection we can find at present has been eliminated; by surgery where possible, and by autogenous vaccines and antistreptococci and anticolon serum in addition.

It is easy to see from our work that merely extracting a few teeth and enucleating a few tonsils will not produce results. In this so-called functional group our records show that for a period of ten years 37 per cent of this group recovered spontaneously. In the last four years the recovery rate in the same group, where treatment has been energetically applied, averages 85 per cent. This cannot be altogether imagination on our part, nor can it be ascribed to our enthusiasm. These are facts which cannot be controverted.

We do not include in these 1400 cases some 250 who have left the hospital as unimproved. The majority of them have been admitted from other institutions and the psychoses are of such long duration that nothing can be done for them. These patients frequently return to the institutions from whence they came and, of course, serve as an object lesson for the poor work done at Trenton.

It is interesting to know that the work done systematically and conscientiously in other institutions supports our position rather than that of Ward's Island. At least six State Hospitals are following our methods and are obtaining similar results. While it is disappointing to have such a report as this come from Ward's Island, at the same time we feel that it in no wise decides the question. If I may be allowed to make a suggestion in public that I have made in private, I would advise they should first do the work as it has been done at Trenton in the last four years; that they do it systematically and routinely and not by selecting certain patients and neglecting others. Then and only then will their work be of value.

Dr. M. Osnato asked: What is our attitude to be when these patients have foci of infection? Shall we leave them absolutely alone?

Dr. C. E. Gibbs (by invitation) said: I have been closely associated with Dr. Kopeloff and am familiar with his work. I feel that it should be definitely established as to what constitutes a focus

of infection outside of teeth and tonsils. It remains to be demonstrated that bacteria free in the stomach are the source of infection or intoxication. Are they any more a focus of infection than those free in the mouth, in the saliva? Dr. Cotton says that 80 per cent of his female patients have infection of the cervix. If I understood him correctly, one of Dr. Cotton's associates recently stated at a meeting here that any cervical discharge meant a focus of infection. I doubt if that is the generally accepted idea.

Dr. G. H. Hyslop (by invitation) said: Dr. Cotton stated that cervical infection was very common in the psychoses of women. I heard Dr. Maxwell say that the bacteria found in the cervix originated in the tonsils, and reached the cervix through the blood stream and lymph channels. I think they might go by the blood, but I don't think that they could reach the cervix by the lymph glands. It sounds as if the longest way round were the shortest way home. I think the most direct way would be along the intestinal canal. It is really remarkable how very few clear-cut functional psychoses result from infection. They have delirium or mental confusion, but the number of manic-depressive cases or dementia precox cases is negligible. It may be that the infection precipitates an attack. We have seen a number of Dr. Cotton's patients. Many of them have come back really handicapped by lack of teeth. There is no doubt about that. A wholesale removal of teeth is not advocated. In regard to the cervical erosions in the female, it is remarkable how many have erosions and discharges, but relatively few develop psychoses as the result. I do believe that the value of Dr. Cotton's work is that he has called attention to the mouth, tonsils, and colon; surely stomach infection is rare. Prior to his work, the teeth and mouth were utterly neglected, but I do not think that all his claims are justified.

Dr. G. H. Kirby said: There is very little I can add to the paper presented. It seems to me that the facts speak for themselves. The results are of course preliminary. We have stated what we found after carefully tackling the problem. I think the revival of interest in physical disorders in patients suffering from functional nervous disorders is a very great step forward. It is a reaction against the purely psychological viewpoint. We owe a considerable debt to Dr. Cotton for having drawn attention to the physical neglect in these hospital cases. The idea that nervous affections are due to bodily disorders is not a new one, but few well-controlled observations have been made. Neuropsychiatrists have held the view that a definite etiological relationship did exist—that there was some toxemia responsible for the psychoneurosis. The data on which the column rests, however, are rather indefinite. The opinions regarding the toxemia are based on empirical observations of the apparent effect of treatment on the patients. The problem is a difficult one, and one hard to prove or to disprove. A great deal of interest was attracted on account of the claim that the problem had been solved, that there was no real difference clinically between manic-depressive types, dementia, and psychosis due to some toxic effect on the central

nervous system. If the toxin was of a mild nature, it was thought that there would be a more benign psychosis; if chronic and prolonged, it would be of the manic-depressive type. This hypothesis sweeps away clinical distinctions. As to the technical points involved, Dr. Kopeloff will take them up in closing.

Dr. L. Pierce Clark said: The issue at stake in Dr. Kopeloff's presentation is a much broader one than whether a focal infection was a causative factor in the type of cases presented here, or even in the more extensive work of Dr. Cotton previously reported. The issue is: Are the psychoneuroses and psychoses ever caused by focal infection or any type of infection? Does their etiology rest upon such a cause as is popularly stated in textbooks and as taught in the medical schools, or have they a causation upon more fundamental biologic or psychobiologic principles—in make-up, difficulties in life adaptations, and the like? Dr. Cotton in particular denies the latter any great place in etiology, and places emphasis upon purely somatic and local infection agents. I believe such a view is wrong and runs counter to all our conceptions of psychogenesis and the upbuilding of a mental pathology, which rests upon too firm a scientific foundation to be thus uprooted. The whole movement of focal infection in psychoneuroses, while in the immediate interest of good internal medicine in mental hospitals, is a regressive tendency so far as giving the mental pathology a secondary place, or no place at all, in the domain of psychiatry.

Dr. Kopeloff said: I am sure that we all feel indebted to Dr. Cotton for his work on the physical status of these patients. I think it is hardly fair for him to say that our results are identical with those he obtained in 1916, if for no other reason than that we have no detailed report as to what did occur in 1916. It is true that in some of our patients examined by Dr. Cotton there were tonsil rests. This is not an unusual finding—even in Trenton. These tonsil rests were removed after Dr. Cotton saw the patients, and their condition has remained the same. Dr. Cotton claims that bacteria in the stomach cause a low gastric acidity, but a very careful examination of his own tables in an article recently published in the *American Journal of Psychiatry* (October, 1922) reveals the fact that streptococci were found irrespective of high or low degrees of acidity. With regard to his results attempting to disprove that bacteria in the stomach come to a large extent from the saliva, his technic is open to severe criticism. We plated out the bacteria quantitatively at once. He puts a sample in broth and incubates, which permits one kind or another to predominate, so that one cannot tell the following day what types of organism were present on the day before. Our criticism of Rehffuss rests on two grounds: one, that the gastric contents are not homogeneous, and second, that a single fractional gastric analysis is insufficient data upon which to base a conclusion with regard to an individual gastric acidity. Gorham, Wheelon, and White have furnished additional evidence along these lines. With regard to operative procedure, we did not neglect operations when

necessary, but we did not operate without adequate indication. Dr. Cotton says that we cannot cure colon lesions with *acidophilus* milk. We make no such claim, but simply say that we can relieve chronic constipation by this means, which removes Dr. Cotton's cardinal symptom for abdominal surgery. Dr. Hyslop and Dr. Gibbs have already discussed cervical infection, as presented before a society last month by Dr. Langstroth. It is sufficient to state that he claims to cure not only functional psychoses by enucleation of the cervix, but includes epilepsy and feeble-mindedness. In answer to another speaker's question as to whether or not one ought to eliminate focal infection in psychotic patients, I believe that we would be all agreed that we should give a patient as good a bill of health as possible. However, the influence which this has on the psychosis is another matter. This is the reason for our work.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY*

REGULAR MONTHLY MEETING, NOVEMBER 16, 1922

DR. F. H. PACKARD, President, in the Chair

TWO CASES OF DYSTONIA LENTICULARIS

Dr. H. C. Solomon read this paper. One object of the presentation, he said, is to suggest the possibility that a case of apparent spasmodic tortocollis can be an early stage in the development of a dystonia lenticularis. There is no doubt as to the diagnosis in the first case being dystonia lenticularis. The important point is that in this case the first symptom was a peculiar contracture of the muscles of the left foot. Due to this the patient walked with an unusual type of limp but was able to run in a normal fashion. This led to the diagnosis of hysteria. This condition continued for some three years and then spontaneously recovered for a period of six months, when it reappeared. From thence on the progress was rapid, spreading to other parts of the body but not taking in the head. The patient developed the characteristic symptomatology of dystonia lenticularis, including torsion of the body, hypo- and hyper-tonic condition of the muscles, marked disorder of the equilibration, which, however, never led to falling. After a time, a characteristic dromedary gait developed, and later the patient was unable to walk at all. The second point of interest is a partial remission so that at the time of presentation the patient, after having been confined to a chair for many months, is again able to walk and go about fairly successfully.

The second patient is a young lad of seventeen, who about two years ago rather suddenly developed spasmodic torticollis. Six months previous to the development of this condition he had been in

* Communications from the members of the staff of the Psychopathic Hospital, Boston.

an automobile accident in which he was slightly injured. A few days before the torticollis appeared, he had had two convulsions, which were the only convulsive phenomena that had occurred. For a period of a year various therapeutic devices had been attempted, including electricity, massage, gymnastics, plaster cast, Thomas collar, reëducation, suggestion, psychological analysis, suggestion under ether, etc. Slight improvement had followed many of these procedures but was very temporary, and on the whole the condition has become progressively worse.

The patient presents a spasm of contracture of the trapezius and sternocleidomastoid muscles of the left side, with occasional relaxation. A considerable degree of scoliosis is present. Occasionally the patient is able voluntarily to straighten his neck. At other times it occurs spontaneously. There has been a considerable degree of myodemia, which is not now present. The biceps and triceps jerks are very weak. The other reflexes are active. All the muscles are irritable to percussion, otherwise the neurological and physical examinations are entirely negative.

It is suggested that this is possibly a case of dystonia lenticularis with the onset of symptoms localized largely in the muscles of the neck but slowly progressing, the patient having already developed a certain degree of torsion. It is realized that it is not possible to make a definite diagnosis of dystonia lenticularis at this time. There is no method of making this diagnosis except that of the symptomatology. As shown by the first case, it is possible to have symptoms localized in one part of the body continue for a considerable period of time before a more generalized spread takes place, a remission of a greater or lesser degree may occur; considering the onset, the disease may well be considered as hysteria.

The most frequent locus of symptoms at the onset is the leg. Dr. E. W. Taylor has presented a case beginning in the arm and a probable case beginning in the neck. It is suggested that this is a case of dystonia lenticularis with the early symptoms affecting the trapezius and sternocleidomastoid muscles.

Discussion: Dr. E. W. Taylor said that the first case reported which he had an opportunity of observing has improved in the last two weeks. The patient is extremely euphoric, and is convinced that he will be entirely well and wishes forthwith to begin work at an art school. In this case there cannot be the slightest doubt as to the diagnosis. He shows in peculiar degree the characteristic feature of dystonia, which is a combination of hyper- and hypo-tonia, as its name implies. If one notices carefully the way he holds himself, one sees that some of the muscles are in a spastic state while others are in a state of hypotonia. It is very characteristic that he has never fallen in the ten years that he has been afflicted with this condition. There is no Romberg sign; he can stand perfectly well with his eyes closed with no reeling whatever. This is an addition to the literature of this rare disease, which a few years ago numbered not more than thirty or forty cases.

Regarding the second case, I should think the ultimate diagnosis would depend upon whether or not there is a spread of the difficulty from the neck muscles. As he sat there, it appeared to me that probably he had a torticollis. The sternocleidomastoid and trapezius were markedly involved. With that alone one would hardly be justified in calling it dystonia, but the process has already begun to extend to the body muscles, as shown in the distortion of the trunk. I should not regard it as hysterical; it is probably dystonia, but up to this time hardly to be distinguished from a very marked case of torticollis. Is it not impossible that the movements of torticollis may be due to a lenticular lesion, or at least to a disturbance of function in that part of the brain?

TWO CASES OF PELLAGRA

Dr. S. K. Smith said: I am presenting two cases of pellagra, not with any idea of discussing the subject of pellagra, but rather to emphasize the apparent increasing frequency of the condition in the New England States. There are some six cases in Boston at the present time.

The first case is a Scotch woman, age forty-three, who gives a history of chronic alcoholism. The patient has eaten little meat for a year and probably no milk. There is a history of mental change of three months' duration, together with a history of glossitis, diarrhea, and a bilateral dermatitis of the hands, together with a loss of weight—these symptoms being over a period of two months. On examination, the patient shows (1) marked emaciation; (2) negative neurological symptoms; (3) typical delirium, with complete disorientation, confabulation, memory changes and hallucinations.

The second patient is a man of thirty-eight, also a chronic alcoholic. His dietary history suggests a poorly balanced diet. The history shows a duration of about three months of (1) alternating gains and losses of weight; (2) alternating constipation and diarrhea; and (3) dermatitis, starting as a macular eruption. On examination the patient shows (1) marked emaciation; (2) characteristic dermatitis of hands, feet, elbows, forehead, and neck; (3) neurological findings which show sluggish pupillary reflexes, absent abdominal and absent right Achilles reflexes; (4) simple mental deterioration, with marked memory change, disorientation, confabulation, and hallucinations.

A CASE OF DEPRESSION WITH FEELINGS OF UNREALITY

Dr. C. H. Morris presented this case. The patient, a married woman of twenty-six, gave the following account of the day during which she had lost the data of personal identification. "I left my house in the morning to go to church. Everything at home seemed natural. In church everything seemed different. I did not understand what the priest was saying. When I came out of church I wandered around and got on a car. I think I changed cars several

times. I did not know where to go. I could not remember where I wanted to go. I could not remember who I was. I sat all day in a field near Randolph. I knew I couldn't stay there, but I did not know who I was or where to go. Then I walked around and then rode on cars some more. I think I was over in Cambridge and I think it was 8 o'clock when I remembered my telephone number and everything came back. I called up my sister and told her I would come right home. I came out—I intended taking a car, but forgot again. I walked up and down streets and then everything came back and I went right home. I think it was about 11 when I got home."

How are we going to interpret this loss of the data of personal identification? In the above episode it appears that this loss was not in the setting of a delirious condition, not in one of disorientation, for the patient was able to take cars, go to different places, and do this without attracting attention. The relation of the loss of personal identification to mood is interesting, for though in many cases of depression the patient feels a change in personality, feels that his actions are no longer self-directed, and that the world has lost a familiar quality, yet this does not lead to an amnesia of name and place. There are other cases besides those of depression in which there is a peculiar alteration in the feeling of personal identity: those cited by Janet and termed *psycholeptic crises* in which a patient may have a feeling that he is different, *i.e.*, "It is not I who eats, speaks, works. I lack something to give me real existence." But here we have no loss of the data of personal identification but rather a change in the feeling tone which is at the basis of personal identification. In other cases of amnesia the patient in a new environment has forgotten all that identifies him with a painful past environment.

None of the above types quite fits the present case: neither a severe depression, nor depression with feeling of unreality, nor *psycholepsy*, nor hysterical type of reaction. The clinical picture shows a married woman of twenty-six, who had a bereavement in the early part of January, 1922, in the loss of her third child, at the age of two weeks, and soon afterwards developed a pleurisy with effusion. In February she received a letter from her brother in Colorado warning her of the danger of pleurisy and telling her that it was usually due to tuberculosis. Her brother died of tuberculosis soon after this. In March she had pneumonia and claims never to have physically recovered, for she has had an empty feeling in her head, poor appetite, and palpitation. In March, while recuperating, she began reading a medical book with especial reference to tuberculosis and insanity (her mother had died in an insane asylum two weeks after a pneumonia). After reading about hallucinations she heard a chain dragged across the floor, and knocking on the windows. Since March she has been depressed, has taken little interest in anything, and has been retarded. She entered the hospital in July, presenting at that time a picture of depression and retardation, and did not develop a feeling of unreality until her first visit home in September.

On that occasion she said that the home looked "dark and dreary and different from the way it used to." She describes her second visit a week later as follows: "I did not know what it was all about in church, but I knew I was in church. I saw all the people and priest, but I didn't know why they were there. At home everything looked queer and mixed up as though the tables and chairs didn't belong there. I could not think." On her third visit home the incident of the loss of the data of personal identification occurred, and on that same day her two children were found comatose and one died later at the City Hospital, where a diagnosis of veronal poisoning and bronchopneumonia was made. The children had been alone with the patient on the preceding day. On her return to the hospital she did not remember having been there before, though she had been away five days only, and said: "Everything looks queer. Nothing looks natural. People look as though they were pieces of wood walking around." At first she did not recognize people and later said that her husband talked about things she used to know about. In this case we have both a feeling of unreality and the loss of the data of personal identification.

In the etiology we have a serious illness from which the patient claims never to have fully recovered, worry over her brother's prognosis in regard to tuberculosis, and worry over the restriction of her family which seemed necessary on economic grounds and yet which could not be reconciled with the teachings of the Catholic Church. The physical status does not show a fully adequate basis for this reaction, nor is this psychosis the same type as a depression of endogenous origin, and this difference of type suggests a different etiology.

Discussion: Dr. F. H. Packard said it would seem to him that this patient was one who simply began to get confused and dazed, and in the beginning things began to be vague. It is a little hard to understand how one at this time could remember what happened when she couldn't remember anything, and I should say these explanations she makes at the present time are attempts to explain a situation.

PRESENTATION OF FIVE CASES OF MENTAL DISORDER WITH LOW BASAL METABOLISM

Dr. Karl M. Bowman presented these cases.

Case 1. A single woman of forty-four who was admitted to the hospital in a stuporous condition with a history that she had had a cold three weeks before admission, and felt weak, then had become excited and noisy, and finally developed a stupor. The basal metabolism in this case was -56 per cent. As far as known this is the lowest basal metabolism on record. Examination showed the patient to be a typical case of myxedema. Attention is called to the sparse hair, scanty eyebrows and pubic hair, and lack of axillary hair; the dry, rough, leathery skin with a yellowish tint, the marked edematous and flabby eyelids, and the large, beefy tongue. The urine showed albu-

men and casts; the phenolphthalein excretion in two hours was 50 per cent. The blood sugar curve was: Fasting, 134 mgms.; 1 hour, 144 mgms.; 2 hours, 160 mgms.; 3 hours, 170 mgms. In contrast to the first case in which the low basal metabolism was thought to be due essentially to hypothyroidism, four other cases are presented in which it seems impossible to demonstrate any such cause.

Case 2. Narcolepsy in a single girl of twenty-two, who had been having narcoleptic attacks for the past nine years. The basal metabolism in this case was -18 per cent.

Case 3. Epilepsy in a girl of ten, who, since ten months of age, had had typical grand mal and petit mal attacks. The basal metabolism in this case was -24 per cent.

Case 4. Conversion hysteria in a married woman of forty, who, for the past year and a half, following some distressing incidents, has developed fainting attacks and typical hysterical anesthesia and paralysis of the right arm. The basal metabolism in this case was -26 per cent.

Case 5. Schizophrenia in a boy of fifteen, who had developed a stuporous condition about a year ago, in which he was mute, showed some waxy flexibility, was hallucinated at times, and had to be tubefed. The condition had come on following a blow to the head. The basal metabolism in this case was -20 per cent.

The first case is presented because it is typical of myxedema and probably shows the effect of lack of thyroid secretion on the basal metabolism of the individual. In the other four cases the cause of the low basal metabolism is unknown. Careful studies have been made in every case for evidences of endocrine disorder, and the effects of various endocrine feedings are being tried without very satisfactory results. Further studies in basal metabolism at the Boston Psychopathic Hospital have demonstrated a marked tendency toward low basal metabolisms in various types of mental disorder. No attempt can be made at the present time to explain this, and the cases are presented merely to call attention to an interesting clinical observation which may lead to further study and perhaps give us some further insight into the mechanisms of mental disease.

Discussion: N. Percival Bailey said: Dr. Bowman says he has no explanation to offer for the low metabolism. I also have no explanation, only an hypothesis. It seems to me unnecessary to look outside the brain for the lesion responsible. There is in the base of the brain—to be exact, in the hypothalamus—a region which exercises control over manifold visceral and chemical activities in the body (metabolism of sugar, proteins, heat regulations, etc.). It seems to me reasonable to search in the same pathological influence upon the brain for the explanation of both the mental disturbances and the disturbances of metabolism in these cases.

THE ACTUAL ENVIRONMENT OF CHILDREN IN A BOSTON DISTRICT

Dr. Marianna Taylor presented this paper. A survey has recently been made of a section of Boston by the Mental Hygiene Association from the point of view of the mental health of the children. Fifty

homes of all types were visited—also kindergartens, day nurseries, and clinics. The findings were exceedingly significant.

In an unselected series of 190 children, the following conditions were noted:

1. <i>Speech Defects</i>	
Baby talk	10
Stuttering	1
Late in talking	4
Mutism	2
2. <i>Motor habits, incoördination, and convulsive manifestations</i>	
Fidgetiness and choreiform movements	13
Twitching of eyes and face	7
Shivering	2
3. <i>Incontinence, etc.</i>	
Bed wetting	49
Incontinence by day	27
Soiling	9
Difficult micturition	1
4. <i>Conduct Defects</i>	
Holding of breath	1
Tantrums	52
Spoiled child (stubborn, difficult, uncontrolled)	41
Excessive boldness	11
Excessive timidity and shyness	13
Excessive finickiness and precision	1
Runaways	3
Truancy	2
Pilfering	1
Biting and scratching others	5
Seclusiveness	6
5. <i>Sleep Disturbances</i>	
Restless sleep	12
Disturbing dreams	7
Sleep walking	1
Crying out in sleep	6
Sighing in sleep	2
Talking in sleep	11
6. <i>Mental Habits and Mental Grades</i>	
Mentally retarded or defective	13
Children in one grade two years	18
Day dreaming and fantasizing	3
Preoccupation and absentmindedness	4
Epileptic children	3
Idiocy	4
Mentally deficient, epileptic, or psychotic parents	18
7. <i>Miscellaneous</i>	
Capricious appetite	17
Headaches	2
Imitativeness (excessive)	1

Masturbation	12
Thumb and finger sucking	10
Nailbiting	33
Picking of nose, lips, and fingers	26
Gritting of teeth	3
Strabismus	10
Excessive jealousy	2
Hydrocephalus	2

The actual environmental factors and neurotic traits found can best be appreciated by citing a few illustrative cases:

Case 1. In the home of an Italian laborer the six children ranging in years from ten years to ten months were found to have all been slow in developing, none talked before two and one-half years, one is retarded at school, three have enuresis, all masturbate. The five year old child set herself on fire recently and was seriously burned; the mother became maniacal and died within two weeks in an asylum.

Case 2. In an American family consisting of father, mother, and three children, the father had recently been a patient in the Psychopathic Hospital for eighteen months. He has a violent, uncontrolled temper, and his wife refuses to have him placed in an institution. The oldest child shows many neurotic traits. She is pale and undernourished. She is so morbidly anxious to be on time at school that each night she puts on fresh clothes and sleeps in them in order to be punctual the following morning. The second child has had convulsions several times, and the third child was premature.

Case 3. In a family comprising four girls and one boy the oldest presents a number of neurotic habits, for example, nailbiting, talking in her sleep, and picking her nose. She and one sister are retarded at school and have repeated a grade. Two other children have enuresis, day and night; no effort is being made to correct these conditions.

Case 4. The next family consists of father, mother, and eight children ranging from sixteen years to five months. The fifteen year old boy has enuresis, the five year old bits her nails, and the three year old sucks her thumb constantly. She attacks her sister frequently with a butcher knife. The sixteen year old daughter recently ran away and married a man much her senior because her mother beat her, gave her no freedom, and made home unbearable.

Case 5. The next case is that of an epileptic mother who beats her children and spends the greater part of her time on the streets, leaving her children locked in, in charge of the five year old. One of them is retarded in school, has a speech defect, and is a finicky eater, and underweight. One sleeps poorly and has convulsions.

Such findings point to the need for educational and preventive work along the lines of mental hygiene: the establishment of mental hygiene clinics, the instruction of social workers, nurses, and parents—and better recreational facilities and supervision of the juvenile population.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

2. ENDOCRINOPATHIES

Harper, J. PARTIAL THYROIDECTOMY. [Journ. Laryngology and Otology, March, 1921.]

The avoidance of operative and postoperative hemorrhage, of shock and of interference with the recurrent laryngeal nerve, are the advantages claimed by the author for his method of removing thyroid growths and for partial removal of the gland itself. He advises a transverse curved incision over the tumor through the deep fascia, division of the sternohyoid and sternothyroid muscles and transverse incision through the capsule of the gland along the whole length of the isthmus. The tumor and lobe also, if the tumor has reached the size of a hen's egg, is now separated from the capsule by the right forefinger and delivered. The isthmus is then cut across and the stump ligatured. The cavity is loosely packed for 24 hours. In none of Harper's cases (over 20) was an artery ligatured, nor was there any postoperative hemorrhage.

Boothby, Walter M. ADENOMA OF THE THYROID WITH HYPERTHYROIDISM. [Endocrinology, January, 1921.]

Walter M. Boothby traces the history of the recognition of this disease as a clinical entity, and studies the symptomatology with basal metabolic rates. He summarizes his findings thus: 1. According to Plummer's classification there are two separate and distinct types of hyperthyroidism, each due to a different pathological change in the thyroid gland: in the one type, the hyperthyroidism associated with the clinical syndrome of true exophthalmic goiter is always accompanied by diffuse hypertrophy and hyperplasia of the thyroid gland, in the other type the hyperthyroidism, not associated with this typical diffuse hypertrophy and hyperplasia, but with the occurrence of adenoma in the gland, is due to the adenoma, and the resulting clinical syndrome is distinguishable from that occurring in true exophthalmic goiter. 2. The syndrome associated with the hyperthyroidism from adenoma of the thyroid is considered by Plummer to be a distinct clinical entity and may be defined as a disease associated with adenoma, characterized by an increased basal metabolic rate excited by an excess of the normal thyroid hormone in the tissues. About middle age the adenomatous tissue gradually begins to furnish an excessive amount of the apparently normal thyroid hormone (thyroxin) and this produces the increased metabolic rate and intoxication clinically evidenced by

nervousness, tremor, tachycardia, loss in strength and weight, and a tendency to hypertension, and in the later stages myocardial disintegration. The underlying cause or stimulus that activates the thyroid to adenomatous growth and oversecretion is not known. 3. Detailed metabolic rate and blood pressure studies are reported in seventy-five cases of adenoma with hyperthyroidism in which the average basal metabolic rate before treatment was + 35 per cent and after operation +7 per cent. Similar studies of 201 cases before treatment are also given in which the average basal metabolic rate was + 28 per cent. In contrast the average basal metabolic rate in 167 cases of adenoma without clinical evidence of hyperthyroidism was + 2 per cent; in eighteen of these cases the average basal metabolic rate before operation was - 4 per cent and it remained practically unchanged, - 8 per cent, as a result of thyroidectomy. 4. Three groups of exophthalmic goiter cases of varying degrees of severity were studied. In thirty-six patients with the severest type of the disease the average metabolic rate before treatment was + 66 per cent; these patients were subjected to rest in bed and two ligations at an interval of a week or more and within ten days after the second ligation the basal metabolic rate was + 50 per cent. After three months' rest at home these patients returned to the clinic and were found to have an average basal metabolic rate of + 42 per cent, with corresponding clinical improvement; within two weeks after thyroidectomy the rate had dropped to + 19 per cent. In a second group, fifty-two moderately severe cases, the patients were subjected to a single ligation and thyroidectomy one to two weeks later. The basal metabolic rate before treatment was + 52 per cent; after thyroidectomy + 15 per cent. In twenty-two the basal metabolic rate before treatment was + 57 per cent and ten days after the preliminary ligation was + 41 per cent; within two weeks after thyroidectomy the basal metabolic rate in this group had fallen to + 16 per cent. In fifty-two patients with mild exophthalmic goiter on whom a primary thyroidectomy was performed the average basal metabolic rate before treatment was + 36 per cent and two weeks after operation + 8 per cent.

Morris. HYPERTHYROIDISM. [Med. Record, January 22, 1921.]

Morris urges the importance of diagnosing hyperthyroidism before the disease has progressed to the terminal stage. In making an early diagnosis the estimation of the basal metabolism, the adrenaline tests, and the glucose tolerance test are most useful, especially in making a differential diagnosis between hyperthyroidism, early tuberculosis, neurasthenia, D.A.H., etc. In hyperthyroidism the metabolic rate is always increased in direct proportion to the amount of thyroid intoxication. The hypodermic injection of 8 minims of a 1:1000 solution of adrenaline increases both pulse rate and blood pressure, followed by a fall and then a secondary rise, with a return to normal in about an hour and a half, and such injection causes an exaggeration of symptoms. These cases have

a low glucose tolerance, a hyperglycaemia following the ingestion of 100 grams of glucose, even in borderland cases. X-rays or radium in conjunction with medical treatment give excellent results, the use of surgery being mainly when other measures fail, and when pressure symptoms or malignant degeneration of the thyroid occur, or in removing causes of hypersecretion. [Br. M. J.]

Mayo, C. H. THE THYROID AND ITS DISEASES. [Surg., Gynec. and Obst., 1921, XXXII, 209.]

The author discusses the work of Kendall in relation to the discovery of thyroxin and the studies of Plummer concerning the effect of thyroxin on metabolism. Hyperfunction of the thyroid gland raises the basal metabolic rate, while hypofunction lowers the rate. Metabolism can be returned to normal in most cases of hypothyroidism by the administration of thyroxin. The thyroid gland enables an individual to develop an available iodinated secretion from the iodids in food. In simple colloid goiter there is an increased amount of iodine in the gland, while in exophthalmic goiter there is a deficiency of iodine. Wilson has shown that the amounts of hypertrophy and hyperplasia in exophthalmic goiter are usually in proportion to the degree of toxicity. The thyroid consists of encapsulated alveoli held together by a stroma of connective tissue. The vesicles are lined by a single layer of cells. In exophthalmic goiter there is a crowding of the epithelium and vesicles with no retention of secretion. In simple goiter there is an excess of secretion. In two-thirds of 100 cases of myxedema thyroiditis was the cause of destruction of the gland. Simple goiter may occasionally cause a low metabolic rate. The cause of goiter may lie in the chemistry of infection, a toxemia produced within the gland or at a focus. Thyroxin benefits patients with cretinism and cures those with myxedema. The treatment of simple goiter is the administration of iodine or thyroxin, preferably the latter. Operation is the treatment of choice in adenoma of the thyroid.

Patients with exophthalmic goiter have exacerbations and remissions of symptoms. The earlier operation is performed in the course of the disease the safer it will be and it should not be performed in an exacerbation of symptoms.

Hyperthyroidism due to adenoma should be differentiated from exophthalmic goiter. It occurs in goiter of long standing, fourteen to twenty years, and there is no exophthalmos. The patients have a tachycardia and develop arrhythmia. The average age at appearance is forty-three, at operation forty-eight. In exophthalmic goiter the average age is thirty-six and the exophthalmos occurs in 50 per cent in the first few months and in 87 per cent within two years. There is tachycardia, but a steady pulse until degenerative changes ensue. The diagnosis of exophthalmic goiter is greatly aided by the employment of the metabolic test. Exophthalmic goiter occurs five times more often than adenoma with hyperthyroidism. The types of goiter should always be distinguished.

In patients who have respiratory difficulty the isthmus of the thyroid should be divided first. The posterior capsule of the gland should be preserved in order to avoid nerve injury and protect the parathyroids.

In the Mayo Clinic during 1919, 1709 of 2205 operations on the thyroid gland were performed under ether anesthesia, 135 with novocain, and in 303 cases combined anesthesia was used. In recent years only about 20 per cent of patients come to operation in the late stages of the disease. In the last series of patients there were 144 operations for exophthalmic goiter between deaths. According to the condition of the patients the mortality will range from 0 to 3 per cent in 100 cases. [Author's Abstract.]

Mosenthal. BASAL METABOLISM DETERMINATIONS IN DISEASES OF THE THYROID GLAND. [New York Med. Journ., July, 1921.]

In this readable article the author emphasizes his belief in the importance of a determination of the basal metabolic rate in regard particularly to cases of Graves' disease. In mild cases the so-called basal metabolism usually shows an increase of 15 to 30 per cent above normal, while in very severe cases a rise to over 75 per cent above normal may be frequently substantiated. Its chief value is probably manifested in assisting the diagnosis. Tuberculosis, cardiac disease, under-nutrition, obesity, and certain nervous affections may all give rise to the suspicion that the thyroid gland is affected, but a determination of the basal metabolic rate will show in these diseases only a comparatively small variation from the normal. As an example, he quotes a statement furnished by Peabody, Wearn, and Tompkins. Of fifty-seven soldiers submitted to them for treatment, principally because of rapid heart action, nervous instability, and physical inferiority, a diagnosis of hyperthyroidism was made in twenty-four; this diagnosis was, however, disproved, on finding that a normal metabolic rate was present in them all. With regard to treatment the basal metabolism furnishes the best measure by which to gauge the effect of medication, X-ray, or operation, and is of especial value in determining the presence of hyperthyroidism when symptoms still persist after operation. Neither the pulse rate nor the weight shows any constant correlation with the basal metabolic rate, and therefore, according to Mosenthal, who considers this as the most fundamental sign of Graves' disease, cannot be accepted as reliable indications of the progress of the disease.

Rowe. VALUE OF BASAL METABOLISM IN THYROID DISEASE. [Am. Journ. of Medical Sciences, August, 1921, CLXII, No. 2.]

This author also is an advocate of this new laboratory sign. Early and obscure cases of hyperthyroidism are more readily diagnosed (manufactured?). The severity of an obvious hyperthyroidism can be more accurately estimated. The presence or absence of toxicity of an adenomatous thyroid is brought into relief by these metabolic studies,

hence are of service as a guide for surgical removal of goiters. In the diagnosis of hypothyroidism and in accurate therapeusis metabolic rate determinations are of service.

Iseke, C. CREATIVE METABOLISM AND THE THYROID GLAND. [Mon. für Kinderheilkunde, July, 1921, XXI, No. 4, J. A. M. A.]

Iseke concludes, from a series of investigations, that hyperfunctioning of the thyroid gland causes an increased creatin metabolism, and a hypofunctioning of the gland a lowering of the creatin output. In children up to thirteen, creatin, which occurs physiologically in the urine, is diminished in myxedema. This may serve as an early and differential sign by which athyreosis may be diagnosed. In exophthalmic goiter we find a high creatin content; also in fevers, toxicoses, retrogressive muscular changes and severe diabetes excessively high creatin value appear. The excretion of creatin in the urine of children reaches its apex at about the fourth month. Then it gradually decreases and disappears from the urine at the age of twelve to fourteen. By noting the effect on creatin values brought about by the administration of thyroid extracts or preparations, we have an excellent means of judging their quality.

Schlesinger, E. THE THYROID IN THE YOUNG. [Zeits. für Kinder., 1920, XXVII, Nos. 3-4.]

In regions where goiter is endemic, transient hyperplasia of the thyroid which subsides in a few months is frequent. A second period sets in about the age of six or seven in girls, nine in boys, and frequently reaches its height before or during puberty. About a sixth of the boys and youths and a third or more of the girls show cardiovascular disturbances. The growth and development of the children with this hyperthyroidism are usually in advance of their years, both physically and mentally. Curvature of the spine is more common, and pronounced myopia is frequent.

Eustis and DeBuys. CASE OF MIXED HYPOTHYROIDISM AND HYPOPIUITARISM. [New Orleans Med. and Surgical Journ., March, 1920, LXXII, No. 9, J. A. M. A.]

Eustis and DeBuys here describe the case of a girl, 15 years of age, who, two years ago, presented symptoms of hypothyroidism, while during the past two years she has developed well defined symptoms of hypopituitarism. She has the mental and physical development of a child of five, and her most marked symptoms are: weakness, unsteady gait, obesity, dryness of skin, lack of physical and mental development and wetting of the bed. Her coördination of muscular movements is so poor that she is unable to feed herself. Constipation has been a prominent symptom for six years. For one month she has had a capsule, three times daily, consisting of 2 grains of extract of the whole pituitary gland, 1 grain of extract of thyroid, and 1 grain of ovarian extract. The authors believe

that the condition is one primarily of the disturbance of the anterior lobe of the pituitary gland in which there is a diminished secretion, with secondarily a diminished secretion of the thyroid.

Fasano, M. UNUSUAL FORM OF THYROIDITIS. [Policlinico, April 26, 1920.]

This is a case in which pus and necrotic scraps were present in the thyroid, resulting from an acute inflammatory process. In addition to the fever chills and pain she developed a complete picture of mild exophthalmic goiter with the three cardinal symptoms, but the Stellwag and Graefe signs were negative. After incision the thyroiditis subsided and with it the exophthalmic goiter symptoms.

Sandiford, T. THE BASAL METABOLIC RATE IN EXOPHTHALMIC GOITER (1917 CASES) WITH A BRIEF DESCRIPTION OF THE TECHNIQUE USED AT THE MAYO CLINIC. [Endocrinology, 1920, IV, 71.]

The paper gives an account of the routine procedure employed in the Mayo Clinic for the investigation of thyroid disorders. For this purpose the estimation of the basal metabolism of the patient is stated to be of the greatest value, because it gives a very accurate mathematical index of the degree of functional activity of the thyroid gland. The metabolic rate is increased in hyperthyroidism and may rise well over 100 per cent above normal in exophthalmic goiter; it is diminished in hypothyroidism, and may in myxoedema fall to 40 per cent below the normal. Beside thyroid disorders there are no diseases that have so far been shown to have a constant and distinct variation from the normal in the basal metabolic rate except disorders of the pituitary gland, conditions of profound inanition and fevers. The method is therefore particularly useful in the differential diagnosis of neuroses simulating hyperthyroidism and true hyperthyroidism. The average basal metabolism for every person can now be calculated by means of a formula from the surface area, height, and weight of a patient. The actual basal metabolism is determined by means of a simple method (Tissot's method) which is described in the paper. Both the apparatus and the technique are simple so that thirty estimations have been carried out in a day. These estimations render it possible to study by quantitative methods the effects of the various treatments applied to cases of exophthalmic goiter: rest in bed, ligation, and thyroidectomy. The results obtained in a large number of cases are given in tabular form and are briefly discussed.

In 182 cases of exophthalmic goiter before any treatment was instituted the average metabolic rate was plus 51 per cent, with an average pulse rate of 115. In thirteen patients whose average metabolic rate, as outpatients, was plus 59 per cent, with an average pulse rate of 115, the average metabolic rate fell to plus 46 per cent, and the average pulse rate to 108 as a result of approximately one week's complete rest in bed.

In five patients whose average metabolic rate, determined within two to five days after they entered the hospital, was plus 59 per cent, and the pulse 118; after a further rest in bed of approximately one week's duration there was a definite improvement in their condition, as shown by a fall in the metabolic rate to an average of plus 48 per cent and pulse to 104. The effect of a single ligation was studied in sixteen cases. The basal metabolic rate taken after the patient had had several days' rest in bed and within five days before the first ligation was plus 54 per cent and pulse 116. One week after the single ligation the average metabolic rate had increased to plus 44 per cent and the pulse to 112. The effect of the second ligation is likewise a general improvement in the patient's condition as evidenced by a decrease in the metabolic rate. In twenty-two patients there was an average decrease in the basal metabolic rate from plus 46 to plus 39 per cent, and in the pulse from 115 to 107, with a gain in weight from 46.4 to 54.5 kilograms in the determinations made a few days after the second ligation as compared with the data obtained after three months' rest at home and just previous to thyroidectomy. A definite improvement from thyroidectomy in those patients who had had two ligations and a three months' rest was shown two weeks following operation by a decrease in the basal metabolic rate from plus 39 to plus 16 per cent, and in the pulse rate from 107 to 89. In another group of nineteen patients with exophthalmic goiter in whom the preliminary basal metabolic rate varied between plus 13 and plus 50 per cent, giving an average of plus 31 per cent with an average pulse of 104, and in whom primary thyroidectomy was done without any other preliminary treatment, except for a short rest in bed, the basal metabolic rate fell, about two weeks after operation, to plus 5 per cent and the pulse to 48.

Troell, A. THE DIAGNOSIS OF EXOPHTHALMIC GOITER. [*Hygiea*, January 31, 1920.]

Charts are given showing the clinical response to subcutaneous injection of 0.5 c.c. of a 1 : 1000 solution of epinephrin in six patients with manifest exophthalmic goiter and in four with ordinary goiter. The findings on the whole confirm those reported by Goetsch in 195 cases of goiter, including fifty of the exophthalmic type, demonstrating the peculiar hypersusceptibility to suprarenal extract in clinical states of hyperthyroidism. This characteristic response to epinephrin and also the discovery of extreme functional activity of the thyroid cells, as indicated by the mitochondria contents, will aid in the differential diagnosis from other nervous disturbances, and also in estimation of the value of different modes of treatment.

Deusch, G. THE BLOOD IN MYXEDEMA. [*Deut. Archiv. für. klin. Med.*, December, 1920.]

In seven myxedema patients the viscosity of the whole blood was within the average range, but the albumin content, the viscosity and the

refraction coefficient of the serum were very high. These figures returned to average as clinical improvement became manifest under thyroid treatment. As a means of obtaining rapid oversight of conditions in regard to albumin metabolism it shows or disproves any great disturbance in the nitrogen transformations. The author also believes that it enables one to classify the severer forms of myxedema, and to watch the effect of therapy.

Gallotti, A. SIGNS OF HYPERTHYROIDISM IN PULMONARY TUBERCULOSIS. [Reforma Medica, January, 1920, XXXVI, No. 1.]

Six cases are here reported upon in which toxic action from an insidious tuberculosis resulted in a more or less complete hyperthyroid picture. The goiter was treated with electricity, and tonics were given. The results indicated that treatment of the thyroid in such cases is likely to have a favorable influence on the pulmonary tuberculosis. Gallotti has seen so many cases of this combination that he now suspects pulmonary tuberculosis in every case of exophthalmic goiter until this can be excluded. [In all of which one returns to the old Vienna post mortem table and finds some evidence of tuberculosis in nearly every one. Ed.]

Coulaud. THYROID IN THE TUBERCULOUS. [Bull. d. l. Soc. Méd. des Hôp. Dec. 17, 1920, XLIV, No. 39.]

This observer has been examining the thyroids post mortem in patients who have died of acute tuberculosis. The thyroids were apparently healthy or showed merely a tendency to hyperplasia. There does not seem to be anything which suggests to him functional thyroid inferiority in the tuberculous. In the majority of the chronic cases there appears to be a sort of struggle between sclerosis and hyperplasia. In the cases of cured tuberculosis sclerosis was frequent.

Garibaldi. INFLUENCE OF THYROIDECTOMY IN FORMATION OF IMMUNE ANTIBODIES IN THE DOG. [Cron. Méd., September, 1920, XXXVII, No. 687.]

Garibaldi's experiments on dogs seem to indicate that these glands play an important part in the phenomena of renovation of the blood and in the pathogenesis of certain hemolytic syndromes.

Roussy and Cornil. EXOPHTHALMIC GOITER. [Bul. Méd., November 27, 1920, XXXIV, No. 56.]

The authors here give a critical review of the pathologic physiology and the various tests for toxic goiter, chiefly as developed in American laboratories. Of the alimentary hyperglycemia test they claim that a negative reaction alone is decisive. With injection of 5 to 15 cg. of an extract of the superior lobe of the pituitary, the pulse becomes accelerated in the average individual, while with exophthalmic goiter the pulse grows slower and the glycosuria is more pronounced. Another pituitary

test is the reaction to subepidermic injection of pituitary extract: a bluish spot surrounded by a white halo, turning to red, in cases of exophthalmic goiter which are evident.

Houssay, B. A. EXPERIMENTAL GOITER. [Rev. del Inst. Bacter., Buenos Aires, May, 1920.]

The author tells that goiter developed in two rats at Buenos Aires that were given exclusively water from a remote focus of endemic goiter. The water in demijohns was three or five or more days en route. Several lots of twenty white rats each were given the water for about six months, but in none of the others was there any tendency to enlargement of the thyroid. No tendency of the kind had ever been noted in 160 normal Buenos Aires rats examined, nor in eighty others dying from various causes. Spontaneous goiter has never been found at Buenos Aires in any laboratory animals. Bircher reported macroscopic goiter in 90.1 per cent of 484 rats tested in this way in Switzerland. [J. A. M. A.]

Schmerz, H. RETROPHARYNGEAL GOITERS. [Beit. für klinischen Chirurgie, 1920, CXX, No. 2.]

The author's experiences in von Hacker's service at Graz with 2000 goiter operations in sixteen years are here analyzed. Among all these and an additional group of 130 operative cases of strumitis, the percentage of retropharyngeal goiter was only 0.02 per cent. These retropharyngeal tumors were all successfully removed by the usual thyroidectomy technic. They had interfered with swallowing, and in one case the tumor, as large as an apple, could be seen at the root of the tongue.

Cordua, R. BASEDOW'S DISEASE AND MYXEDEMA. [Mittheil, a. d. Grenzgebieten d. Med. und Chir., 1920, XXXII, No. 2.]

Cases where such an influence undoubtedly was proved were analyzed. The author warns against pursuing radiologic treatment until complete disappearance of struma, and recommends two to four energetic treatments with a subsequent rest period for five or six weeks before resumption.

Hoskins, E. R., and Hoskins, M. M. RELATION OF THYROID AND HYPOPHYSIS TO GROWTH AND DEVELOPMENT. [Endocrinology, January-March, 1920, IV, No. 1.]

The authors state that a preparation of the anterior lobe of beef hypophysis, which contains some form of iodine, 1 : 200,000 of fresh substance, when administered to normal frog larvæ will bring about a precocious metamorphosis, resulting in the production of frogs the size of which varies with the size of the larvæ at the beginning of the experiment. Such frogs have little vitality. If permitted to remain exposed to the air they die and dry down almost flat, losing their shape and there remains but a very small percentage of the original volume. When the

pituitary preparation was administered to thyroidless larvæ which would otherwise have remained in the larval form more or less indefinitely, a beginning of metamorphosis occurred within twenty-four hours; it progressed somewhat more slowly than in the other experiments; but it ultimately became nearly complete by the time the animals were either killed or died spontaneously. The authors regard the results obtained as due to a stimulation of natural general metabolic processes, either directly or indirectly, but the exact nature of this action is not known. The effect is both progressive, as seen especially in the skeletal and cutaneous development, and retrogressive as seen especially in the digestive tract and tail. It is very doubtful that the action of the anterior pituitary substance is due merely to its iodine content, although such may be the case. Other tissues with traces of iodine will not produce the same effect as the pituitary. It is quite possible that the initial stimulation in hypophysis feeding is exerted on the calcium and phosphorous metabolism as is indicated by skeletal changes in these experiments, although intestinal transformation also begins very early. [J. A. M. A.]

Loeb, L. INFLUENCE OF IODINE ON HYPERTROPHY OF THYROID. [Journ. Med. Research, May, 1920.]

Loeb states that iodine does not diminish the intensity of the hypertrophic changes in the thyroid gland of the guinea-pig which follow extirpation of such a quantity of the gland as is necessary to call forth compensatory hypertrophy. On the contrary the indication is that possibly iodine preparations increase such hypertrophic changes. The effect of iodine on compensatory hypertrophy differs, therefore, markedly from that on endemic goiter. In those experiments in which great parts of the thyroid gland were extirpated during the summer months, compensatory hypertrophy resulted in a much lower percentage of cases than in experiments carried out in the colder season. This suggests a relation between compensatory hypertrophy and temperature.

Briand, M., and Livet, L. NERVOUS INSTABILITY AND CONGENITAL HYPERTHYROIDISM. [Presse Médicale. January 3, 1920.]

The authors refer to a distinctly "hyperemotive" patient, with paroxysms of anxiety, hot flushes, palpitations, respiratory and visceral angor, and nightmares. The boy also presented a slight cyclothymic tendency and an incomplete Graves syndrome. His father had had exophthalmos and his grandfather both goiter and exophthalmos. Attention is directed, on the basis of this case, to the frequent association of exophthalmic goiter with excessive emotionalism. The thyroid syndrome may be exceedingly attenuated and, as in the case reported, revealed only by the anamnesis, but should be always inquired for by the clinician confronted with a hyperemotive case, just as nervousness is sought in cases of exophthalmic goiter.

II. SENSORI-MOTOR NEUROLOGY.

1. PERIPHERAL NERVES.

Teissier, Gastinel and Reilly. THE UNITY OF HERPES. [C. r. Soc. J. Biol., January 14, 1922.]

This experimental paper states that the researches of more than one observer have shown that when the contents of a herpetic vesicle are applied to the scarified cornea of a rabbit, the latter will develop a keratitis and in the course of a few days will die of an encephalitic process. The virus can be recovered from the brain and used to propagate the disease through a series of fresh rabbits. These authors have investigated a number of patients who were suffering from symptomatic herpes occurring in such illnesses as cerebrospinal meningitis, acute pneumonia, diphtheritic angina, influenza, catarrhal jaundice, and mumps, as well as in genital herpes appearing in the secondary stage of syphilis, with the result that they find a close similarity existing between the actions of each virus. Control experiments carried out with the contents of vesicles from polymorphous erythema, varicella, or zona were completely negative. It is probable, therefore, that there is no difference between spontaneous and symptomatic herpes. The appearance of the vesicles during the course of an infectious disease must be regarded as a definite complication caused by a different organism from that which has given rise to the primary disease. They conclude by asking why it should be so common to meet with herpetic lesions in cerebrospinal fever and in pneumonia, while in other diseases, particularly in those which are suspected to be due to a filter-passing virus—such as scarlet fever, variola, and chickenpox—the occurrence of herpes is quite exceptional.

Gosset and Charrier. FATE OF NERVE GRAFTS. [Journ. d. Chir., January, 1922, Vol. XIX, No. 1.]

A critical review of the end results of nerve grafting in which 216 cases are subjected to analysis. Auto-, homo- and hetero-animal grafts were reckoned. The results were good in 5 of the autograft cases; 2 of the homografts and in 5 of the heterografts among the 99 cases under observation for a long time (17 per cent). In 57 other cases in which nerves were sutured, good results were obtained in 40 per cent, and 40 per cent of the others were improved.

Meyer. BRAIN TUMOR LOCALIZATION. [D. Zeit. f. Chir., December 10, 1921, 48-49. J. A. M. A.]

Meyer having found palpation, puncture and percussion inadequate for the localization of brain tumors, decided to investigate the relative electrical conductivity of normal brain tissue and brain tumors, with the idea that possibly the brain, being richer in fat, would show greater elec-

trical resistance than a brain tumor. In collaboration with Dr. Schlüter, he made researches on fresh brain and brain tumor material from a cadaver, and discovered that there is a very marked difference in the electrical conductivity of the normal brain and of brain tumors. He found that the cerebrum at a given distance and with electrodes of a given size showed a resistance of about 550 and the cerebellum a resistance of about 650 ohms, whereas the brain tumor (a gliosarcoma) had an electrical resistance of only 200 ohms; cerebral fluid and physiologic sodium chlorid solution, a resistance of 35 ohms, and the blood, of 150 ohms. Experiments on a living cat brain revealed the same differences that had been found in the human cadaver. The insertion of the electrode into the living cat brain caused no injuries. The first trial on a human subject was made June 5, 1921, since which time no further brain tumor cases have come to operation, but, since the results of the single trial were so favorable, he concluded to publish this preliminary report. Enderlen performed the trephining operation, and, after laying bare the dura at the site designated by the neurologist, punctured the supposed tumor. In a few seconds Schlüter measured the electrical resistance of the tumor, which proved to be 260 ohms, whereas the resistance of the brain was 660 ohms, thus disclosing the same marked differences in the living human brain that had been previously found in the cadaver. After the gliosarcoma had been removed, its electrical resistance was the same as when in the living body. No disturbances were observed as the result of the determination of the electrical resistance in the living subject.

Christiansen. RIGHT SCIATICA; LEFT BRACHIALGIA. [Hospitalstidende, January 4, 1922, Vol. LXV, No. 1.]

A clinical compilation of the cases of sciatica coming to the neurologic polyclinic at Copenhagen in the last seven years. Six per thousand of the 5235 patients had sciatica. Disseminated sclerosis was diagnosed in 2.5 per cent. Sciatica attacks were nearly always preceded by lumbago, just as neuritis in the brachial plexus is nearly always preceded by one or more attacks of neuralgic torticollis. The connection between the lumbago and the sciatica is obscure but the connection between the wry-neck and the brachial neuritis is more direct since the trapezius muscle is accessible to palpation. The disturbance is primarily in the muscle. These attacks may be recurrent with no other manifestations than the lumbago or the stiff neck. The process, however, has a tendency to spread to the fascia and the connective tissue, and finally the lumbosacral or the brachial plexus are implicated. The exclusion of a cervical rib is one of the first things to be accomplished in brachial neuritis.

Rudolf. PHYLOGENETIC SIGNIFICANCE OF PLANTAR RESPONSE IN MAN. [Journ. of Neur. and Psychopath., February, 1922, Vol. II, No. 8.]

Following the work of Brouwer of Amsterdam Rudolf has shown that a flexor plantar response of a primitive character similar to that

found in the lower animals is present in the majority of young human infants. In certain cases of total transection of the human cord in adults it is also present. The primitive flexor plantar response changes to an extensor response as development proceeds, either as the animal scale is ascended or as the child grows older, or as the spinal cord readapts itself to its altered conditions after transection. The extensor plantar response changes to a flexor plantar response in animals higher than the anthropoid apes, *i.e.*, in man. Thus there is a succession of flexor, extensor, flexor, or F. E. F., responses both in the phylogeny of the race and in the ontogeny of the individual. In the case of total transection of the cord in man, the final adult flexor plantar response is not obtained. The theory that the alteration of the plantar response from extensor to flexor is due to the myelination of the pyramidal tracts is apparently incorrect; more probably it is due to the myelination of the peripheral nerves, which occurs at the eighth month of life. The hypothesis that the extensor plantar response of infants and of "spinal" man is an atavistic phenomenon dependent on the prehensile toe of our arboreal ancestors is not shown by these investigations to be incorrect. The normal adult flexor plantar response is due to the control of the brain over the lower centers of the cord, and this control is exercised only by the brain in its most highly developed form, *i.e.*, the brain of man.

Feiling and Viner. IRIDOCYCLITIS—PAROTITIS—POLYNEURITIS. [Journ. of Neur. and Psychopath., February, 1922, Vol. II, No. 8.]

The syndrome described by Feiling and Viner consists of iridocyclitis and parotitis, with or without involvement of either cranial or peripheral nerves, and occasionally accompanied by cutaneous lesions. Whether this syndrome is produced by any specific infection or may occur as the result of several different infective agents is an open question. In the case cited no definite infective agent could be isolated. [J. A. M. A.]

Scheltema, M. W. A PECULIAR CASE OF POLYNEURITIS. [Nederl. Tijdschr. voor Geneesk., January 7, 1922, LXVI, p. 45.]

The case was one of the ataxia form of polyneuritis combined with bilateral facial palsy of peripheral type, involvement of the sensory trigeminus and left auditory nerve, with right hypoglossal palsy. A market gardener, thirty-eight, had felt for some days ill and feverish, had supraocular headache, severe sleeplessness on account of violent shooting pains that seemed to compress his thorax and abdomen, but no limb pains. He had had much heavy work to do in the severe cold weather. The pain kept him awake all night, but ceased by day. No alcoholism nor syphilis. He had slight fever; his trunk muscles were tender on pressure, and Valleix's points were present in most of the intercostal spaces. Loss of corneal reflexes; both corneæ insensitive; slight hyperesthesia in trigeminal areas, but no motor fifth affection. His mouth felt very dry. Hearing on left greatly diminished. Right hypo-

glossal palsy. Right arm weak and less sensitive than left; loss of right triceps jerk. Subjective sensory symptoms in legs, much hypesthesia of feet. Loss of abdominal and cremasteric reflexes. Marked Rombergism. Walking and standing almost impossible owing to the great ataxy. No visceral or other signs. Great improvement under rest, good feeding, exercise of facial muscles, and strychnine hypodermically. The ataxy went first; facial paresis was still present, however, after six weeks. Complete recovery in six months. The case was probably due to slight influenza, aided by his very hard work in exceptionally severe cold weather. [Leonard J. Kidd, London, England.]

Ingram, Robert. SOME CLINICAL OBSERVATIONS ON THE EXTERNAL MALLEOLAR REFLEX—CHADDOCK'S SIGN. [The Ohio State Med. Jounl., March, 1921.]

The particular object of this report is to contribute added observations on a new sign, which it is believed will enable us to separate normal from diseased conditions of the upper motor neurons or pyramidal tracts.

Chaddock's Sign. Dr. Charles G. Chaddock read a paper before the St. Louis Neurological Society, May 29, 1911, in which he described the sign as follows: "It consists in irritating the outer side of the foot below the external malleolar process. The degree of irritation should be varied. In some cases the merest touch is sufficient to excite the sign; in others rather severe scratching may be required. Usually the most sensitive point is a slight depression just in front of the lower point of the external malleolus and behind the tuberosity of the cuboid, but sometimes the movement occurs more readily when the posterior groove is scratched." Miscellaneous diseases of the nervous system in which the pyramidal tracts are involved were taken from the neurological service of the Cincinnati Hospital. In all of these the Chaddock sign was elicited, and the contention of its discoverer, that the malleolar sign is equal in value to the extensor plantar reflex (Babinski), and that, being a more delicate test, appearing earlier and frequently lasting longer than the Babinski, whereas the Babinski does not occur without the Chaddock, was fully substantiated. In conclusion the essayist does not wish to say that the Chaddock in any way displaces the Babinski, but believes it to be a more delicate sign. The Chaddock is a contralateral sign and is useful in determining pyramidal trouble of slight degree. It appears earlier and is seen later than the Babinski sign. Dercum says that the Chaddock sign interrogates the same level as the Mendel-Bechterew, striking over the cuboid bone. [Author's abstract.]

Cope. NERVE SUPPLY OF PARIETAL PERITONEUM AND SUBPERITONEAL TISSUES. [Lancet, March 4, 1922, Vol. I, No. 514. J. A. M. A.]

The clinical application of knowledge of the nerve supply of the parietal peritoneum, Cope says, depends on the various ways in which irritation of the nerve terminals may be made known. The manifesta-

tions depend partly on the nature of the irritant. The local pain due to parietal irritation varies in amount and diagnostic value according to the part affected. When the subperitoneal tissue lying over a muscle becomes edematous and irritated, movement of the subjacent muscle causes local pain. Under certain conditions pain results from abnormal states of the viscera. No referred pain of any localizing value is ever furnished by the nondemonstrative areas. That part of the abdominal lining in which diagnosis is most aided by referred pain is the diaphragmatic area. Pain is referred to the right shoulder from the under surface of the right side of the diaphragm, and similarly from the left side to the left shoulder. The maximum site of pain when the dome is irritated is the acromioclavicular joint. If pain is felt equally on top of both shoulders a median irritation is presented. Cope points out that when a patient comes to the surgeon with symptoms of intestinal obstruction an almost painless femoral hernia often proves to be the source of the trouble. In such cases there is referred pain in the abdomen, but the local pain, though present, is so slight as to be overlooked by the patient. If a complete coil of intestine be present in the sac there may be greater tenderness, but if only a knuckle of intestine or omentum there may be little or insignificant pain.

Rava, G. CALCANEUM REFLEX. [*Riforma Med.*, February 19, 1921.]

Tapping the posterior inferior angle of the heel bone induces contraction of the semimembranosus, semitendinosus and the biceps. In order to elicit this periosteum reflex the patient should lie on the same side, the thigh flexed on the pelvis and the leg flexed. The calcaneum is tapped without raising the foot from the bed. The findings with this reflex in cases of different nervous disturbances and in the healthy are tabulated by the author. In pseudobulbar disturbances, he found that this reflex was present on both sides; in hemiplegia on the affected side.

Lindstedt. CAUSES OF SCIATICA. [*Acta Medica Scandinavica*, January 14, 1921.]

In this clinical study static factors promoting sciatica were called to the author's attention by seeing a patient with a sciatica associated with an inflammatory pes planus. One hundred cases in which the diagnosis of sciatica had been made by independent observers in Stockholm were then analyzed. In no less than 91 cases important morbid conditions of the nature indicated were found, and they were calculated, in the author's opinion, to favor the development of sciatica. In 14 cases the knee joint, in 12 rheumatoid arthritis, in 11 the hip joint, in 8 varicose dilatation of the veins, in 8 the spine, such as spondylitis deformans or fracture, in 8 pes planus, in 5 traumatic lesions of the foot, and in 4 looseness of the knee joint with genu recurvatum. These were all found. Tumors, fracture of the femur, salpingitis, genu valgum, deformities of the foot, and constitutional static weakness were also accompanying conditions.

In 7 cases the complications were gonorrhoeal. Whenever they were unilateral they occurred on the same side as the sciatica. The complications were too numerous to be merely coincidental, and many of them were of a noteworthy and comparatively rare type. Sciatic neuralgia due to these causes may be compared with trigeminal neuralgia following toothache or the muscular fatigue induced by presbyopia.

Goulden, E. A. GALVANIC ACUPUNCTURE IN SCIATICA. [British Med. Jour., April 9, 1921. J. A. M. A.]

The aim of all the various forms of treatment devised for sciatica is to induce hyperemia of the nerve. Goulden claims that by acupuncture the hyperemia occurs just where it is required, and it can be given in definite doses varying according to the response of the nerve. Again, when an electric current is passed through the tissues, sodium hydrate is formed at the negative electrode, which in this case is the needle passed down to the tender spot on the nerve. This sodium hydrate has a caustic action on the tissues. In acupuncture only a small amount of current is used (from 3 to 6 ma.). The effect of ionic movement in the tissues is involved also. From one or all of the above effects it is maintained by Goulden that by this treatment there is complete relief of pain, but the wasting of muscles with weakness of limb and lameness requires appropriate treatment. Electrical acupuncture, carried out according to instructions, is harmless. It must not, of course, be used recklessly with any strength of current, nor must the needle be plunged into any part of the body without consideration of the underlying parts.

Oljenick, Ign. LATE NEURITIS OF THE ULNAR NERVE. [Nederlandsch Tijdschr. v. Geneeskunde, February 5, 1921, LXV, 738.]

Oljenick has shown cases of "late" neuritis of the ulnar nerve to the Amsterdam Neurological Society: in one the interval between the date of injury and the onset of the ulnar palsy exceeded forty years. The injury is commonly a fracture of one or more of the bones of the elbow joint. In the case just mentioned an X-ray examination showed evidence of an ancient T-shaped fracture of the left humerus with displacement of both condyles. Oljenick gives reasons for his rejection of the common views of this peculiar late form of ulnar neuritis, in which for some distance there is a hypertrophic form of neuritis of the ulnar trunk. He holds that in these elbow injuries there is an effusion of blood either in or around the ulnar nerve; in the former case there may be an immediate interruption of its conduction of impulses; in the latter, if the blood be organized into connective tissue, the contraction of the latter slowly and progressively squeezes the nerve. He advises a Röntgenological examination of both elbow joints in every case of neuritis of the ulnar nerve; if the usual methods of treatment have failed (electrotherapy, massage, warmth, etc.) the nerve should be laid bare in its sulcus, and be freed from all surrounding connective tissue that is squeezing the nerve bundles.

This holds good not only for cases of "late" neuritis of the ulnar nerve after fracture, but also for all cases of traumatic ulnar neuritis. If one now goes on to operative treatment, a complete peri- and endoneurectomy is indicated, and one must reject the simple incision of the perineurium. [Leonard J. Kidd, London, England.]

2. CRANIAL NERVES.

Magnus, U. TRIGEMINAL NEURALGIA. [Norsk Magazine for Laegevd., June, 1921, Vol. LXXXII, No. 6. J. A. M. A.]

Magnus reports recurrence in twelve to eighteen months in all of the twenty-nine cases in which he resected a peripheral portion of the nerve. In 211 of the 248 injections of alcohol, in 118 cases the pain subsided at once after the injection, and one patient has had no recurrence for eight years and four for five years. In the others the pain returned in a year or year and a half. It was banished anew by injection of alcohol, but the respite was only temporary and operative measures were finally applied. In twenty-four of the patients two or three of the branches were affected and hence no attempt at alcohol injection was made, and the sensory pontine root of the nerve was resected at once. In four cases he partially resected the gasserian ganglion, with return of the pain in one case after a four year interval. In four of the thirty-one root resection cases a corneal ulcer developed, but he ascribes this to the patients' neglect to heed instructions to wear protecting glasses when exposed to wind, or disregard of early signs of irritation in the eye.

Nittono, K. THE GROWTH OF NEURONES OF THE GASSERIAN GANGLION. [Jl. Comp. Neur., October 15, 1920.]

Measurements were made of 25 of the largest ganglion cells in 76 ganglia taken from 38 normal albino rats and of the 10 largest fibers from each branch and from the fifth nerve root in 39 rats. The growth of the ganglion cells shows three distinct phases: (1) A rapid growing period, extending from birth to about the twentieth day of life. (2) A slower period, lasting for a further 60 or 80 days. (3) A period of much slower rate, extending to maturity. This growth rate is noted in both nucleus and cell body, but the increase in the diameter of the nuclei is slower than that of the cell body. The ratios between the volumes of the cytoplasm and the volumes of the nuclei increase with increasing size (age) of the ganglion cells and in the largest cells the ratio is more than twice as large as in the smallest. About twenty days after birth the cell body and the nucleus show almost the same appearance as that in the adult rat. After this time both increase in size and there is also an increase in the quantity of Nissl substance, but the other morphological changes are very slight. The diameter of the fibers is least in the ophthalmic branch and largest in the fifth nerve root. Up to eighty days of age the volume of the ganglion cells increases at the same rate as the

area of the head surface; but after this the growth of the neurone slows down, while that of the head continues. The ratios between the diameters of the ganglion cells and the diameters of the nerve fibers decrease as the body weight increases. The decrease after puberty is due to a longer continued growth in the diameter of the fiber, as compared with that of the ganglion cells. The neurones in the Gasserian ganglion are larger, have a higher nucleus-plasma ratio and mature earlier than do those in the ganglion of the seventh cervical nerve. However, the fibers from the Gasserian cells have a smaller diameter than those of the seventh cervical ganglion. These differences are possibly related to the somewhat specialized character of the fifth cranial nerve.

Wiener, A. HEMIANOPSIA FOLLOWING MIGRAINE. [Medical Record, November, 1921, Vol. C, No. 20.]

This clinical case is of a young woman, healthy in every respect, save for repeated attacks of migraine. She developed a left hemianopsia with a severe migrainous attack from which she showed no improvement. A vasoconstriction, sufficient to produce an ischemia, according to the author, resulted in a softening of the visual area. She ate a cake of yeast two hours before the migraine. Whether it had any relation to the attack, or some toxemia causing a change in the blood, encouraging the formation of a thrombus, is the problem presented by this unique case.

Silva, R. FUNDUS AFTER SKULL TRAUMA. [Gac. Méd. de Mexico, January-September, 1921, Vol. LV, No. 1.]

This patient fell from a horse and fractured his skull. He developed optic neuritis in both eyes and also an acute otitis. Lumbar puncture was performed at once. The headache was relieved and the vision gradually recovered. Spinal puncture, the author says, may ward off blindness in such cases. It also tells something of the nature of the damage from the trauma.

Denyer, Stanley E. BLINDNESS AS AN IMMEDIATE SEQUELA OF INFLUENZA; RECOVERY.

Female, aged seventeen years, during convalescence from influenza, was attacked with papillitis, accompanied by blindness frontal and temporal pain. The sight came back in three or four weeks. Optic neuritis both eyes. No evidence of cerebral tumor, abscess or syphilis. Wassermann reaction of cerebrospinal fluid was negative. No evidence of ear, nose or throat origin. Heart, lungs and abdomen showed nothing abnormal. Urine contained a trace of albumen. Urea, 8 grains per oz. Blood pressure, 95 mm. Hg. Central nervous system showed no Kernig's sign, but there was slight tension on the hamstrings of both legs. No Babinski, ankle clonus or incoördination. Mentally dull. Swab from nasopharynx showed on culture pneumococci, staphylococci and micrococcus catarrhalis. Treatment: Diet, farinaceous, milk, fish. Pot.

citrat. 5 gr. liq. Am. Acet. 15 m. Hexamine 5 gr. aq. loz. 4 times a day. Lumbar puncture yielded 15 cc. clear cerebrospinal fluid, with a few lymphocytes but no organisms on culture. Headache disappeared under treatment; sight gradually improved; fingers with right eye at two feet; left eye at seven feet. Optic discs slowly cleared up. Albumen disappeared from urine. Was able to read ordinary print about a fortnight after admission; in three or four weeks was feeling quite well, with no headache; mental condition normal. One hot pack had been given, and one million pneumococci, vaccine; the tension of the hamstrings had quite gone. This condition of tension on hamstrings is found sometimes in cases of generalized infections, and as I have pointed out, is helpful in diagnosis in some acute abdominal infections. In a case seen, child six years, with acute abdominal pain and vomiting accompanied by diarrhea and fever, decision was made against operative interference chiefly on this sign. The fact that there was slight tension on hamstrings pointed to a blood infection—in appendicitis the same condition is sometimes seen, but only in *one leg*, viz., the right; and the pathology of this differs, as it is due to local and not general infection. [Author's abstract.]

Vogt. HEREDITARY EYE ABNORMALITIES. [Schweiz. med. Woch., January 26, 1922, Vol. LII, No. 4.]

The appearance in males only of hemophilia, dichromasia and other sex-linked hereditary defects and anomalies which are transmitted through the mother is discussed by this author in its relations to hereditary factors. The unpaired chromosome hypothesis is sustained by the nine new cases of transmitted red-green blindness which Vogt has studied in five different matings. He offers data hitherto lacking in human pathology. The paper records a genealogical chart of two new cases of red-green blindness found among 730 schoolgirls, and compared them with the previously published record showing eleven cases of hereditary degeneration of the optic nerve.

Rostedt. METHYL ALCOHOL BLINDNESS. [Finska Läkaresällskapets, March-April, 1921.]

America is not the only place where methyl alcohol blindness occurs. The author reports the cases in Finland occurring since 1917—and 1919, when total prohibition went into effect in that country. He reports sixty cases, in about half of which amaurosis, in the other half amblyopia, resulted. It was seldom possible to get an accurate estimate of the amount of alcohol consumed, but in eight cases this amount was computed at 100 to 400 grams. The percentage of methyl alcohol in methylated spirits being between 2 and 3, these patients must have taken 2.5 to 10 grams of methyl alcohol. The average quantity of methylated spirit taken being a quarter of a litre, the author gives 7.5 grams of methyl alcohol as the toxic dose so far as the eyes are concerned. He notes that pure methyl alcohol possesses only a third to a quarter of the

toxicity of ethyl alcohol, and that the poisonous properties of raw wood spirit depend on certain impurities, many of which have not yet been identified. In most of his cases disturbances of vision began during the third day after the alcohol was taken; during the next two to three days vision rapidly failed, and the improvement often observed during the following two to four weeks was seldom maintained. There was at first no limitation of the field of vision, and the outlines of the central scotomata were often diffuse. With the gradual atrophy of the optic nerve there was a concentric limitation of the field of vision. Loss of color sensation followed the same course, but no parallelism could be established between acuity of vision and limitation of the field of vision. After a couple of months the optic disc was pitted, pale, and often showed a green tinge.

Jervey, J. W. MONOCULAR RETROBULBAR OPTIC NEURITIS CAUSED BY PURULENT MAXILLARY SINUSITIS.

Jervey states that in the literature of the past few years he finds only two cases which directly connect pathology of the antrum of Highmore with optic nerve pathology. The cases of retrobulbar neuritis reported in connection with the paranasal sinuses practically all occurred as a result of infection of the posterior ethmoid and sphenoid sinuses. Jervey thinks, however, that as a large part of the orbital floor is constituted of the roof of the maxillary antrum, it is reasonable to believe that antral infection could and does at times involve the first nerve and its environs in the orbital apex. He reports a case of retrobulbar optic neuritis in the right eye with vision, with correction, 20/100. No disease was found of any of the sinuses except the right maxillary antrum, which contained a large quantity of pus, removed by irrigation. Two days later vision in right eye with correction equaled 20/70. The antrum was again irrigated and the following day vision with correction equaled 20/50. One week after this the tonsils and adenoid were removed and antrum irrigations were continued every two or three days. Seven weeks after the first opening of the antrum the cavity remained clean and the vision with correction equaled 20/15. He comments that it is true the tonsils and adenoid were removed during the course of treatment, but inasmuch as the ocular condition had shown immediate and continuing marked improvement following the evacuation of the antral pus, steadily progressing during and after tonsil operation, it seems fair to conclude that the maxillary sinus was the real atrium of infection. [Author's abstract.]

Strebel, J. RETROBULBAR NEURITIS. [Schweiz. med. Woch., February 10, 1921.]

This clinical paper calls special attention to changes in the shape of scotoma, in diabetics particularly. Chronic axial neuritis shows an oval blind area for red and green. In severe cases of the acute form of axial neuritis, the scotoma is pericentric and star-shaped. This four-point

star shape is generally the expression of inflammation from infection, or of toxic action or both. The oval chronic form is the manifestation of dystrophia and degeneration, and this diabetic papillomacular neurodystrophia is of grave prognosis. Every practitioner should test for central scotoma. A good qualitative test is with the stethoscope. Transient scotoma for red and green may follow even the smoking of a strong cigar.

Lafon. HOMOLATERAL MIOSIS FROM PARASYMPATHETIC REPERCUSSION IN AFFECTIONS OF THE HEAD. [Annal. d'oculist., October, 1921, p. 736.]

Unilateral affections of the head, traumatic or otherwise, according to Lafon may occasion an inequality of the pupils, in the form either of homolateral mydriasis or miosis. In the former case, the lesion, in general superficial, provokes an irritation of the centripetal fibers of the thorax lumbar sympathetic system which spreads to the bulbar pupillomotor nucleus of the same system, resulting in dilatation of the pupil of the same side. In the second case (miosis), the lesion, in general profound, provokes an irritation of the centripetal fibers of the cranial parasympathetic, or autonomous system, which likewise spreads to the mesocephalic pupillomotor nucleus depending upon the same system, giving rise to a narrowing of the pupil on the same side. Such mydriasis and miosis, from repercussion, are accordingly of the spasmodic type. Beside their homolaterality, they possess characteristics in common of not directly altering the sensorimotor reactions, and of not being accompanied by other elements of the syndromes of excitation or paralysis of the cervical sympathetic or third nerve; such anisocoria becomes more marked in darkness, while it diminishes and tends to disappear in bright light.

Amat. PROTEIN THERAPY WITH OPTIC NEURITIS. [Siglo Médico, June, 1921, Vol. LXVIII, No. 3523. J. A. M. A.]

Marín Amat reports the rapid cure after parenteral injections of milk in a case of intense intraocular optic neuritis or papillitis, with total amaurosis of the one eye involved.

Giron, J. INVERSION OF THE OCULO-CARDIAC REFLEX, A SIGN OF CEREBRAL COMPRESSION IN OTO-PETRO-MASTOID PATHOLOGY. [Rev. de Laryngol., d'Otol., e. d. Rhinol., December 31, 1921, p. 665.]

In 1915 Loeper showed that in cranial or cerebral traumata the oculo-cardiac reflex is often diminished or even abolished. Giron records three cases of bradycardia with inversion of the oculo-cardiac reflex observed in the course of otogenic abscesses giving rise to cerebral compression; on evacuation of the pus the inversion of the reflex gives place to the normal oculo-cardiac reflex. This is explained thus: the mechanical rôle of the abscess creates by hypertension vagus hypertonia and this brady-

cardia; if the excitation of the vagus reaches its limits, the vagus can receive no more excitation. If, now, to the cerebral compression produced by the abscess we add the element of ocular compression, the vagus cannot receive any more stimulation from the trigeminus nerve, and the reflex thus passes out by the sympathetic; thus, we have stimulation of the accelerator nerve fibers and a resulting inversion of the oculo-cardiac reflex. Giron regards this inversion of the reflex as an important sign of cerebral compression by otitic abscesses. [Leonard J. Kidd, London, England.]

Sergent. INEQUALITY OF THE PUPILS AS AN EARLY SIGN OF PULMONARY TUBERCULOSIS. [Bull. Acad. d. Méd., April 12, 1921.]

Inequality of the pupils in pleuropulmonary affections has been observed for many years. A study of the subject, especially in pleuritis of the apex, is here offered. The importance and frequency of unilateral mydriasis from irritation of the sympathetic as a diagnostic mark of early lesions—at times preceding all other signs—is especially emphasized. The same writer has studied a latent inequality rendered manifest by instillation of a weak solution of atropin, 1:1000. Before making the test, it is necessary to make sure that the eye itself is free from disease. After instillation, the beginning of the reaction must be observed attentively; it commences in general after ten or twelve minutes, and increases progressively to become complete at the expiration of twenty to twenty-five minutes; one pupil begins to dilate before the other.

Harman, U. B. CAUSES AND PREVENTION OF BLINDNESS. [British Med. Journ., November, 1921, Vol. II, No. 3175. J. A. M. A.]

Harman's remarks are based on an analysis of 4288 cases. Of sixty-three blind infants, thirty-six had surface inflammations of the eyes, thirty-one due to ophthalmia neonatorum and five to purulent conjunctivitis of later months. There were seven cases of inflammations within the eyes, two due to iridocyclitis of great severity, two to cerebrospinal meningitis, five to optic atrophy or defect. There were nineteen cases of congenital defects. The total number of blind and partially sighted children brought into this inquiry is 3300. Surface inflammations were responsible for 699 cases of which 299 cases were the result of ophthalmia neonatorum. Of 919 cases of inflammation within the eyeball, by far the greater number are of congenital syphilitic origin, interstitial keratitis, iritis or iridocyclitis, disseminated choroiditis with or without optic atrophy. Congenital defects were present in 408 cases and were of great varieties, defects of the crystalline lenses heading the list with 248 cases. The cases of high myopia not due to syphilis numbered 1235. Harman also analyzes blindness in 925 persons of all ages as ascertained in private practice.

III. SYMBOLIC NEUROLOGY

2. PSYCHOSES.

Boven, W. CONDITIONS OF DEVELOPMENT WITHIN THE FAMILY IN SCHIZOPHRENIA AND IN MANIC-DEPRESSIVE PSYCHOSES. [Arch. Suisses de Neur. et Psych., Vol. VIII, No. 89.]

The author presents an interesting study of family characteristics which should serve as a guide to the physician in determining the probabilities of mental disease in the children of such families. Naturally it cannot be definitely foretold whether all the children or only individual descendants will fall victim to the indicated psychosis but where in a family there is one member already mentally ill and such abnormal characters as described are present in the family or if, merely, several forms of abnormalities are present among brothers and sisters of candidates for marriage psychosis among the descendants is to be predicted.

Among the ascendants of schizophrenics certain abnormal characters play a large part and schizophrenia may be expected to flourish where they are present in a family. These may present themselves in various forms but all represent an attitude of unsociableness as a fundamental family trait. This appears as ill-nature, brutality, quarrelsomeness, hardness, suspicion, deceitfulness. In childhood the unsociableness takes on a more passive form, anxiety and timidity, shyness, uncommunicativeness, blind obedience. These manifestations are frequently followed by dementia precox, particularly if some trauma to body or mind has acted as a precipitating cause. If two individuals possessing these traits marry they intensify their force in their descendants. In families where there is mental disease of the manic-depressive type there are manifest all varieties of melancholic disposition without alteration of the social instinct while there are also fewer anomalies of character than in schizophrenic families. [J.]

Haverkate. LATE RECOVERY FROM KATATONIA. [Nederl. Tijdschr. v. Geneesk., October 15, 1921.]

Very little is to be found in textbooks of psychiatry about late recovery from katatonia. Kraepelin states that in 13 per cent of the cases recovery takes place, or at least improvement bordering on recovery, but that a relapse is very likely to occur, even after an interval of ten to twenty years. The duration of improvement is usually two to three years, but it may be nine to sixteen years, and Kraepelin has seen a case of recurrence after twenty-nine years. In Raecke's series of 200 cases of katatonia the duration of cases ending in recovery was rarely more than two years; forty-six of the 200 recovered, but in only three of these had the disease lasted three to four years, and cases of recovery with a duration of illness of more than four years were not observed. Kreuser in 1900

reported twelve cases of recovery from katatonia in which the disease had lasted more than seven years, and twenty-one recoveries in which it had lasted from four to seven years. The case of longest duration in which Kreuser had seen recovery take place was twenty-one years. The longest duration of a case on record of katatonia which finally recovered is that reported by Fromme in which the disease had lasted thirty years. As a rule, however, katatonia seldom ends in recovery after it has lasted two years. Haverkate reports the case of a man, aged thirty-four, who made a good recovery from katatonia after eight years' illness, and was able to obtain work as clerk in an insurance office and obtain promotion, his mental condition being good at the time of publication, two years after his recovery.

Bevis, W. M. PSYCHOLOGICAL TRAITS OF THE SOUTHERN NEGRO WITH OBSERVATIONS AS TO SOME OF HIS PSYCHOSES. [Am. Jr. Psychiat., 1921, Vol. I, No. 69.]

The negro race evinces certain traits, habits and behavior that seem sufficiently important to make the consideration of these peculiarities worth while. These characteristics affect and color the psychoses most often seen in the negro. The talent for mimicry seen in this people is remarkable. Miscegenation has produced significant effects upon the race, but limited observation of the negro family of the south will show that there are still hundreds of pure black African stock. Healthy negro children are bright, cunning, full of life and intelligent, but about puberty there begins a slowing up of mental development and a loss of interest in education, as fun and sexual matters begin to dominate the life and have the first place in the thoughts of the negro. The untoward effect of excesses and vices are potent factors in the production of mental diseases. Motion, rhythm, music and excitement make up a large part of the life of the race. All negroes have a fear of darkness and seldom venture out alone at night unless on mischief bent. It is the conscious or unconscious wish of every negro to be white. This is brought out in his dreams, in the hope of being white in the eternal life and in his delusions. Secret orders with their mysticism, ceremonies of initiation, parades and marches in highly colored uniforms greatly fascinate both men and women. Naturally, the most of the race are carefree, live in the "here and now" with a limited capacity to recall or profit by experiences of the past. Sadness and depression have little part in his psychological makeup. The religion of the race is unique in that it is not taken as seriously as is superstition. The two are so interwoven it is difficult to tell where one begins and the other ends. Of all his peculiarities, fears and superstitious ideas stand out most prominently. With all the handicaps resulting from fears, low ideals, and primitive notions, it occasionally happens that the negro youth is fortunate in having the proper guidance and sufficient work to prevent him from making a complete wreck of his physical and mental life. Spurred on by a good example

and a wholesome desire to be an exception and a leader who can help the race, many profit by the opportunities offered even in the south to secure a good education and develop into most excellent citizens. The number of cases of alcoholic psychoses is surprisingly low. Suicide and suicidal tendencies are almost absent in colored patients, the ratio being about one to three thousand in state hospitals. The incidence of cerebrospinal syphilis and paresis is relatively low in the southern negro. Manic-depressive psychoses are observed to occur in higher percentage than that given by Green in 1916 (17 per cent). The manic phase is the one nearly always seen. Dementia precox stands at the head of the list of the colored, catatonic form occurring about twice as often as in the white, and paranoid form coming next in importance. Mechanistic classification of the psychoses of this race show that nearly all are dissociation, compensatory or repression types. [Author's abstract.]

Uyematsu, Shichi. THE PLATELET COUNT AND BLEEDING TIME IN CATATONIC DEMENTIA PRECOX. [American Journal of Psychiatry, July, 1921, Vol. I, No. 1.]

Forty-five catatonic dementia precox patients were most carefully studied in regard to the bleeding time and the number of platelets. In contrast to other diseases of the central nervous system, the catatonic patients showed decided shortening of bleeding time and marked increase of platelet count. It is interesting to note that the same condition was demonstrated in cases of hypothyroidism. Basing his discussion on the above results and several other studies the author considers the possible relationship existing between catatonic dementia precox and hypothyroidism. It is a fascinating article and a valuable contribution to the field, although no definite conclusion has been reached. [Ed.] [Author's abstract.]

Dacpitt, H. A STATISTICAL STUDY OF THREE THOUSAND CASES OF MENTAL DISEASE. [New Orleans Medical and Surgical Journal, August, 1921.]

The author reviews the first three thousand admissions to the New Orleans City Hospital for Mental Diseases, employing the classification recommended by the National Committee for Mental Hygiene. The figures should be accepted as indicative of conditions in the southern states. In estimating the percentage of the various groups, a study of his tabulation is found to show that some nine hundred and seventy-eight belong to the psychoneurotic and substandards without definable psychosis.

Senile psychoses carefully limited to those mental disorders beginning in the involutional period totaled two hundred and thirteen. The traumatic group, those following head injury, etc., thirteen cases. Psychoses depending on cerebral arteriosclerosis, seventy-five. General paresis showed the greatest number, four hundred and forty-three (white:

males two hundred and twenty-three, white females fifty-five; colored males one hundred and fifteen, colored females fifty). Cerebral syphilis with psychosis, fifty, in proportion of six males to one female. One case of psychosis of the organic reaction type was observed associated with Huntington's chorea. Brain tumor (confirmed) five cases. Manic depressive amounted to two hundred and eighty-eight, in proportion of three females to one male. One hundred and two of these were colored females. Involuntional melancholia, averaging about three females to the male, totaled one hundred and eighteen. Only thirty-two cases were observed in negroes. Three hundred and twenty-five cases of dementia precox, with the greater number in males, are recorded. Paranoid states, and paranoia rare, not admitting classification with the precox group, one hundred and thirty-one. Males predominate about two to one. Twenty-four instances of psychoses developing in pellagrins are noted. Epileptic psychotics amounted to one hundred and fifty-one. Two hundred and thirty-three acute alcoholism (simple) are noted. Nine cases of mental disease depending on epidemic encephalitis were seen. Of the parietic group more than 50 per cent were married and of these over 80 per cent after the syphilis had been contracted. [Author's abstract.]

Comby, J. MONGOLIAN IDIOCY. [Médecine, August, 1921, Vol. II, No. 11. J. A. M. A.]

Comby has observed that the mongolian imbecile is often the last child of a large family, the mothers physically exhausted or worried. Hence this type of idiocy is rare in countries with a low birth rate. He gives thyroid extract systematically in all such cases, and has noted decided benefit from it although nothing like the miracle in myxedema.

Riggs, C. Eugene. THREE NEUROPSYCHIATRIC NOTES: EPILEPSY, LETHARGIC ENCEPHALITIS AND THE DEMENTIA PRECOX SYNDROME. [Minnesota Medicine, April, 1921.]

Epilepsy: Experience confirms Hughlings Jackson's remark that there is no such thing as ordinary epilepsy. One can recall patients supposedly suffering from essential epilepsy in whom a month or possibly years afterwards, optic neuritis and the objective signs of brain tumor appeared. Dr. James Taylor, London, reports the observation at Queen's Square, of two cases of apparently chronic epilepsy; in one the symptoms developed four, in the other seventeen years before any signs of a brain lesion were recognizable. In two of my cases the epileptiform seizures occurred in one patient two months, in the other six months before the symptoms of a brain tumor were apparent. Autopsy in all these cases revealed large neoplasms. Epilepsy developing after the third decade is due to an unrecognized petit mal, a nocturnal epilepsy or an organic brain lesion. Diagnosis is rendered more difficult by the fact that organic epilepsies may respond as favorably to anticonvulsive drugs as those of the essential type. Spasmophilia is frequently mistaken for

epilepsy. If it is kept in mind that the former occurs between seven months and three years—rarely as late as the sixth or eighth year—that it is seen usually in the spring or fall, that it manifests a trinity of symptoms, namely, laryngeal spasm, tetany and convulsions, and that there is a marked mechanical and electrical irritability of the motor nerves, the differentiation will not be difficult. In the majority of epileptics, luminal is an excellent substitute for bromide. It is a safe, nonhabit forming drug and there are really no contraindications of its use. Very rarely is there urinary disturbance or a rash necessitating discontinuance. The dose varies from two-thirds of a grain to one grain three times a day; intractable cases may require temporarily from six to nine grains in twenty-four hours. The dosage should be gauged so as to avoid drowsiness.

Lethargic encephalitis: According to Professor Netter, there have been more than fifteen hundred cases of this disease in Paris and ten thousand in other parts of France during the past year. Classification as to type is futile. There are many varieties of virus, states a recent editorial in *The British Medical Journal*, capable of causing a diffuse inflammation of the central nervous system and producing a clinical picture of an acute nervous disease, its symptoms depending on the point of initial localization of the infection, and the distinction between these as yet is far from absolute. A differentiation of lethargic encephalitis from typhoid fever, acute miliary tuberculosis, tubercular meningitis, acute chronic symptoms and neurosyphilis, is a matter of real difficulty. The important fact is that there is a form of encephalitis with a definite pathology possessing a clinical syndrome which has in common a variety of symptoms observed in all forms of encephalitis, yet manifesting certain distinctive characteristics, its cause being a virus separate and distinct from that of influenza, poliomyelitis or any of the infections involving the central nervous system. Abortive and ambulant cases commonly escape recognition. Patients suffering from so grave a disease as inflammation of the brain should not be allowed to continue their normal activities even in the absence of fever, vomiting or headache. The cardinal symptoms are somnolence, cranial nerve palsies and fever, yet the occurrence of diplopia, although transient, and blurring vision without ascertainable cause, should always be investigated. Lymphocytosis is the exception, not the rule; a marked or persistent lymphocytosis suggests either a tubercular or luetic meningitis. Since there is no evidence that an antibody appears at an early date in the blood, Netter does not advise the intraspinal injection of serum taken from a recovered patient. He combines adrenalin with pilocarpin, thus safeguarding the heart, to assist in elimination. The treatment that has given him most benefit is the creation of an artificial abscess by the injection of from fifteen to thirty minims of turpentine into the outer side of the thigh. Bond has observed improvement after dental attention, thyroid therapy and lumbar puncture. The only thing in my experience to give positive relief is lumbar puncture.

The dementia precox syndrome: Manic-depressive insanity, dementia precox and paranoia are a malevolent triumvirate. The precox syndrome is the least clearly defined. What is supposed to have been paranoia, observation has shown to have been the paranoid forms of dementia precox. Paranoia is a definite clinical entity, manifests no hallucinations and is of rare occurrence. The characteristic feature of manic-depressive insanity is recovery from the individual attack with a diabolic tendency to recurrence. A fundamentally defective mental mechanism, a failure in biologic adjustment is basic in all these psychoses. Precox is an unfortunate term but no longer misleads if one accepts White's interpretation that it is a *precocity* of dementia, not of age. Symptoms vary greatly depending upon the time when the mental mechanism is involved in the course of its evolution. Age, therefore, possesses a real significance. Pubescence, because this mechanism is in the process of evolution, is most to be feared (8 per cent of recoveries); adolescence more favorable (13 per cent), and adult life distinctly so (50 per cent, Beaton). Causative influences are endocrine disturbance, toxic influences, infections and cerebral traumatism. Recovery may be startlingly sudden; after months of apparently hopeless illness the symptoms may disappear, the patient being able to return home within a week or ten days, apparently perfectly well. The dementia precox syndrome is a waste basket in which all the psychoses of which we are unable to make a diagnosis are cast and it includes a wide range of cases not found in our classic conceptions of the disease, thus offering a more hopeful prognosis than was ever conceived of by Morel and Kraepelin. The delusions, hallucinations, illusions and mental confusion are suggestive of a toxic psychosis, not necessarily a precocious dementia with a background of neurodegenerative taint, or a failure in the evolution of the organism with glandular defect and a faulty metabolism. Only in this way can we explain the remarkable results reported by Dr. Beaton, which my experience confirms but finds much too small. [Author's abstract.]

Robinson, William. THE FUTURE OF EXSERVICE PATIENTS IN MENTAL HOSPITALS. [Journal of Mental Science, January, 1921.]

In this communication the author states that since a change of legislation regarding the treatment of incipient mental disorder is contemplated, a change which is likely to increase the discontent already existing among the relatives of exservice patients, it is well to emphasize the following points: Firstly, large numbers of exservice patients have been sent to mental hospitals after prolonged treatment in military hospitals, solely because they were considered incurable. Secondly, the provision of small local mental hospitals for exservice patients would not only involve extraordinary expenditure, but might lead to serious fatalities, since the forms of mental disorder from which they suffer are imperfectly understood by those who make the greatest outcry. Thirdly, it appears that the exservice class presents the following differences from

the ordinary male patients admitted to a mental hospital: (1) The history of hereditary instability is more frequent. (2) A criminal history is more common. (3) The incidence of alcohol and syphilis as causative factors is unusually great. (4) Amentia is more frequent. (5) The percentage of cases of general paralysis is much greater. (6) The recovery rate of direct admissions is unusually small. (7) The mental disorder, apparently attributable to injury, wounds and gas poisoning, has occurred among potential psychopaths. Finally, it would be impossible to arrive at any other conclusion than that the majority would have been in mental hospitals sooner or later had there been no war, while the minority would have formed the prewar group of waifs and strays, inhabitants of the casual wards of workhouses and of civil prisons.

Krabbe. FAMILIAL DEMENTIA PRECOX. [*Acta Med. Scandinavica*, April, 1921, Vol. LIV, No. 5.]

Krabbe describes from Copenhagen three sisters with schizophrenia and myoclonus. The family tree shows three with dementia precox out of twelve in the second generation and six out of twenty-four in the third generation, including the three sisters with myoclonus in addition. The fourth generation has twenty-seven members, and all seem normal. The family is Jewish and eminent in commercial life. The founder of the family married his cousin, and his wife's mother also belonged to the same family. The dementia precox seems to be a recessive mendelian quality in the family.

Keschner, M. ABNORMAL MENTAL STATES ENCOUNTERED IN A DETENTION PRISON. [*Am. Archives of Neurology and Psychiatry*, April, 1921, Vol. V, pp. 382-397.]

After describing the clinical material with which a physician of one of the detention prisons in New York City has to deal, the author concludes that there is no such thing as a physical criminal type. The number of inmates presenting stigmas of degeneration is not greater than one would ordinarily find among the free population. The futility of statistical studies as regards the proportion of mentally abnormal persons in prisons is then pointed out. The conclusion, however, is reached that the number of mentally abnormal persons in prisons is unusually large but what the actual percentage is, is purely a matter of speculation. For purposes of studying mentality as a factor in crime, the prison population is divided roughly into four large groups: (1) The accidental criminal. (2) The occasional criminal. (3) The insane criminal. (4) The habitual criminal.

(1) The accidental criminal or "criminal by passion," shows, as a rule, no defect of intellect or character, except that emotionally he is somewhat unstable. Numerically he plays a comparatively minor rôle in forensic psychiatry. His previous reputation is generally good and he never commits a crime for gain or revenge.

(2) The occasional criminal, shows no gross defect of intellect but possesses little will power. His power of discrimination is—below par. He is easily influenced and is of unstable character. The members of this group become criminals when quite young. They commit crimes against nature, person, and property. This group represents approximately three-fourths of the “detention” prison population. Many of these become habitual criminals. Under this heading is also discussed the so-called “criminal by adventure.”

(3) The insane criminal. By an insane criminal is meant a person who as a result of a psychosis commits a crime. This group constitutes a small fraction of the prison population, and is discussed under the headings of “commitable,” and “noncommitable.” Psychopathic states due to toxic or infectious conditions, except those of alcoholics and drug addicts, are rarely encountered in detention prisons. The most difficult problem in forensic psychiatry are presented by the periodic insane and the epileptic who commit crimes during an episode of insanity or during a pre- or post-paroxysmal state. Among the noncommitable cases are included the paranoid states without deterioration, the querulous and the militant women.

(4) The habitual criminal group is subdivided into (a) the instinctive, (b) the professional or incorrigible, and (c) the feebleminded criminal.

The instinctive criminal—the so-called prison rounder—shows no defect of intellect but is a moral monster. He resorts to criminality as a sole means of making a livelihood. The professional criminal, as far as character and personality are concerned, is not unlike the instinctive criminal, except that he is more resourceful, and more conceited. He represents the aristocracy of the criminal world.

The feebleminded criminal. This group is the most heterogeneous one: it includes all borderline cases and all persons who commit anti-social acts on account of defect of intellect as well as of character, the latter being the result of the former. These are called defective delinquents and include the cases of so-called constitutional inferiority. Such constitution may be congenital or acquired. Under this heading, following Scholtz's classification, are discussed: (1) the indolent, (2) the depressed, (3) the maniacal, (4) the impulsives, (5) the imperatives, (6) the pathologic liar, (7) the epileptic, (8) the perverts, (9) the prostitutes, (10) the kleptomaniacs, (11) the alcoholics, (12) the drug addicts, and (13) the hysteric.

The study is concluded with a discussion of simulation of insanity among prisoners awaiting trial for the purpose of evading the penalty of the law. Some of the common mistakes that simulators make are: (1) the exaggeration of individual symptoms; (2) absurd and entirely wrong answers to ordinary questions; (3) wrong combination of symptoms of different psychoses, and (4) a too sudden onset or recession of symptoms. [Author's abstract.]

Austregesilo, A. CATAPHRENIAS. [Brazil Med., January 15. 1921. J. A. M. A.]

Austregesilo has been teaching for some time that the curable cases of dementia precox and similar diseases should be classed apart, and for this class he has coined the term cataphrenia. A wide variety of causes, from syphilis to epidemic encephalitis, may induce this spurious dementia precox. It includes many cases of manic-depressive psychosis of a confusional type, posttraumatic psychoses, curable chronic confusion, delirium of a catatonoid type, confusional hysteric psychoses on an oniric basis, and probably many cases erroneously labeled dementia precox although the patients finally recovered. He adds that in the classic description of dementia precox by Kraepelin in his textbook, he alters the description somewhat in each succeeding edition. Time will probably define still more clearly this notion of cataphrenias.

Robertson, G. A PSYCHIATRIST'S REVIEW. [British Med. Journ., Saturday, March 12, 1921.]

The physician-superintendents of what is now known as the Royal Edinburgh Mental Hospital have accustomed us to expect that their annual reports shall partake rather of the nature of disquisitions on current psychiatric topics than detailed statistical statements. We propose here to make some comments on three topics, of interest alike to the profession and the public, dealt with by Dr. George Robertson in his report for 1920.

Some five-and-twenty years ago the late Sir Thomas Clouston, then physician-superintendent, induced the managers to build a hospital on a fine site in the outskirts of Edinburgh for the reception of private patients; the success of this hospital—Craig House—has surpassed the highest expectations of those who promoted it. Of the 126 patients admitted last year to Craig House no fewer than 66, or more than half, entered as voluntary patients. The procedure is simple: an application is made to the physician-superintendent in writing, who, if he thinks proper, admits the patient, and a similar application is sent to the board of control, which gives its sanction without further formality should the application be clear and unambiguous. The whole amounts to little more than notification. Dr. Robertson asks, "if the majority of patients of the richer classes are prepared to enter a mental hospital voluntarily for early treatment and without certification, and if their financial and other interests are sufficiently safeguarded by a formality which resembles notification," why should not similar facilities be available for the poor? At present the only course open, even in Scotland, to a person afflicted in mind, and not endowed with wealth, is to submit to certification as a lunatic and to be committed under an order granted by a sheriff. It is, Dr. Robertson says, useless in these circumstances to hope for the adoption of early treatment; he thinks that the Act of 1857 should be amended, and that the financial difficulty would be overcome were the government

grant in aid, given to assist in the maintenance of certified parochial patients, also given for voluntary parochial patients. Another but much more expensive plan by which early treatment can be obtained in Scotland is by temporary residence in a nursing home. This plan, it would appear, is approved by the board of control, for Dr. John Macpherson, one of the medical commissioners, in his address at the celebration of the centenary of the Dundee Royal Asylum, said: "We are inclined to think that adjunct houses, in which patients afflicted with certain forms of insanity could be received without the strict legal formalities at present recognized, would prove a beneficial modification of our asylums." The managers of the Edinburgh Mental Hospital are in sympathy with this proposal; they have already established two such houses or homes, and hope to open a third this year.

The second topic of general interest discussed in Dr. Robertson's report is the policy of the temperance party in Scotland in seeking to secure total prohibition of the sale of alcoholic beverages when the vote under the Scottish Temperance Act was taken last year. As will be seen from the table reproduced on p. 401, the percentage of admissions to the Edinburgh Mental Hospital in which alcoholic excess is believed to have been the exciting cause has progressively declined in both sexes since the beginning of this century; alcoholism was less frequently assigned as a cause among women than among men, and the decline among them has been very remarkable. In the seven years before the war alcoholic excess was given as the exciting cause, on the average, in 9.6 per cent of the cases in women; in the following seven years the average was 2.6; last year the percentage was only 1.0. It is pointed out that the number of cases of insanity alleged to be due to alcoholic excess is little more than a rough means of gauging the amount of excessive drinking in a community. "It only represents a fraction of the evil done to the nation by intemperate habits, just as the number of balls that find their way into the Swilcan Burn would represent a fraction of the bad play over St. Andrews Links." Still Dr. Robertson is not prepared to prescribe total prohibition for all, and in this he undoubtedly shares the opinion of his predecessor, Sir Thomas Clouston. "A simple and direct procedure like prohibition," he says, "may appear to be a very obvious remedy for the evil, but we have been well warned by Herbert Spencer that in a complex organization like civilized society such interference often brings with it consequences which are worse for the social body than the disease it is intended to remove." Owing to this attitude Dr. Robertson is regarded by the temperance party as a source of weakness, in spite of the views he has expressed on the subject of excess. His retort is—if that party had been content to advocate a reduction of licenses they would probably have been rewarded with success.

Dr. Robertson, it will be remembered, is professor of psychiatry in the University of Edinburgh, and the third topic of general interest

treated in this report is psychoanalysis. The theory of repression he regards as the main pillar of psychoanalysis, and that, he holds, leads inevitably to the conception of an unconscious, yet active, mind, for the repressed subject, "though forgotten, is not annihilated. It continues to exist unconsciously, and this not in a passive state, but as an active, though unsuspected, force." Freud's work, he considers, is continuous with that of two great teachers of the Edinburgh school; thus the unconscious mind is but an elaboration of the psychological aspect of Professor Laycock's famous hypothesis of "reflex, automatic, or unconscious cerebration," applied by him to account for the phenomena of delirium, dreams, and somnambulism. The idea of repression was grasped by Sir Thomas Clouston when he wrote in 1880: "The intense and complete outward repression and inhibition of certain physiological cravings required by our morals and our civilization causes, no doubt, a dangerous strain on the brain functions and a reaction in other directions, where there are hereditary neurotic weaknesses." And in another place he said: "The psychological analysis of what female modesty is, by a physiologist, reveals the transformation and apotheosis in the higher regions of the brain of reflex impressions from the reproductive organs into a high moral quality, not only beautiful, but absolutely essential to social life." Professor Robertson then goes on to point out how the theory of conscious and unconscious forms of mental action is in accord with the views enunciated many years ago by Hughlings Jackson, that the higher nervous arrangements were evolved out of the lower, and kept down or repressed the lower, just as a government evolved out of a nation controlled as well as directed that nation. In dreams, the conscious level, tired by the day's work, is put out of action during sleep, and the lower unconscious level runs riot in primitive and illogical dreams and nightmares. In insanity the higher or conscious level is usually put out of action to a greater or less degree by obscure poisons, by exhaustion, or by both, and the patient suffers from dreams by day, or at least from delusions and "such stuff as dreams are made of." Professor Robertson, therefore, is grateful to Freud for what he has done to bring the working of the sound and unsound mind into line with and closer to one another. People, Professor Robertson thinks, are furious with Freud because he endeavors to make them realize the kinships of their own highly cultured minds to those of beings of a primitive, coarser, or inferior type, whether these be children, savages or animals. This aspect of the matter is fully discussed in the remarkable book on *Instinct and the Unconscious* by Dr. Rivers, which was reviewed in our columns of February 26, p. 305. The causes of such "fury" as has been displayed are other.

BOOK REVIEWS

Berguer, Georges. QUELQUES TRAITS DE LA VIE DE JESUS AU POINT DE VUE PSYCHOLOGIQUE ET PSYCHANALYTIQUE. [Edition Atar, Paris and Geneva.]

Bundy, Walter E. THE PSYCHIC HEALTH OF JESUS. [The Macmillan Company, New York.]

There was a time, early Victorian we think, when reproach was inevitable for one "who would peep and botanize upon his mother's grave." The uplifted eyebrow of disapproval has not entirely passed away when "man and monkey" are linked in casual relationships. Happily "touchiness" is being more and more comprehended as a subjective difficulty within the "sensitive" soul rather than a valid appraisal of the objective projection.

In the sphere of religious activities we also observe a broader appreciation of comparative values although the human animal still shows indubitable evidences of his adolescent emotivity and narcissism in his intolerance of other functional values than his own.

Human behavior has fortunately come to occupy the front row of interest and psychological valuations are being more and more subjected to careful judicial estimations. It is but natural that group behavior—as a special manifestation of the developing herd instinct, in both its ego and libido trends, should be submitted to analytical investigation and the newer psychological methods be found of transcendent value in such studies.

Religious groupings are among the most striking of such segregations and efforts to understand them in terms of inner affective needs are becoming more promising and more capable of reasonable discussion.

In the Western world those group behavior segregations more or less adhesive about the principles of Christianity and most intimately allied in their focal symbolizations to the person of Jesus have occupied a place of transcendent interest for the past two millenia. The functional values of this concentration have been appraised in thousands of ways and all along the line evidences of better and better understanding are pushing into more settled convictions.

The serious methods of science in this work of valuation have become increasingly applicable and none more promising, although as yet but falteringly followed. Reproach no longer deters, disapproval is sympathetically met with, and "touchiness" respected. Yet the research into group behavior and its inner motivation advances, and study of religious experience has become valuable.

These volumes are but two of a flood of witnesses to this advancing group of investigations that would better comprehend the workings of the human "soul." Different as they are in method, they are at one in their aim. Jesus as person, and Jesus as functional symbol are here dealt with.

Berguer sets forth, as a doctor in theology, the inner significance of the functional values of the symbolizations which reached concrete expression in the life, the sayings, and the influences of Jesus. He seeks to set forth the working utilities for society of the principles which underly the essence of Christianity. He does not discuss how far below the goal society as a whole still gropes. He throws light upon what that goal signifies, as worked out by serious students of the unconscious in its collective aspects. Utilizing the tools which at present are termed psychoanalysis he would offer some suggestions of the way these symbolizations are valuable in combating individual disintegration, through the phenomenon conceptualized behind the terms Introversion and Regression in their pathological settings. Christianity as a remedy in combating "soul" disease is what he tries to set forth, both in its individual and social aggregate sense. What it is, and how it works, these he makes a valiant and valuable attempt to outline.

Thus, to outline but one facet of his discussion in his chapter on "Temptations of Jesus" he would show how the mechanisms of "Introversion" work. As glimpsed by the psychoanalytic methods, particularly studied by Silberer [See his Problems of Mysticism, Moffat Yard and Co.] human introversion shows at least three characteristic trends which appear as functional compromises with spiritual death—*i.e.*, complete regression. [Suicide, murder, criminality: psychoses; stealing, dishonesty, dishonor: neuroses, etc.] These functional compromises are quite comparable to the three temptations of Jesus. Silberer enumerates them as (a) the relapse to magic; (b) the schizophrenic splitting; (c) the development of mysticism. When Jesus is tempted to change stones into bread he is faced with the magic formula—whose present-day face we speak of largely as pseudoscience. To "cast himself from the mountain and be unhurt" would require a schizophrenic dissociation from reality, whereas in the problem of the "money lenders," can be recognized, in Silberer's classification, the innumerable hypocrisies surrounding the conceptions and generalizations, relative to worldly power and success.

Much as one is tempted to deal further with Berguer's very able, even though fragmentary discussion, as to the functional values of symbols as factors in individual health and happiness, and social progress, we must pass to our second work.

Bundy's book is of different meat. As associate professor of English Bible in De Pauw University, he has the same theological platform, but his arrows go in quite a different direction. Bundy has been reading a number of studies relative to the imputation that Jesus was a lunatic, and that therefore no good can come out of

Israel. He does much more credit to biblical scholarship than can be found in the pathographers of the life of Jesus, and, in the reviewer's opinion, disposes of them in quite as conclusive a manner. Such pathographers, Soury and Binet-Sanglé may be singled out as representative, Chapter III, had they had the insight that Berguer, for instance, had had of mental mechanisms, would never have emitted the stupidities which Bundy disposes of in quite a different manner. Bundy annihilates them at the conscious level from the records. He shows that they were bad historical students. They were. And this work shows how ridiculously inadequate they were to handle the historical material. Here, too, had Bundy not relied too much upon what we, cognizant perhaps of a modified superiority in our "newer psychiatry," term the "static, descriptive psychiatry," he could the more completely demolish the Soury and Binet-Sanglé "paranoia" hypothesis.

The world of to-day, and this includes the Soury and Binet-Sanglé devotees, is all too prone to despise and deprecate what it is incapable of understanding. It all too frequently hides its ignorance of large affective reactions behind the deprecative terms, crazy, cracked, etc. It laughs at things which poets, philosophers and "dreamers" are trying to comprehend, and measures values, as in the third temptation of Jesus on the "money lenders", too much in the terms of worldly success. Thus if Bundy had become conversant with the problems that psychoanalysis has set itself to unravel, instead of relying upon the "Krafft Ebing" stage in neuropsychiatry, he would have found weapons to dispose of the pathographers of Jesus which would have given them as definite a consummation as that found by Hamlet in the final sword thrust to the lecherous uncle of that soul tragedy.

Yet in spite of his limitations he gives a wholesome coup de grace to those who would consider Jesus as a "paranoiac." Yet, suppose he were so appraised by the Soury-Binet-Sanglé group, still all too prevalent in our present-day conceptions, can no good come from the "psychopath"? Are not our biographies (pseudobiographies in aside) of all men of genius filled with smug derision at their "smallnesses," their "eccentricities," their "paranoias"? Are they not all made lower than ourselves [biographers ourselves] by the tittle-tattle of their stomachaches, their arithmetical fallacies, their group convention banality nonobservances? Do they not all give the lie to our most tightly hugged hypocrisies?

When Jesus at a supreme test, stated "render unto Caesar the things that belong to Caesar and to God the things that are of God" did he not state what psychoanalysis has shown that when *Ego* values and *Libido* values become entangled [displaced] then disaster follows in the Individual and in Society. When self-preservation instinctive trends become confused with creative [race propagation trends] the fat is in the fire. And the poet, the philosopher and the genius has always attempted to isolate and keep apart the things which belong to "Caesar" and those that are of "God."

In the turgid current of daily events these two volumes float up for consideration. They are both of interest and of value. They both show sincere effort and are backed up by honest workmanship. They are recommended to our readers as striking contrasts to many others, which perhaps are more vigorously applauded by their publishers but which are but the flotsam and jetsam in that same sea of many appearances. [JELLIFFE.]

Putnam, James J. ADDRESSES ON PSYCHOANALYSIS. WITH A PREFACE BY SIGMUND FREUD. [The International Psycho-Analytical Press, London, Vienna, and New York.]

No better introduction to this book and its purposes can be offered than that contributed by Freud in his preface. He writes: "The editor of this series must feel a special satisfaction in being able to issue as its opening volume this collection of the psychoanalytical writings of Professor James J. Putnam, the distinguished neurologist of Harvard University. Professor Putnam, who died in 1918 at the age of seventy-two, was not only the first American to interest himself in psychoanalysis, but soon became its most decided supporter and its most influential representative in America. In consequence of the established reputation which he had gained through his activities as a teacher, as well as through his important work in the domain of organic nervous disease, and thanks to the universal respect which his personality enjoyed, he was able to do perhaps more than anyone for the spread of psychoanalysis in his own country, and was able to protect it from aspersions which, on the other side of the Atlantic no less than this, would inevitably have been cast upon it. But all such reproaches were bound to be silenced when a man of Putnam's lofty ethical standards and moral rectitude had ranged himself among the supporters of the new science and of the therapeutics based upon it.

The papers here collected into a single volume, which were written by Putnam between 1909 and the end of his life, give a good picture of his relations to psychoanalysis. They show how he was at first occupied in correcting a provisional judgment which was based on insufficient knowledge; how he then accepted the essence of analysis, recognized its capacity for throwing a clear light upon the origin of human imperfections and failings, and how he was struck by the prospect of contributing toward the improvement of humanity along analytical lines; how he then became convinced by his own activities as a physician as to the truth of most of the psychoanalytical conclusions and postulates, and then in his turn bore witness to the fact that the physician who makes use of analysis understands far more about the sufferings of his patients and can do far more for them than was possible with the earlier methods of treatment; and finally how he began to extend beyond the limits of analysis, demanding that as a science it should be linked on to a particular philosophical system, and that its practice should be openly associated with a particular set of ethical doctrines.

So it is not to be wondered at that a mind with such preëminently ethical and philosophical tendencies as Putnam's should have desired, after he had plunged deep into psychoanalysis, to establish the closest relation between it and the aims which lay nearest his heart. But his enthusiasm, so admirable in a man of his advanced age, did not succeed in carrying others along with him. Younger people remained cooler. It was especially Ferenczi who expressed the opposite view. The decisive reason for the rejection of Putnam's proposals was the doubt as to which of the countless philosophical systems should be accepted, since they all seemed to rest on an equally insecure basis, and since everything had up till then been sacrificed for the sake of the relative certainty of the results of psychoanalysis. It seemed more prudent to wait, and to discover whether a particular attitude toward life might be forced upon us with all the weight of necessity by analytical investigation itself.

It is our duty to express our thanks to the author's widow, Mrs. Putnam, for her assistance with the manuscripts, with the copyrights, and with financial support, without all of which the publication of this volume would have been impossible. No English manuscripts were forthcoming in the case of the papers numbered VI, VII, and X. They have been translated into English by Dr. Katherine Jones from the German text which originated from Putnam himself.

"This volume will keep fresh in analytical circles the memory of the friend whose loss we so profoundly deplore. May it be the first of a series of publications which shall serve the end of furthering the understanding and application of psychoanalysis among those who speak the English tongue—an end to which James J. Putnam dedicated the last ten years of his fruitful life."

Putnam's work in neuropsychiatry is known to the readers of this Journal and it is with a special satisfaction to American workers to have his psychoanalytic writings brought together in such excellent form. The International Psycho-Analytic Press could start under no better auspices and this volume will repay careful study. It is entitled to find an extensive audience both among physicians and laymen.

There is an appreciative and delightful obituary by Dr. Ernest Jones of London, an excellent photogravure of Dr. Putnam and a complete bibliography of his psychological contributions.

Mott, F. W. ARCHIVES OF NEUROLOGY AND PSYCHIATRY. Vol. VIII. London County Council. [P. S. King and Son, London, 1922. 31s. 6d.]

This new volume from the Pathological Laboratory of the London County Mental Hospitals, now located at the Maudsley Hospital, London, consists, as have its predecessors, of collected and revised reprints of papers which have been prepared by members of the staff of the laboratory of the London County Hospitals. They represent mostly the activities of its director, Sir Dr. Frederick W. Mott.

There are seventeen papers in all, the majority dealing with

various aspects of the Dementia precox problem. Other papers are by Golla, F. L., on The Objective Study of the Neurosis; Donkin, B., on Mental Defect and Clinical Conduct; Morowska, T., on Gamma Rays and Brain Reactions and Study of Choroid Plexus in Paresis and Other Forms of Mental Disease; Gilfillan, J. A., Typhoid Carriers in Mental Hospitals; Mann, S. A., Chemical Examination of the Testes, the Chemistry of the Blood and Cerebrospinal Fluid in Epilepsy and the Urinary Metabolism in Epilepsy.

With Mott's general conceptions, slowly undergoing revision, our readers are aware. An early advocate of placing the emphasis on the somatic side of the problems of mental disease, Mott has come more and more to acknowledge the rôle played by psychogenic components in the production of mental disturbances. This gradual drift of opinion was most striking in Dr. Mott's discussion of the phenomena of the Traumatic Neuroses and Psychoses of War.

In the present volume of reprints the chief interest centers in his studies of the reproductive glands in dementia precox. Recognizing, perhaps tardily, the transcendent importance of the sex function for the race, and acknowledging Freud's contribution to the problem, although again reiterating the false statement that Freud considered the energy of the sex instinct the only driving force behind nature's purposes—a misstatement that is repeated again and again, although attention has frequently been called to this distortion of Freud's attitude, Mott has exhaustively studied the sex glands in dementia precox and finds them uniformly involved. He is inclined to see these as causes—whereas others regard them as effects; or perhaps, as some American students have done, sex gland changes are considered as a part of an interplay of factors which are as yet too extensive and too subtle to permit precise delimitations but that interpretation from the point of view of the function of the body as a whole—*i.e.*, psychological—should bear the accent, rather than placing it upon changes in any single group of structures, no matter how important they may be. At all events his investigations show the actual changes in the gonads, even if the interpretations are not so convincing.

Other papers have been reviewed in the Abstract columns of this journal. It is a distinct advantage to have them all collected in this most excellent volume.

Spielmeyer, W. HISTOPATHOLOGIE DES NERVENSYSTEMS. Erster Band. Allgemeiner Teil. [Julius Springer, Berlin.]

The mantle of Nissl and of Alzheimer has fallen upon worthy shoulders and fortunately for psychiatry the impulse given by these workers in histopathology promises to acquire momentum and gather harvests of value. The Munich Research Institute in Psychiatry lost Nissl almost at its inception but there were not wanting younger disciples and this excellent volume is one of the first evidences of activity in Nissl's chosen field.

The author tells us he had planned a "Lehrbuch" but the exigencies of the world war caused modifications of the projected pro-

gram and the present work was issued notwithstanding certain incompletenesses in the author's ideal.

A book of 500 pages of unexampled mechanical construction, beautifully illustrated and thoughtfully conceived is this *General Histopathology of the Nervous System*. Herein the author divides his material under the "pathological changes of the single elements of the nervous system," and the "pathological-anatomical symptom complexes." Changes in the Ganglion Cells, Nerve Fibers, Neuroglia and Mesodermal Tissues are described in the first section; Degenerative Processes, Central Changes due to Circulatory Disturbances, Inflammation, and Regeneration are discussed in the second section.

The masterly researches of neuroanatomy now reaching back many decades have resulted in the accumulation of a mass of data which have made anatomical-physiological knowledge of the nervous system the most accurate and complete of any "system" in the body. For the understanding of the anatomical substrata of the psychoses, however, such data are unavailing and Nissl's dictum that "fiber anatomy was not histopathology" has urged the investigator of the psychoses further and further into the details of cellular alterations in the effort to apprehend, if possible, the anatomical correlates of disordered psychological activities. Brodmann's masterly researches on cellular architecture, as an extension of the Vogts' studies of cortical integrations, and Nissl's delimitation of cortical functional units, served as the stepping stones to the detailed histopathological studies, which are here almost for the first time brought into systematic and orderly presentation.

These considerations and the details of the evolution of the problems connected therewith are outlined in Spielmeier's excellent introduction.

The precise and exhaustive working out of the detailed cellular alterations, those occurring in the nerve fibers, the neuroglia and the mesodermal tissues cannot be reviewed here. They must be read in this book, for nowhere have they been so well collected and evaluated for the purposes in hand of a general histopathology of nervous tissues. One need not be reminded that the most modern histotechnical methods are utilized in the elucidation of the general problems and the illustrations are of the most exquisite workmanship—mostly in colors, and very numerous. Nor is it possible in the space of a book review to deal with the various topics of the pathological anatomical symptom complexes. Here degenerative processes are sharply differentiated from those resulting from circulatory disturbances, and from inflammatory reactions. These chapters offer concise and clear concepts of the cellular changes found in the diseased central nervous system. They are partially correlated with so-called "diseases," but this series of topics will be discussed in a later volume.

We can only summarize our judgment after a preliminary reading of this work by saying that we consider it par-excellence the most valuable contribution in this field thus far produced. No technical

worker can neglect it, and all students of psychiatry will gain much from it. [JELLIFFE.]

Ferenczi, S., Abraham, K., Simmel, E., Jones, E. PSYCHO-ANALYSIS AND THE WAR NEUROSES. [International Psycho-Analytical Press, London, Vienna, New York.]

This volume, No. 2 of the International Psycho-Analytical Library, edited by Drs. Freud and Jones, presents in small and well groomed compass some most interesting and valuable discussions of the war neuroses. Their interest and value is not the least diminished in times of peace for it is shown with reasonable certainty that both ego and sex factors enter into both war time and peace time neuroses. What differences that may be shown to exist are differences of degree and not of kind and hence the present volume will always claim the attention of serious students of the neuroses.

Freud contributes an illuminating and noteworthy introduction, summarizing as he does the general features of neurotic illness which the psychoanalytic method has made partly comprehensible. He also sets forth the conditions surrounding the production of this volume, coming out of the discussion at the Fifth Psychoanalytic Congress in Budapest in 1918, which was attended by representatives of the central governments then engaged in war. He points out that many medical men of these governments had been brought into close contact with the psychoanalytic theories in their necessities for handling large numbers of war neurotics. Similar contacts in the Allies' medical service produced similar results and thus the principles of psychoanalysis were pushed into the foreground and shown to be valid and therefore valuable.

In this volume there is no attempt to say that the laborious methods have direct applicability to the direct treatment of neurotics under war conditions. No one recognizes better the fallacy of such a claim than the analytically trained medical man, but that the insight gained into the neurotic mechanisms, could by proper direction be made of service is most definitely shown in all of the four papers here given.

The ego component in the neuroses of peace had been universally recognized even before the war. The sex component as well. That the ego component in the war neuroses should have had special stress laid upon it was quickly recognized. In fact superficial observers considered it the sole component, and neglected or denied the sex component, and at the same time—assuming what they mistakenly thought to be the Freudian teaching that the sex drive was the only drive, inferred therefrom the falsity of the Freudian hypothesis. Jones had adequately dealt with this aspect of the problem in the present volume and shown most conclusively that the sex component plays a most important rôle.

We cannot further particularize this volume but can most cordially recommend it to all serious students of the problems of the traumatic neuroses.

OBITUARY

SIGBERT GANSER

A long life of fruitful scientific activity and devoted public service was ended with the death of Sigbert Ganser. He was born in 1853 and after his preliminary education became a student at the famous clinic of Rinecker in Würzburg, a clinic which combined mental, skin and sexual diseases. In 1877 he was sent by Rinecker to Munich to continue his studies under Gudden. The relation of the older and the younger man was one of peculiar sympathy in their mutual work. The fruitfulness of this period for Ganser appears in his works upon the anterior brain commissure in mammals, the peripheral and central course of the fibers of the optic nerve, the anterior corpora quadrigemina, the retina of a cat and especially the cerebrum of the mole which won him special distinction.

His work at Munich as student and later as docent brought him into contact with Forel, v. Monakow, the young student Franz Nissl and other prominent workers. After a period of service at Sorau he was prevailed upon by Kraepelin to take up work at Dresden following Kraepelin in the department for the insane in the municipal hospital. Here through the years that followed Ganser revealed his capacity for establishing and maintaining psychiatric service of a varied practical character. He was the organizer of city institutions for the diseased mentally and otherwise, a work which grew to such an extent that in time he was forced to limit his own special activity to the receiving department. This in turn he built up to be a great municipal clinic. Many other physicians owed a very valuable part of their training to this clinic. Ganser's occupation with it did not interfere with a number of other important activities. He was never content to leave clinical problems without serious investigation upon them. It was he who described the twilight state, studied the relation between alcoholism and hysteria and examined into alcoholic delirium in which work he outlined the interesting syndrome called "Ganser's Syndrome." He was much interested in the problem of alcoholism and founded an institution for its cure. He also instituted family care for the mentally diseased. His interest in

forensic questions won for him the high esteem of the courts where his opinion was sought.

He was a member of many associations of physicians within and without his own specialty. He was president or vice-president of more than one society and he himself was a founder with Wéber of the Dresden Forensic and Psychiatric Association and of the Conference of Psychiatrists and Neurologists of Middle Germany. His work was recognized by a number of orders and titles and he was given the position of state health officer. His private practice, where he was recognized widely as a consultant, as well as his contact with institutional patients revealed the sincerity and thoroughness of his work as well as his sympathetic concern for the welfare of the individual patient. He combined gentleness of character with firm self discipline and adherence to the tasks he saw before him.

JELLIFFE.

NOTES AND NEWS

The National Hospital for the Paralyzed and Epileptic, Queen Square, London, W. C. 1, England, is probably one of the British hospitals best known to practitioners in the United States. A welcome is always given to students in Neurology from the U. S. A., and the authorities like to meet them when passing through London, no charge being made for occasional visits to the clinics.

The School, however, has arranged three courses a year of Neurological lectures, demonstrations, of ward cases and pathological courses for the convenience of students in Neurology, the fees for these being on a moderate scale. The course usually lasts 8-10 weeks: January to March, May to July, October to December.

The Secretary of the School will be glad to mail the prospectus to any practitioner interested.

Biologic Neuropsychiatric Reunions.—Under this name, the physicians of the Asile Sainte-Anne at Paris are holding quarterly conferences to demonstrate the new biologic methods of research in nervous and mental diseases. At the January meeting, Claude gave tests of the polygraph, which records the solar reflexes and the oculocardiac reflex. Garrelon presented evidence that dogs in which hypervagotony is induced are more susceptible to the action of toxins. Aubel's data confirmed that functional tests of the liver demonstrate insufficiency of this organ in melancholia. A number of neurologists from home and abroad attended this reunion. The second is to be held early in April.

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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The Journal

OF

Nervous and Mental Disease

An American Journal of Neuropsychiatry, Founded in 1874

ORIGINAL ARTICLES

THE PSYCHOBIOLOGIC CONCEPT OF ESSENTIAL EPILEPSY *

BY L. PIERCE CLARK, M.D.

NEW YORK, N. Y.

The Association is to be commended in its decision to select the general topic of epilepsy for discussion, but it is unfortunate in confusing its one obvious symptom with that of other convulsive states. It links the disorder with that symptom the invariable presence of which has been seriously questioned by at least several members of this Society. Had the Association joined the disease with disorders of consciousness or with the varied aspects of deterioration, it might have been more applicable. For, after all, is not some phase of disordered consciousness the invariable accompaniment of all the epilepsies, and is there not some degree or kind of mental deterioration always present in any enduring epileptic state?

The issue raised is not purely an academic one, as it unconsciously prejudices the whole situation and tacitly limits consideration of the subject in one direction instead of considering the subject to be one of general deterioration. This undoubtedly will be the main line of research for some time to come whatever theory for the disease we may accept at present.

The Association is also to be greatly commended in selecting the subject of Epilepsy, if for no other reason than its great practical importance. I need not remind you that there are more than three hundred thousand sufferers from this disorder in the United States,

* Read before Association for Research in Nervous and Mental Diseases, New York, December 28, 1922.

and we have no reason to believe that other countries harbor any less than an equal ratio of similarly afflicted persons. As a distinct disease entity, if epilepsy may be considered as such, it outranks in numbers any other single nervous or mental disorder.

In length of unrelieved days of misery the epileptic is unique in the annals of human woe. Even though one of the prominent symptoms is disordered consciousness whereby the subject may not directly experience pain, the state is attended by as an enduring unhappiness as may be imagined, and which may be proven objectively if by no other index than the sorrowful mien and dejected attitude of the epileptic. His wretchedness has been a byword throughout the ages. Inasmuch as our art is a part of science we must recognize our obligation that epilepsy is a real problem of civilization, and we cannot shirk our task to continually attempt to solve the problem of Epilepsy, if not its mystery. After all, is its obscure origin any greater than the absence of exact knowledge regarding other vital modes of behavior?

At this point I want to announce the title of my paper as that of the psychobiologic concept of essential epilepsy, instead of psychologic, as it appears on the program, inasmuch as I shall stress the biologic features of my approach to the subject as being more fundamentally accurate than the purely psychologic ones. To make my presentation as brief as possible, I will adopt the juristic method and place my admissions before the commission at the outset:

First, I shall confine my remarks to the essential form of epilepsy and shall not include the various symptomatic manifestations of the disease with their admitted physical or chemical pathologies. The term *essential*, implying, as it does, that the nature is inherent, unfortunately prejudices at the outset that part of the thesis for which I am contending. I beg your leave to let this stand, however, to await such evidence and reasons as I shall give later. The term *genuine* is bound up with the morbid or anatomic pathology of epilepsy and the name is too vague and presumptive in many other directions for our immediate use, while the word *idiopathic* indicates there is no *obvious* cause for the disease—which is exactly contrary to that which I wish to imply.

Secondly, I admit that essential epilepsy is based upon organic, or rather upon a constitutional substratum, but not in the sense that it has a specific causative lesion in the cerebral cortex or elsewhere, as has been so often contended by others as well as myself in the past. When such lesions are found I am inclined to hold with Meyer, as Alzheimer did, and as Redlich has recently stated, that

the cerebral changes are but a symptomatic tissue expression of the antedating disease. Perhaps these lesions may partly cloud the clinical picture of the disease in its later stages; I do not know. The contention which I do *not* deny is the existence of various precipitants to the florid stage of the disease which have been endlessly detailed here and elsewhere, but I *do* deny that they are of full causal significance in such profound deteriorations as we see in the terminal stages of epilepsy. These alleged causes are but excitors to partial reactions; they may act as disturbers in organismic balance and are circumscribed in causative moment perhaps as releasers of the total reactions of the epileptic state, which latter state I believe is based upon a predisposition shown in certain individual characteristics that are specific. The constitutional defect of the disease then rests upon somewhat the same morbid basis of instincts as dementia precox and various psychopathic states independent of the psychoneuroses. Epilepsy, then, is a disease dependent upon a defective functioning of the whole organism, perhaps only seemingly closely related to the function of the brain and neural processes, as these are the structures and functions through which the correlation of normal and morbid behavior are expressed. Nothing less than a conception of the epileptic as a *functioning biologic whole* can give us a sufficiently large view of his innate defects. Hence the greater hope in future will be to make these new researches clearer. They will in greater part come from researches in biochemistry, social psychiatry and behavioristic psychology; otherwise our view of epilepsy will remain too static and formalistic, as it is to-day. Any method that aids us to this more dynamic view of life processes and reactions will be welcome.

Nothing has been wanting in exact descriptions of clinical and pathologic processes in this disease, and yet we are left in a *cul de sac* in understanding the epileptic and his morbid manifestations of seizures and dementia. Gradually we are widening our concept of the disease as a whole. Formerly we spoke of *epilepsy* and *the epileptic*; now the phrase is slowly being reversed at the endless behest of clinicians, who demand that the *epileptic* and not the *disease* must be the main concern of our therapeutics. Further, it is increasingly held to be a disease process broadly interrelated with many other disordered functions of the whole organism, and finally, we may look upon it as a morbid modal behavior pattern of the organismic-environmental contact, as a sort of disease gesture of a peculiarly inferior adaptive mechanism. The point of intensive study is beginning to shift from the disease process of fits as such,

which are the immediate and obvious symptoms of the disorder, to that of the *total life reactions* of these peculiarly afflicted individuals. We then view the seizure epoch more clearly as but a *part* of the disorder—the most dire, it is true, but yet only as a section of the total defect. We may thus look upon the fit disorder and its periodic loss of consciousness as condensed episodes of intensive epileptic moment. The furors, the deliria, and the manic excitement are similar chaotic rushes of the organism to a more or less certain final goal in status or dementia. This is but another way of thinking of the whole problem; but isn't that just what is primarily needed for us to gain a proper evaluation of the new approach? I venture to say that not one of us who has visited institutions for interned epileptics has not been more or less critical of the epileptologist's vague concern or his nonmeticulous exactness in what we as neurologists have been pleased to call *the* disease, the fit, and have noted how he endlessly points out the defects in the life reactions of his charges. By a practical living experience with the patients he has been forced to place the study of the epileptic as an individual on an equal or superior footing with the fit phenomena of his disease. Perhaps the wisest, most humane, and scientific approach to the disease is carried out at the Bethel Colony at Bielefeld and the David Lewis Colony in England, where the major management is in the hands of trained lay individuals. These and other considerations force us to recognize that our problem is not one of the test-tube and microscope solely, but is a broad psychobiologic one in which various partial reactions and static mechanisms help us to understand how all the vital processes are interwoven in an organismic whole. We may then comprehend at the advent of the epileptic as a patient at the first consultation that his disease is one whose classic description is classed as organic and chronic, and the latter not alone because the changes are a slow process, but one that is enduring and fixed. Often our best efforts as physicians are requisitioned in the final battle of an arduous and prolonged biologic conflict. No wonder we have covered ourselves with so little glory in neurology if we are appealed to as strategists of last resort whose chief function is to lay down an ineffectual barrage of sedatives—even Luminal. My almost daily preoccupation with epileptics for three decades has continually intensified my conviction that the future of the epileptic problem is one requiring us to take the very deepest concern in all the life activities of the epileptic if we are to relieve the patient. This means a more comprehensive study of all his life activities, not alone the physical and chemical problems of his purely internal economy. A short sojourn

in living relations with the epileptics will teach us much. However hopeless the solutions to the problem may have been in the past, it is really only a little less hopeless now than our chances were in fighting tuberculosis but a few decades ago, or in the terminal process of many organic diseases of to-day where, in spite of everything done, as in brain tumor cases, but a bare 2 per cent fully recover. Nothing but a full realization of the totality of the problem involved, and by moving our armamentarium nearer to the etiologic source in these perverted biologic processes, will give us an increased fighting chance.

We may ask, are there enduring evidences of the disease independent of seizures and loss of consciousness? Everyone admits that in the vast majority of epileptics deterioration occurs almost at its seizure inception, and this is hallmarked in physical and mental stigma. Nearly all concede that independent of this marked terminal state there exists long before the dementia an enduring character failure or alteration of the ethical, emotional, and perhaps intellectual status. Such investigators as Vogt, Sommer, Bonhöffer, Kraepelin, Kirchoff, Oppenheim, Nothnagel, Turner, Voisin, Echeverria, Pilcz, and a host of others, may be cited to show that the two foregoing statements need not be further defended, and such are properly not debatable here. Again, I presume no one seriously contends that the seizures in themselves, any more than the continued exhibitions of sedatives, actually produce this deterioration. In other words, the neural or other vital processes which underlie the fit phenomena are really responsible for this deterioration. Many instances are on record in which the process of deterioration is not checked even when the fits cease. In other words, we are dealing with certain types of vital processes that are responsible for the deterioration.

Inasmuch as Bleuler's study of the deterioration of epilepsy based upon histopathologic changes in the cortex (marginal hypergliosis) has no longer proven tenable, in that such students of the subject as Alzheimer have shown that his cases of marked dementia showed no marginal gliosis whatever, a specific pathology has yet to be discovered. Probably when present such cortical changes or scleroses when otherwise situated in the brain are but the residual or resulting pathologic symptoms of more intangible causes perhaps chemic or physical, but still more probably a resultant of a failure on the part of the epileptic organism as a whole to make proper adaptation owing to the faulty make-up already discovered. This latter view is still more likely in that the presence and absence of gross or microscopic lesion deterioration may be present. Indeed, MacCurdy cites a case

of a man of fifty, resident twenty-five years in the Manhattan State Hospital, who, though many years before death without convulsions, showed continuous deterioration, and yet at death the brain showed no abnormality either gross or microscopic, and the brain was not dissimilar in changes from that of any normal man of fifty. In Southard and Thom's study of epileptic dementia they found there was virtually as much dementia in cases of epileptics having normal looking brains as in cases having decidedly abnormal looking ones. We are therefore forced, as elsewhere noted, to give the state of deterioration the same functional or biologic interpretation as in other portions of this work. If it were possible the inference that the frequency of seizures made the deterioration would be comforting and simple, but here again one finds this criteria is far from satisfactory inasmuch as we have elsewhere shown the epileptic deterioration often continues in the absence of attacks and the severest states of deterioration are often seen in those having few fits. Binswanger claims that deterioration is dependent not only upon the number of attacks, including abortive ones, but on the mental status of the patient before the onset of the epilepsy as well, a view closely allied to that which accords with my own experience. The basis for this deterioration tendency in the make-up we have already taken up.

What are the salient characteristics of the mental status of the epileptics? They have been fairly well summarized by Vogt as follows: He states that even in the mildest forms of the disorder there is an alteration of the total personality. When this is carried to a higher degree we speak of the epileptic character (developed from the earlier alteration); beyond the "character" we find the epileptic psychosis. The epileptic character is a peculiar admixture of psychic components which are mutually antagonistic. Obstinacy and contrariness may exist with a high degree of superficial docility, which is apparently based on change of moods. Mendacity and ethical perversions may be seen with piety and pleasing speech; openness contrasts with distrust; misanthropy with a childlike cheerfulness. Through all this variegated expression, however, one notes a general tendency to a severe ethical degeneration. The subject becomes unsocial, quarrelsome, is inclined to lie and to employ violence; hence the great forensic importance of the "character." The intellectual faculties may remain intact during the development of the character, until the epileptic psychosis develops with its well-known intellectual failure. This is naturally accompanied by persistence of the character changes—the piety, the narrowing of the horizon to self and family, the emphasis of trifles, and the lack of judgment.

The patient undervalues his disease and his mental state as he magnifies his own importance and becomes arrogant. Vogt finally adds that in gloomy moods the affects are one-sided, monotonous, and superficial; or they are irritable and manifold. The subjects are sensitive, feel uncomfortable, are whimsical, and "know it all"; they show great obstinacy, distrust, and are inclined to outbursts of rage. Their intense irritability, their utter disregard and tendency toward violence, make them the most difficult and least welcome patients.

In brief, we see here a gradual aggregation of rigidity of the whole personality. Its salient characteristics may be defined in the egocentric character and supersensitiveness; the latter is a corollary of the former and results in a limitation of the richness of emotional life. I am aware that the very cautious may say these personality faults cannot be of dynamic importance, least of all for so severe a disorder as epilepsy, and that they may be found more or less in every individual. Almost any alienist may thus similarly meet a seeming defeat in giving expert testimony when he is asked upon what one specific detail he judges a demented person as insane. It is quite absurd for us to try to find the vital facts in any other than the total living processes of the epileptic. But even if this criticism is permitted, the time to use it for a telling defeat is not yet. The next point is the one still in great debate: Whence comes this rigid and early contraction of personality and character? It has long been held that the disease process, whatever it may be, induces it. This may be true in part, but any careful analysis of the previous histories of epileptics shows that all the disorganized faculties and traits glaringly manifested *after* the fits occur are present in the make-up of the potential epileptic. Whenever they are absent one may well doubt the disorder as being essential but rather to be symptomatic in character and import. As yet the full detection of these primary faults in the so-called preëpileptic history is not universally recognized, but such good clinicians as Turner, Kraepelin, Bianchi, and Vogt find it, and one of the reasons why it has been slow of acceptance is that the majority of epileptics first come under observation in private or ambulatory clinics where there is neither the time nor the skill necessary for a careful psychologic examination. Kraepelin finds the presence of the character not only in the previous history of the epileptic, but also present to a greater or less extent in the family stock of 87 per cent of his material. In my experience, aside from the well recognized forms of neuropathy, I find the epileptic character is usually exhibited in the ascendants

in the form of high volatile tempers and all they connote. But observers who have been chiefly neurologically trained, as Redlich, see it in a smaller per cent and consequently attribute a minor rôle to its significance in the epileptic process. In a hundred consecutive private cases of my own, where careful checking up is possible, it was invariably found in all essential epileptics. The data is in process of publication.

The next point, and one which has less general acceptance as yet, is the contention that by and large this preëpileptic make-up constitutes the *real predisposition* to the disease—that it is the essential dynamic element in the induction of the disease as we know it to-day. It is contended that these primary defects are profound and far-reaching; in fact, they pervade the whole vital reactions of the individual who possesses them, and the make-up, as the integrating nucleus of the organism, induces or permits a series of varying physical faults which are organized and remain undeveloped; taken as a whole, the state produces an inferior organism which cannot withstand the environmental demands and sooner or later breaks under the strain. The name of this strain or stress factor is *legion* and is usually unconscious. Indeed, most frequently it is entirely hidden from the conscious mind, otherwise the individual would react away from the stress to his salvation.

The advent of the epileptic state in seizures may be best illustrated by citing very briefly an example. It is necessary to do this because the essential contention of my thesis rests upon this point.

The case is that of a man of sixty-seven years of age, who has had infrequent attacks of epilepsy since his forty-third year. A cursory examination revealed no epileptic makeup. He was a slenderly built man, so well preserved that he appeared to be at least a dozen years younger than he really was. There was no arterial degeneration and no physical or functional defects other than a mild degree of constipation, which followed some years after his epilepsy developed, and at a time when his occupation became most sedentary in character. The patient was placed under trained observation and the following facts in development were revealed:

His earliest childhood is unknown. It was, however, learned that at school he found it moderately difficult to learn. He had to study hard and fretted over his studies. His class standing was up to the average but he maintained it with great effort. He was especially good in mathematics. His reports were signed by his mother with the statement that she thought the standing "was good for such a nervous boy". Although he was quick and impulsive, very energetic and under a tension most of the time, he was obedient

and never exhibited tempers or rages. He was very sensitive and paid great attention to aches and pains. He was inclined to criticize others, and took advice and reprimands poorly. He liked to form his own judgments. He was very stubborn and set in his opinions. He always had a tendency to brood, to look on the dark side. In adolescence, he had but one love affair, which was broken off by the death of his fiancée. The sexual life was active and not unusual in its history. In middle life, several years before his seizures began and after he had been in the employ of the government, he showed poor concentration, became unambitious and lost confidence in himself. Never having made a wide acquaintance in his boyhood, in middle life the antisocial tendency grew upon him until he was almost friendless at forty-five years of age. He preferred to be alone at all times. He then became somewhat quarrelsome and dictatorial and a great stickler for having his own way. He also began to grow suspicious, resentful, easily offended, and held grudges for a long time. He soon became rather jealous and thought the world treated him badly. Dissatisfaction with his occupation and environment came on as he saw no evidence of release from the government position he occupied, in which the work was exacting and painstaking and the compensation moderate with no chance of advancement. His deeper interests in political and civic affairs began to dwindle and became perfunctory. Gradually he became less frank and open in his confidences with his business associates. He kept everything to himself, as that was the easiest way. If confidence was inspired from without he could still talk freely. He began to doubt the sincerity of all people and contracted his own "never too strong charitableness and sincerity". Finally he began to get the usual attitude of old government employees, that his work was not appreciated, that the government was indifferent and unfriendly to long suffering servants, and he talked of little else than these injustices. (He has now been thirty years in the government's employ.) He became definitely committed to a routine and was exacting about the way he did everything, doing his work in a methodical way. His finicky ways about personal belongings now spread to the minutest details of his work at the office. He was strong in his demands for precision and order in everything and felt relieved and free only when this feeling was gratified. He began to worry and fret when this feeling was not met. An exaggerated demand for truthfulness and justice, especially the latter, began to grow upon him. Gradually he lost the little initiative he had possessed and submitted, but with growing intolerance, to the "domination" of his superiors. He then began to day-dream and plan how it could all be changed for the better if his superiors would but accept his advice, which they seemed to seek less and less. He lost courage and hope. He became moody all the time as a sort of protection in some way—probably to gain comfort or respite from the growing irritation of his work and his associations. He then began to worry about his health, which had always been perfect since a young boy. He finally failed to make any effort

to overcome his despondency and the fixed mood of dejection became more or less permanent. Soon he found irritability and outbursts of temper were growing upon him, especially under the slightest criticism. He finally lost interest in his work completely, and at last lost all satisfaction in life; he was "never known to smile from one year's end to another". He went automatically to work following a set routine, a "government hack". He then became a "cog" in an intolerable government system which he detested but which he continued to be a part of from necessity. The repression and depression deepened until it was thoroughly intolerable, although he did not openly rebel. He kept the year-long grudges to himself until a few days before his first grand mal attack, when he was suddenly called upon to take up two men's work in mid-summer. He felt he should die from the indignity and humiliation to which he could not object, and he had his first grand mal attack. Since then a periodic discharge slowly accumulates every month and he has repeated grand mal seizures. In his prolonged vacations he "feels like a new man" and has no attacks.

I submit that the inherent traits shown in this man passed to their logical conclusion in an early psychic deterioration which occurred long before his epilepsy broke out, and when the sudden and insistent demand of irritative stress was placed upon such a deteriorated makeup, an epileptic reaction was the logical consequence.

Before leaving this case I may say that our patient was born in this city, of normal healthy parents, was college-trained in his country and abroad; in business life at 23, he went from one unsuccessful occupation to another until he finally located in the government employ at about 37 years of age, some six years before his first grand mal attack. He had, however, begun to show the psychic deterioration sketched several years before he entered the government service.

Thus we see in our psychobiologic view of essential epilepsy that, given the epileptic constitution and a sufficient amount of environmental stress, the epileptic career is inaugurated. The attacks are looked upon as vital breaks in such contacts in which the disorder or loss in consciousness is its pathognomic symptom. A study of the mental content in transitory deliria, already published, has shown that the resultant of the fit is a profound regression; the seizure is an acute and condensed epitome of the long drawn out deteriorating processes which follow in a personality imperfectly endowed for healthful life adaptations. Usually every patient follows a more or less definite pattern of automatism of the same degree of severity of attacks. These definite acts or remarks are as com-

monly present as the convulsive pattern of the seizure itself. There are, as is well known, many modifications of the severity of the petit mal; in consequence different levels of unconscious strivings are tapped. In time one may get to recognize these varying levels and govern the interpretation accordingly. Everything being equal, however, the mildest attacks of petit mal bring out a content most compatible with conscious, every day desires and engrossments.

The only new principles we are putting forward for debate are: Do we find a fairly constant epileptic personality present *before* the attacks begin, and is such a makeup the real predisposition to the clinical phase of the disease? In other words, is the epileptic constitution dynamic in causing the seizure epoch of epilepsy? When we turn to the practical aspects of handling epileptics as individuals we find an astonishing confirmation of our views. Interned epileptics are really no different from those who visit our offices aside from the existence of a little more deterioration and perhaps have a more meagre economic and cultural background. Epileptologists in charge of interned epileptics pay particular attention to their charges as persons peculiarly endowed and having a life history of primary importance. The whole plan of care and treatment is of the individual as a whole, as a living vitally reacting personality. They recognize the presence of the invariable stigma of the disease which in most instances they perhaps rightly mark only as a certain grade of mental and physical deterioration. The fits, furors, delirias and manic excitements are but different rates of speed in the deteriorating process as a whole. We have been so long trained in studies of part-reactions in studying nervous disorders that we may feel that these practical epileptologists are not properly or scientifically aware of the intricate problems of the fit reaction; but a more thorough acquaintance with their methods convinces us that the epileptologists at the Bethel Colony at Bielefeld, at the Craig Colony, and at Gallopolis are on the right track toward solving their problem, and their treatment is based upon the broad concept of the epileptic individual in totality. These dynamic views by no means disturb the most active pursuance of the chemic, physiologic and pathologic studies of the epileptic but these part defects are only a small part of the whole organism. I submit that the latter are secondary in point of importance to the fundamental defect of the epileptic character and the modal reaction of this makeup. From our viewpoint it is as absurd to look for an exact anatomic seat for the causative cortical lesion or lesions in essential epilepsy as it is for that of

consciousness, or mind itself. All these phenomena, morbid and normal, are but vital modes of a functioning organism; the epileptic makeup is a defect in the integrative activity of the organism, whether the bad habits are physical, in concrete acts, or in the most abstract processes, of thinking itself. It is possible we shall never know what these particular instinctive defects really are, possibly not until we know what the life process itself is, but that does not hinder us from knowing the *how* of the process if not the *why*. The general biological understanding of man is just beginning but through the development of physical science and especially in biochemistry, physiology and anthropology we now have some beginnings for a basis of our science. Signs of its advent are present in clinical psychiatry and behavioristic and social psychology.

Space does not permit our outlining in detail just how the different factors in the makeup warps the whole growth of the organism. This must be left for another occasion. We must rest content with the general formulations given here. We may briefly summarize the main points of this thesis:

Essential epilepsy is intimately bound up with the epileptic individual as a whole and is an essential morbid vital response of such a defective individual at the behest of environmental stresses which he cannot meet without periodic seizures and loss of consciousness resulting in a flight or abreaction from reality. The seizures are but brusque condensed episodes of such excess stress at different levels of adjustment. The various alleged excitants are just these, which act upon the fundamental predisposition, the epileptic makeup. The fit is but a regressive and protective mechanism resorted to by an overstressed organism. The furors, deliria and excitements are similar to the foregoing and but mark the moments of more rapid deterioration in an otherwise slow combustion, so to speak, which if unrelieved leads to dementia. The inherent makeup is the important dynamic element, and is the predisposition to the epileptic seizure epoch or career. Properly speaking essential epilepsy is one of deterioration based upon a defective primary endowment of a particular and unique pattern common to all of this class of nervous invalids.

This thesis is really a contribution to the accumulated biologic studies of Child and his group, the physiologic biology of Herrick and Sherrington, and the psychology of Dewey and MacDougal. It is an attempt through clinical and psychologic means to gain a better understanding of vital processes in disease such as these scientists are outlining for so-called normal life reactions.

ANTERIOR SPINA BIFIDA AND ITS RELATION TO A PERSISTENCE OF THE NEURENTERIC CANAL

REPORT OF A CASE, IN ASSOCIATION WITH POSTERIOR SPINA BIFIDA, INTRASPINAL PONS, MEDULLA AND CEREBELLUM, ABSENCE OF PINEAL BODY AND TENTORIUM CEREBELLI, AND ABNORMALITIES OF THE CEREBRUM, CARDIAC CIRCULATION, DIAPHRAGM, STOMACH, PANCREAS AND INTESTINES

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It has frequently been stated that the term spina bifida was introduced by Tulpus. This term was accepted by Forster, Sammelname, and later Koch, to designate localized defect in the vertebral column, in contradistinction to the term rachischisis which they used to denote more extensive involvement (1). Tillmanns (2) was more general in the use of the term spina bifida and applied it to congenital cleft of the vertebrae, either posterior, lateral or anterior. He used *spina bifida aperta* in the equivalent sense of rachischisis, and *spina bifida cystica* to denote the more localized lesions; numerous subdivisions of these terms were made by him.

Descriptions of this malformation appeared as early as the seventeenth century (3). More important contributions on the subject, however, were later made by Recklinghausen (4), Muscatello (5) and others. A consideration of the literature has shown that posterior spina bifida has occurred rather frequently, about one in a thousand births (6), while anterior spina bifida has been very rare.

Anterior spina bifida was first described in 1810 (7). Numerous observations have been recorded since that time. This abnormality has occurred involving the cervical, thoracic, lumbar and sacral regions. In the upper divisions of the vertebral column, it has commonly been associated with other defects in the vertebrae, and defects in the cranium, and visceral cavities. When present in the sacral region, it has been of less serious consequence.

In association with anterior spina bifida, the structures of the spinal canal have frequently been connected with some part of the alimentary tract by a cord or a tube composed of nerve tissue and smooth muscle, or by a slit-like opening, through the cleft in the

vertebrae, particularly when the abnormality involved the upper divisions of the vertebral column.

When the cleft in the vertebrae occurred above the attachment of the diaphragm, the associated abnormalities were most marked. There was commonly a retromediastinal peritoneal extension in which was usually contained a part or all of the stomach, held there either by attachment to the opening in the vertebrae or by a shortened oesophagus. In a few instances loops of the small intestine were drawn into the retromediastinal peritoneal extension and were more or less fixed to the defect in the vertebral column.

When the malformation of the vertebrae was high in the cervical region, the defect frequently came into relation with the pharynx or esophagus and anchored that part of the primary alimentary tract and prevented its elongation in growth, with the result of holding the stomach above its normal level. When the defect was lower it frequently came in relation with the stomach through a funnel shaped diverticulum of that organ caused by its downward movement during growth. In several instances, as previously stated, the defect came into relation with the alimentary tract below the stomach. Other abdominal organs were frequently misplaced upward into the retromediastinal extension of the peritoneal cavity. The diaphragm was frequently defective, apparently more often on the left side, which permitted much misplacement of the abdominal organs into the thoracic cavities. When the diaphragm was markedly defective the retromediastinal extension of the peritoneal cavity was frequently less in extent.

The neural canal occasionally failed, more or less, to develop and was represented in some instances by a groove made up of vascular tissue. This area or groove has often been spoken of as "area medulla-vasculosa."

The relation of the spinal structures to the alimentary tract through the defects in the vertebrae varied greatly. In one instance there was wide communication of the greater curvature of the stomach with the exterior through a complete cleft in the vertebral column; stratified squamous epithelium joined the gastric mucosa in the walls of the slit-like opening. In several cases showing less defect, there was communication between a dilated central canal of the spinal cord and the alimentary tract through the opening in the vertebrae. In other cases showing still less defect, the spinal structures were attached to the alimentary tract by a cord composed of nerve tissue in the neural end and smooth muscle in the visceral end; there was frequently a conical shaped diverticulum from the

central canal of the spinal cord in the neural end, and, likewise one from the alimentary tract in the visceral end, however, without a lumen in the more central part. There have been a few cases that showed less definite attachment between the central nervous system and the primary alimentary tract.

The external appearance of infants with anterior spina bifida above the diaphragm has frequently presented certain characteristics. The neck has been short or apparently absent and the head has rested more or less between the shoulders. The chest has been rounded and somewhat shortened. The distance between the pharynx and the elevated stomach has been greatly reduced and in a few instances negligible. Defects in the brain and posterior spina bifida have usually been present, and likewise the peculiarities occasionally associated with posterior spina bifida, such as talipes varus or equinovarus, and the presence of much hair over the body.

I have found record of three cases with this defect above the attachment of the diaphragm that lived. One case lived sixteen months. A second case lived one and one-half years and died from bronchopneumonia. These two cases possessed a cord-like attachment of the spinal structures with the alimentary tract which did not possess a lumen. A third case was discovered by Oehlecker (8) after X-ray examination indicated by curvature of the spine. This child was six and one-half years old and apparently in good health.

Several cases have been more or less briefly mentioned in the literature which showed anterior spina bifida involving only the thoracic region; however, in most instances cervical vertebrae have also been cleft.

When the defect occurred below the diaphragm and above the sacrum, the small intestine was attached to the opening in the vertebrae, and communicated with the exterior by an opening which was considered to represent the abnormally situated anus. I have found one case limited to this region.

True anterior spina bifida is only found in the sacral region and is characterized by anterior meningocele. These cases have almost without exception lived to maturity. I have found sixteen cases on record occurring in adult females and one case in a girl eight years old. In addition two unusual cases were recorded which will be mentioned later. I have found no instance of anterior spina bifida limited to the sacrum in males, although the sex was not * * * mentioned in the description of one case. The significance of this association is not clear. In these cases, in most instances, obstruction to parturition and the finding of an adherent retrorectal mass

were the first indications of the presence of this abnormality. In a few instances the patients complained of constipation, pain, tenderness and some disturbance of bladder function. Enlargement of the abdomen was complained of by several patients. This cystic mass was tapped in several instances with unfavorable results. Removal by laparotomy has been repeatedly successful.

Case I. The child came to full term and was stillborn. It was a well nourished white male infant, measuring 38 c.m. in length and weighing 2110 grams.

The head was elongated anteroposteriorly and somewhat flattened from above downward. The neck appeared to be absent and the head rested between the shoulders. The hard and soft palate and uvula were cleft in the midline, commencing immediately behind the superior dental arch. The thorax and abdomen protruded, and the back showed moderate kyphosis in the upper dorsal and lower cervical regions.

There was posterior spina bifida with myelocystomeningocele of the lower dorsal, lumbar and sacral regions. Above this abnormality the vertebrae were normal for a few centimeters only. Between these normal vertebrae and the occiput, the vertebrae did not possess transverse or spinous processes; this region was covered with skin and appeared normal to inspection, in contradistinction to the area below which was covered with a brownish membrane and appeared to represent a collapsed cystic mass.

The testicles were undescended. The feet showed marked talipes varus. There was much hair on the head and it extended downward posteriorly, converging to a point opposite the manubrium. A persistence of lanugo was conspicuous over the entire body.

In the region between the normal vertebrae, showing spinous processes, and the occiput, the bodies of the vertebrae were cleft in the midline in the sagittal plane, and the halves arched laterally, forming an oval opening measuring 19 mm. transversely and 11 mm. vertically. The lateral halves of the cleft vertebrae showed concave depressions, forming lateral pockets, in which were found two pedunculated, arrow-shaped projections (rudimentary cerebellum) from the lateral surfaces of what was found to be medulla oblongata. The spinal cord with the pia arachnoid was attached anteriorly to the bodies of the vertebrae at the margin of the opening.

The spinal ganglia and the lumbar and sacral plexuses appeared normal. The fibers forming the brachial plexus took origin in the region of the lateral pockets and exchanged fibers on the walls of these pockets and left the spinal canal through numerous openings to form a modified brachial plexus. The gangliated cords of the sympathetic nervous system were apparently normal. Numerous nerve fibers entered the foramen magnum from the lateral surfaces of the upper part of the spinal cord, above the lateral projections.

The cerebrum occupied the entire cranial cavity and rested upon the base of the skull. No trace of cerebellum was in the cranium.

The cerebral peduncles passed immediately through the foramen magnum and were slightly constricted at that level. The falx cerebri was represented by a short crescentic fold extending from the top of the Crista galli upward. There was no tentorium cerebelli. The pituitary body appeared normal. The III, IV, V, VI, VII, and VIII cranial nerves left the cranial cavity through normal foramina. No trace of the IX, X, XI, and XII cranial nerves could be found in the cranial cavity, nevertheless, these were recognized along the course of their normal distribution. The optic nerves and the olfactory lobes appeared normal.

The cerebrum was of about average size for an infant of 2110 grams. The superior longitudinal fissure arched to the left. The right hemisphere was broader than the left and showed a deep longitudinal fissure situated 2 c.m. to the right of the superior longitudinal fissure and nearly parallel with it; this longitudinal fissure ended on the inferior surface of the brain; it measured 21 mm. in depth over the superior surface of the hemisphere.

The fissure of Sylvius was replaced on either side by three diverging fissures; the fissure of Rolando took origin from the middle one and was interrupted on the right side by the accessory longitudinal fissure. No attempt to form the island of Reil was recognized.

No trace of pineal body could be found; sections from the pineal region showed no pineal cells. No aqueduct of Sylvius nor corpora quadragemina were found.

The pedunculated, arrow-shaped, lateral masses attached to the spinal cord in the cervical region had the macroscopic and microscopic appearance of cerebellar tissue. No connection by cerebellar tissue between these masses could be recognized in histological sections of the cord. The part of the central nervous system below the level of the foramen magnum had the macroscopic and microscopic appearance of the pons and medulla. The pons measured 11 mm. anteroposteriorly and 18 mm. transversely, tapering slightly downward toward the medulla and spinal cord.

The appearance of the pons, medulla and lateral masses representing the cerebellum is shown in Figure 1. The olivary bodies crossed by the arcuate fibers could be recognized; this relation was confirmed by histological examination. Behind the lower part of the medulla was a small opening facing upward which represented the opening of the central canal of the cord.

The lateral masses of cerebellar tissue mentioned above measured 28 mm. long, 12 mm. across at the center, and 4 mm. anteroposteriorly. The long axis extended downward and slightly outward. The edges were slightly scalloped and rounded. The surfaces were covered by fine parallel ridges. The lateral masses of cerebellar tissue were situated 33 mm. below the foramen magnum. The lateral pockets in the vertebra, which contained these lateral masses, measured 48 mm. from one to the other.

Twelve ribs were present; the three lowest ones were floating ribs. X-ray examination of the skeleton failed to reveal further abnormalities. The diaphragm was defective on the left side beyond

a line from the left side of the vertebral column to the xyphoid cartilage. The stomach was dilated with fluid and extended into the left pleural cavity; the spleen was attached to the stomach and was found in the apex of the pleural cavity.

The heart appeared normal in size and shape. The pulmonary artery took origin in the right ventricle, showed a very large ductus arteriosus (see below), gave one branch to each lung, gave origin to the left subclavian artery, and continued as the thoracic and



Fig. 1: Drawing from a photograph of the inferior surface of the brain and spinal cord showing the relation of the lateral masses of cerebellar tissue to the spinal cord and brain.

abdominal aorta. The aorta came from the left ventricle, gave off two coronary arteries and divided into two branches, the common carotid and the left carotid; the ductus arteriosus communicated with the left carotid branch. The venous circulation appeared normal. The foramen ovale was open.

The fissures separating the lobes of the lungs were shallow. The neck organs were partly in the mediastinum, nevertheless, they showed no abnormality. The greater omentum was absent. The

urinary organs showed no abnormality. The suprarenals appeared normal. The testicles were on either side of the pelvic wall and the vas-deferens passed from them to the prostate. Below each testicle and in apposition with them was an oval mass 9 mm. across, which, upon section, was shown to be composed of very vascular smooth muscle and fibrous tissue; the peritoneum did not extend into the scrotum.

The dilated stomach was placed transversely in the abdomen and extended into the left pleural cavity. The small intestine entered the stomach in the midline posteriorly and passed through its wall obliquely beneath its peritoneal covering. At the pyloric end of the stomach there was a diverticulum; from the top of this diverticulum the liver and pancreas took origin.

Below and posterior to the esophageal opening, there was a diverticulum from the stomach extending upward to the cleft in the vertebrae where it was attached. This diverticulum was conical in shape and became more and more cordlike as it approached the vertebrae. A probe passed readily from the stomach into the spinal cord region. It was feared that the probe might have ruptured a delicate septum in this tubelike connection between the stomach and the central canal of the spinal cord. Therefore, this part of the connection was embedded in paraffin and every tenth serial section studied. I failed to find any trace of a septum in this tube. Near the stomach, the tube was composed of smooth muscle and was lined with nonspecialized mucosa. Near the neural end it was composed of neuroglia and was lined with ependyma. In the more central part of the tube the tissue and lining membrane showed less differentiation. The relation of this diverticulum to the stomach is shown in Figure No. 2.

The pancreas had an independent transverse and horizontal process. The liver appeared to be reversed; the larger part, or right lobe, appears to be on the left side and the left lobe on the right side. What appeared to be Meckel's diverticulum possessed two terminal branches. The diverticulum measured 20 mm. long and the branches 15 mm. and 8 mm. respectively. The diverticulum and branches possessed a thin mesentery. About 2 cm. beyond the tips of the branches and attached to them by a continuation of mesentery was a nodule 4 mm. in diameter. Upon section of this nodule it was shown to be divided into two hemispheres by a median septum and to contain caseous material. It was lined with mucous membrane resembling that of the intestinal tract. There was no muscularis in its wall.

The large intestine, save the rectum, possessed a fairly long mesentery. The caecum and appendix were normal. The distal part of the transverse colon was diminished in size to nearly that of the small intestine. The descending colon and sigmoid were very long and formed numerous coils in the lower abdomen. The rectum and anus appeared normal.

It is of interest to add that this infant was the first born to a mother twenty-six years old and a father considerably older.

Wassermann tests were negative on both parents at the time of marriage.

In a review of the long series of abnormalities in this case, certain features stand out as exceptional.

Posterior spina bifida usually occurs in association with anterior spina bifida of the cervical and thoracic regions. Myelocystomeningocele and talipes varus are occasionally associated with posterior spina

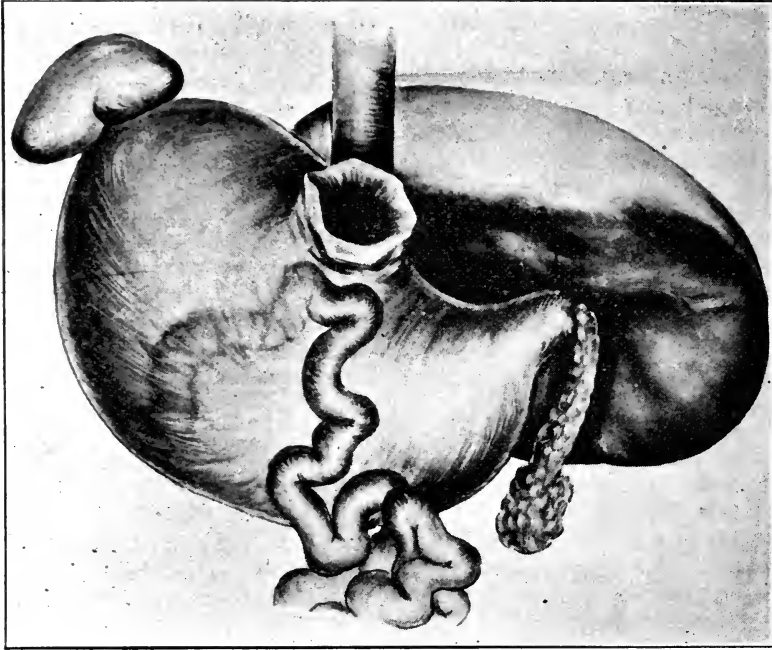


Fig. 2: Drawing of posterior view. The liver is tilted forward. Below and posterior to the oesophagus, is shown the diverticulum which was attached to the cleft vertebrae. Below this diverticulum the small intestine passes obliquely through the wall of the stomach.

bifida. Numerous abnormalities of the central nervous system frequently occur in association with spina bifida. However, I know of instance in which the pons, medulla and cerebellum have developed within the spinal canal. A part of the cerebellum not infrequently extends through the foramen magnum into the spinal canal in instances of spina bifida. E. Schwalbe (9) has discussed this type of abnormality at considerable length.

The associated abnormalities of the central nervous system in my case are very numerous. The cerebral hemisphere occupied the

entire cranial cavity. The tentorium cerebelli was absent. The right cerebral hemisphere was larger than the left and contained an accessory longitudinal fissure. The island of Reil was not developed in either hemisphere. The aqueduct of Sylvius, corpora quadragemina and the pineal body were absent.

It may be of considerable significance that this infant came to term, generally well developed and well nourished without the presence of the pineal body. This fact may be regarded as evidence contributing to show that the pineal body consists of nonspecialized and functionless cells.

Many abnormalities of the abdominal and thoracic cavities frequently occur in association with anterior spina bifida. Defects in the diaphragm and abnormality in the cardiac circulation are not uncommon. However, I know of no instance in which the liver and pancreas took origin from a diverticulum of the stomach; the pancreas possessed a horizontal and vertical process.

A summary of associated abnormalities is as follows: Posterior spina bifida with myelocystomeningocele; anterior spina bifida cervicalis; intraspinal pons, medulla and rudimentary cerebellum; absence of tentorium cerebelli; accessory superior longitudinal fissure in right hemisphere; absence of islands of Reil; absence of pineal body, aqueduct of Sylvius and corpora quadragemina; abnormality of cardiac circulation; defect in diaphragm on left side; abnormality of liver, stomach and pancreas; absence of greater omentum; bifurcated Meckel's diverticulum; abnormal arrangement of small and large intestine; undescended testicles; talipes varus.

Considerable knowledge may be gained from a study of the examples of anterior spina bifida given in the literature. Numerous cases are described with very little detail and are therefore omitted from the following summary. Several instances of tumor formation associated with defect in the vertebrae occur in the literature; these cases are likewise omitted from this series for the reason that the significance of this association is not clear.

A. Cases of anterior spina bifida occurring above the attachment of the diaphragm; those limited to the highest regions are presented first.

1. Veraguth (10) observed a case of "cranio-rachischisis posterior" reaching to a point 3 c.m. above the anus. Anterior spina bifida was present in the upper part of the vertebral column. There was a mass the size of a "hazel nut" in the region of the base of the skull and the upper part of the spine, which contained two loops of small intestine held there by connective tissue attachment.

The diaphragm was defective and the abdominal organs were partly displaced upward.

2. A cyst-like widening of the fourth ventricle, of the aqueduct of Sylvius and the cervical cord was observed by Muscatello (11) and was designated by him as *encephalomyelocystocele occipito-cervicalis*. At the bottom of the cyst was an opening into the esophagus. Upon histological examination, he found that the stratified squamous epithelium extended beyond and over the nervous tissue. That part of the esophagus was fixed and the diaphragm was at the level of the fifth dorsal vertebra. The cervical and upper four dorsal vertebrae were absent. There was a slitlike defect in the diaphragm. Budda (12) believed that the vertebrae mentioned by Muscatello as absent were most likely represented on either side of the slitlike opening in the bodies of the vertebrae by ununited segments.

3. Svitzer (13) observed a case of total "cranio-rachischisis posterior" in which the brain anlage was widened into a cystlike sac. Below this was a secondary sac in which was found a loop of small intestine. Through a defect in the diaphragm on the right side were projected the jejunum, ileum and descending colon into a retromediastinal pocket; these organs formed the content of the secondary sac. No attachment of the intestine to the neural canal was recorded. The slitlike defect in the vertebral column anteriorly involved all of the cervical and upper nine dorsal vertebrae.

4. The case described by Levy (14) showed "cranio-rachischisis posterior." There were two projections from the primary alimentary tract; the upper one represented the pharyngeal diverticulum which was the size of a pea projecting through a baso-occipital slit; the second one represented a serous cavity with loops of small intestines slightly attached to the neural canal. The retromediastinal peritoneal extension contained the stomach, duodenum, small intestine and ascending colon. The slit in the vertebrae anteriorly extended upward from the ninth dorsal vertebra. There was no connection between the neural structures and the alimentary tract.

5. Rindfleisch (15) described a case of *anencephalus* with *spina bifida posterior* and anterior. The bodies of all the cervical and thoracic vertebrae were cleft anteriorly. Through a widened foramen of the diaphragm had protruded the esophagus, stomach and small intestines into a retromediastinal serous cavity which reached the area of the medulla. The small intestines were attached to the central nervous system structures by a band of tissue. The lumbar and sacral vertebrae showed openings anteriorly which diminished in

size downward. Talipes varus was associated with this abnormality.

A description of the skeleton of the second case was also made by Rindfleisch.

6. The case observed by Schmid (16) showed the two upper cervical vertebrae to be cleft anteriorly in association with spina bifida posterior. A probe was passed forward from the neural canal through the cleft in the vertebrae for a long distance. Budda (17) believed that this probe must have passed into the pharynx.

7. Schlippe's (18) case showed complete "cranio-rachischisis posterior" as far as the sacrum. Immediately below the head region was a funnel shaped depression, the bottom of which was lined with mucosa; there was an opening in the roof of this depression which led into the pharynx and a second opening in the floor which led into the abdomen. This depression represented the open stomach. Beyond the stomach there was a serous cavity containing the spleen. The slit in the vertebrae anteriorly extended from the sixth thoracic vertebra to the atlas.

Risel (19) described three cases of anterior spina bifida in association with posterior spina bifida.

8. In the first case the cervical vertebrae were cleft anteriorly. A strand of nervous elements and meninges extended from the anterior surfaces of the medulla oblongata, which was elongated, through the defect in the vertebrae to the posterior wall of the esophagus. The esophagus was fixed and shortened, and the stomach was drawn up into a retromediastinal outpouching of the peritoneal cavity. The left half of the diaphragm was defective. The strand of tissue from the medulla oblongata was composed of nervous tissue and meninges which faded into rudimentary smooth muscle as it approached the esophagus; no lumen was present.

9. The second case showed a fissured occiput and protruding brain, or iniencephalus, and "rachischisis" anterior and posterior cervicalis. There was a cordlike projection from the anterior surface of the medulla oblongata to the posterior wall of the pharynx where it passed into the esophagus, or perhaps into the stomach which was drawn up and adjacent. The stomach was contained in a retromediastinal peritoneal outpouching. The diaphragm was defective on the left side. The histological characteristics of the cord attachment resembled that of the preceding case. The feet showed talipes varus.

10. The third case showed "encephalocele occipitalis" and "rachischisis" anterior and posterior cervicalis. All cervical and

the first three thoracic vertebrae were slit anteriorly. There was a cordlike connection between the central nervous system and the stomach; a funnel-shaped diverticulum from the stomach extended for a short distance into the visceral end of the cordlike connection; another funnel-shaped diverticulum from the central canal of the spinal cord extended for a short distance into the neural end of the cordlike connection; the center of the cord attachment did not possess a lumen. The stomach and duodenum were drawn into a retro-mediastinal extension of the peritoneal cavity. The left half of the diaphragm was defective.

11. Budda (20) described a case showing anterior and posterior spina bifida. The cervical vertebrae from the third to the sixth were split anteriorly. A cordlike attachment extended between the central nervous system and the stomach being situated near the opening of the esophagus. This connecting tissue did not possess a lumen in the more central part, although it contained a diverticulum extending out a short distance from the central canal of the spinal cord and another at the opposite end extending out from the stomach. It was composed of nerve tissue in the neural end and smooth muscle in the visceral end. The stomach was partly drawn into a retro-mediastinal extension of the peritoneal cavity. The diaphragm was defective on the left side.

12. Cruveilhier (21) described a case of posterior spina bifida in which all the cervical and the upper four thoracic vertebrae were cleft anteriorly. In the region of the slit in the vertebrae, continuity between the pharynx and the esophagus were interrupted. In a retromediastinal peritoneal extension were found a part of the liver and the stomach. The diaphragm was defective on the left side.

13. A case of anterior and posterior spina bifida with "encephalocystocele occipitalis" was described by Dammann (22). The anus was high in the back and opened in an upward direction. In a retromediastinal extension of the peritoneal cavity were found the spleen, duodenum, pancreas, the small intestines and a part of the liver. The cleft in the vertebrae anteriorly involved all the cervical and upper ten thoracic vertebrae. The esophagus reached directly to the meninges and was there attached; it was shown and the stomach was drawn up to join it.

14. The case of Morel-Gross (23) is most unusual. The vertebral column was cleft in the midline in the entire length. The opening gave wide communication of the greater curvature of the stomach with the exterior. The squamous epithelium of the back joined the

mucous membrane of the stomach along the wall of the opening. The esophagus and the duodenum communicated with the stomach.

15. Luksch (24) observed two instances of anterior spina bifida in association with posterior spina bifida. The one case was described in considerable detail by him. This case showed cleavage in the bodies of the thoracic vertebrae extending from the third to the sixth vertebrae. In a retroesophageal abdominal extension was a loop of intestine which opened out into and communicated widely with the "area medulla vasculosa."

B. Cases of anterior spina bifida occurring below the attachment of the diaphragm, other than those limited to the sacrum.

1. Rembe (25) described a case showing complete posterior spina bifida and anterior spina bifida below the diaphragm. He observed four openings in the lumbar region situated in the "area medulla-vasculosa." The upper one passed into the lowest part of the small intestine. The remaining three passed into pouches lined with mucous membrane. These pouches were not connected with one another. Rembe believed that the closing of the blastopore was more than once interrupted; the lowest opening represented the anus and the connection between the pouches existed primarily and later atrophied.

C. The subject of spina bifida sacralis anterior is given much consideration by Roux (26) and Tilp (27). Reference has also been made to this malformation by Frazier (28); he mentioned a case recently observed by Dr. Howard A. Kelly which was not included in the studies by Roux and Tilp. For a more detailed account of this type of abnormality, the reader is referred to their works. In addition to the sixteen cases of meningocele sacralis anterior previously referred to, there are two exceptional cases deserving consideration at this time.

1. Marwedel (29) observed anterior spina bifida affecting the sacrum and coccyx in a female child thirteen days old. There was a cyst situated between the intestine and the dura, which has no communication with either structure. This was successfully removed by surgical intervention and upon examination was found to be lined with mucous membrane.

2. Borst (30) operated on a child at three months of age and removed several cysts which were situated behind the rectum and in front of a defective sacrum. These cysts contained clear fluid and were lined with endothelium.

Budda (31) believed that communication between the spinal canal and the intestine existed and was later cleft on either side, in

the one instance isolating intestinal cavity and in the other instance serous cavities.

CONSIDERATION OF THE ETIOLOGY OF SPINA BIFIDA

Many experiments have been conducted on the embryos of lower animals in order to throw some light on the etiology of this malformation. Changes of temperature and trauma have in a few instances been followed by the development of spina bifida. Embryos treated by Richter (32) showed posterior spina bifida in association with "exencephalie" and in some instances only "exencephalie." Kollmann (33) observed modification of the neurenteric canal in duck embryos which had been overheated. Luksch (34) also obtained a variety of "myeloschisis" in duck embryos. The experiments of Hertwig (35) with ova of frogs in which fertilization was delayed, have shown some very interesting examples of spina bifida, and other abnormalities. In some instances the blastopore lips failed to close at either the cephalic or caudal end, and in other instances they remained open for the entire length of the vertebral column. A large number of investigators have observed abnormalities similar to the few instances mentioned here. I have found no record of successful experiments with the embryos of the higher animals.

In consideration of this malformation in man Marchand (36) and others believed that these changes were due to mechanical causes in embryonal life such as abnormality of the amnion, although heredity was mentioned as a possible factor.

The various theories relative to the etiology of spina bifida have been summarized by Roux (37) as follows:

1. For the ancients, for Ruysch, Rokitanski and Foerster, and for Ahlfeld in 1880, spina bifida was caused by hydromyelia; the fluid collected at the point of least resistance, preventing the closure of the vertebral canal. For Cruveilhier, Virchow, Ranke and Koch, it was necessary in addition, at least in certain cases, to have a primitive adherence of the cord and nerves to the skin and an insufficient separation of the medullary canal and the ectoderm.

2. According to the conception of Recklinghausen, Roux, Muscatello and Bockenheimer, the cause effecting the development of "rachischisis" and "myelomeningocele" was different from that effecting the development of meningocele and myelocystocele. In the first condition Recklinghausen believed it was due to a retardation in the development of the medullary canal. In the second condition there was a disproportion between the growth of the vertebral canal.

and the spinal cord; the cord grew faster than the spinal canal. Von Weiting rejected this theory for the reason that he found retardation in the growth of the vertebral column oftener in "rachischisis" than in myelocystocele, and stated further that this retardation was often lacking in the latter condition.

3. For Marchand, this malformation was caused by incomplete separation of the medullary placque and the ectoderm; the closure of the medullary canal was delayed or prevented. Through this adhesion with the ectoderm, or other embryonal layers, the vertebrae were prevented from closing the neural canal. There was no aplasia of the vertebral canal.

Fourneux, Martin and Koch believed that incomplete separation of the ectoderm and retardation in the development of the dorsal vertebral placques were equally responsible.

The committee of London to study spina bifida in 1885 concluded that this condition was due to a failure in the formation of mesoblastic tissue giving rise to the vertebral canal.

Ernst (quoted by Ashoff 1913) stated that the theory of hydrocephalus and hydromyelia as etiological factors in spina bifida were unsupportable, and that the persistence of the medullary placque through retardation in development was more probable ("area medullo-vasculosa").

The preceding theories relative to the etiology of spina bifida were considered by many inapplicable to the etiology of anterior spina bifida, and other theories appeared to explain this malformation.

Natorp and Vrolick stated that the bodies of the vertebrae have a double origin and that these lateral halves failed to unite. Kermauner was of the opinion that exaggerated curvature of the embryo, and Oehlecker that pressure on the long axis of the vertebral column prevented union of the lateral halves of the vertebrae. Neugebauer was convinced that spinal hydrops was sufficient in itself to explain this abnormality. Marwedel (38), Pupovac (39), and others have suggested that it might be due to a failure of the neurenteric canal to close.

Budda (40) was convinced that anterior spina bifida was due to a failure of the neurenteric canal to close and in addition to citing cases gave the following reasons for subscribing to this theory: The mammalian embryo in the gastrula stage corresponds to the lower vertebrates, even if somewhat modified by special intrauterine developmental conditions; all three germ layers meet in the vicinity of the primitive streak. At the anterior end of the primitive streak, the blastopore or canalis neurenteric connects the intestinal lumen

with the external surface at the site of the anlage of the medullary tube; this relation is proven in many classes of mammals and definitely so in human embryos. Kollmann and Luksch have the impression that communication between the gastrointestinal tract and the spinal canal at any level represents a persistence of the neurenteric canal; however, Marchand, Muscatello and Ernst accept this relation for only the caudal end of the embryo. Hertwig's experiments with overripe sperms and ova of amphibia support the former view. He observed symmetrical slit formation in the dorsal region. It is important to remember that the gastrula stage in the amphibia is somewhat different than in the amniotes. In the vertebrates there is a broad invagination of the external layer into the cavity of the blastula; this commences at a definite point and broadens spherically. The folds thus formed are called the blastopore lips and the opening connecting the primitive archenteron with the exterior is called the blastopore. The blastopore migrates posteriorly and fuses anteriorly progressively toward the cauda; the blastopore is pushed caudally until its last remain forms the anus. From the fused strips the primitive embryonal organs develop; from the ectoderm the medullary plate develops; from the entoderm the chorda dorsalis develops; and from either side the mesoderm develops. The proof of this conception is based on the malformations of Hertwig. He recognized two malformations: (1) The entire blastopore remained open and in both lips were formed a medullary anlage, a chorda and a mesodermal plate. (2) The slit formation was present in either the dorsal or caudal region, while the remaining regions came to normal closure.

Budda hesitated to apply the information concerning amphibian embryos to human embryos. However, he cited the case of Morel-Gross in which the stomach communicated with the exterior through a complete slit in the vertebral column, to prove that the observations of Hertwig on amphibian embryos are applicable to human embryos. He further stated that in the mammalian embryo, the first invagination of the blastopore lies in the region which later becomes the occipital area. The blastopore lips close in the midline anteriorly and the process of closure extends caudally. Thus the neurenteric canal migrates cranio-caudally. A localized failure of closure of the neurenteric canal would permit a communication with the gastrointestinal tract at any level. Robl believed that the blastopore closes from all sides equally toward the center and that the embryo grows from the anterior end only, thereby leaving the blastopore near the

caudal end. Budda stated that this theory would only explain lesions involving the caudal end of the embryo and could not be applied to lesions involving the higher regions of the vertebral column.

In the case observed by Budda, which lived one and one-half years and died from bronchopneumonia, the neurenteric band connecting the spinal structures with the stomach did not possess a lumen and no trace of ependyma or epithelium was found in its substance. He attributed this to retrograde changes analogous to those occurring in Meckel's diverticulum and in the olfactory and optical lobes of the brain; in these lobes no trace of ependyma can be found. Furthermore, the left half of the diaphragm was defective; the stomach was drawn up and held in the left pleural cavity by the neurenteric band which prevented the normal development of the diaphragm. Budda stated that the anlage of the diaphragm is in the region of the fourth cervical vertebra, and it later descends to the final level. If the neurenteric connection is above the diaphragmatic anlage, no interference with the descent of the diaphragm occurs. However, if the connection is between the anlage of the diaphragm and its final attachment, it is not possible for the normal development to occur.

I would like to mention here that many embryologists do not subscribe to Budda's view of the origin of the permanent anus.

These cases of anterior spina bifida with continuity of spinal cord and gastrointestinal tract indicate that human embryos may pass through a gastrula stage resembling that of amphibian embryos. This stage is especially represented by the case of Morel-Gross in which the stomach communicated with the exterior through a complete cleft of the vertebrae. In most instances the spina bifida has involved the one or other end of the vertebral column which bears some resemblance to anomalies produced in the experiments of Hertwig.

The author subscribes to the view that anterior spina bifida represents interference with the normal closure of the homologue of the blastopore. The mechanism by which this is accomplished is as yet obscure though the views of Budda appear to be the most feasible explanation that can be offered at the present time. Budda believed that the human embryos pass through a gastrula stage and that the blastopore or *canalis neurentericus* migrated cranio-caudalwards. Arrest or interruption in the process of migration of the blastopore may give rise to anterior spina bifida at any level of the vertebral column.

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ENCEPHALITIS DISSEMINATA*
AND THE DIFFERENTIAL DIAGNOSIS FROM ACUTE CEREBRAL MUL-
TIPLE SCLEROSIS, PSEUDO-TUMOR AND TUMOR
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There are variously incited, presumably post-infectious, *sporadic* cases on record in which multiple foci of infection have occurred in the nuclei of the brainstem, giving irregular combination-pictures of "superior," pontine and bulbar involvement. The cerebrum and the cord may also show foci of disease. Occasionally the cerebellum is likewise involved. Some of the meat-poisoning cases (Botulism) in the literature are of this type. In several of the very earliest cases observed (Leyden's), bulbar symptoms were most pronounced, and Bulbarmyelitis spoken of, or, as in Oppenheim's first case ⁴, the term *Polioencephalitis superior et inferior acuta* applied.

A disseminated, irregularly patchy involvement of both gray and white matter has also occurred in the brainstem in sporadic post-infectious cases, giving various manifestations in the extremities (pareses, paralyzes) beside paralyzes of cranial nerves. Indeed, the entire nervous system, brain, stem and cord, has also now and then shown invasion. The resemblance to an acute multiple sclerosis may be marked. In fact, the question has come up whether or not multiple sclerosis *is* not the resultant of such a disseminated affection.

These disseminated cases do not make a sharply demarcated group. One cannot give them an etiological caption,—they follow the infections (influenza especially), ingestion of toxins and other invalidations—nor do they topographically show any regular precision of election. The disease foci are scattered, the focus-center being now here, now there. At times the cord is mostly affected, at times the brain and stem. The predominatingly cord affections, namely, the myelitides, do not belong within the rubric of our subject, and need not be discussed here; it must be remembered, however, that such a myelitic "fringe" involvement may occur in the disseminated group we are studying. We properly designate such cases *polioencephalo-* or *encephalo-myelitis*; the preponderantly spinal cases (with only slight brain or brainstem involvement) we had best allude to as *myeloencephalitis*.

* This is the fourth *Report* of a series of studies on Acute Brain Disease. For the previous reports, see Nos. 1, 2 and 3.

The following is a case of this sort which we cite from Oppenheim (l. c., p. 65):

Case 1. A boy of fifteen takes sick with headache, lightly clouded sensorium, and but a few days temperature. At the same time a bilateral ptosis develops, and within fourteen days a full ophthalmoplegia externa. At the end of the first week, the speech becomes nasal, there is difficulty in swallowing, and respiratory disturbance follows, weakness is noted in lip muscles, paresis and atrophy of the tongue, paralysis of palate, tachycardia, and then diffuse paresis of the arms, with atrophic paralysis of the small muscles of the hand, partial R. of D. in these muscles, as also in the tongue,—weakness in the legs, exaggerated patella reflexes. The sensorium was free, no headache, no temperature. This patient recovered. The etiological factor was not discovered.

Another much cited case is one of Kaiser⁵:

Case 2. A young man of twenty, up to then entirely well, suddenly comes down with headache and diplopia. Both external recti (abducens) showed paresis; there was ptosis on the left, paresis of the entire left facial and hypaesthesia in the right trigeminal area. Two weeks later, attacks of vertigo were noticed and difficulty of swallowing began, scanning speech and swaying gait. The right internus and left externus showed paresis. Fundi normal. The left corneal reflex was absent. Chewing was normal. The soft palate and tongue were normal, yet swallowing was impossible. There was somnolence, and subsequently coma. Later flaccid paralysis of the left arm. Exitus. Autopsy showed a necrotic condition of cells in the wall gray from the third ventricle to the pyramidal decussation, involving in irregular patches the hypoglossus-, vagus-, and glossopharyngeal-nuclei, the oculomotor, the left nucleus ambiguus, the seventh, the motor and sensory fifth, the ascending glossopharyngeus-, acoustic-, and trigeminal- roots on the left, and the descending trigeminal root on both sides. The motor cells of the right cervical region were also involved. The etiological factor remained undiscovered.

Thus far we have spoken of sporadic instances. Does one also find such "disseminated," polioencephalomyelitic cases in epidemic-encephalitis? The early reports did not make it seem so; later clinical findings, however, intimated the probability, and recently an autopsied case possibly* confirmed the fact. This case, together

* I say *possibly*, for the rarity of this type of case in the literature puts a doubt into the chapter. There is a possibility, too, that these cases are not of Economo etiology. Economo himself publishes a case (see below) which, however, also has exceptional features. Stertz's case also comes to mind (Z. f. d. g. N. u. P., XXI, 5-6, p. 363). Tilney (Tilney and Howe, Ep. En. Hober, 1920) also mentions a multiple-diffuse-lesion type of epidemic encephalitis; of these he has seen a number (13 out of his series of 116 cases). Not having read these histories, I do not, however, know if these cases belong to this disseminated group.

with another out of the Jena clinic of H. Berger, has been published,⁶ and may profitably be gisted here:

Case 3. R. M., on 3, IV, 1920, had to carry very heavy pieces of machinery. It strained him greatly. On way home "all in," legs got heavy, soon could not walk. Twitchings set in, first in thighs. To bed. Severe pain in abdomen, so that he had to cry out. Then better. Could not void. Had to be catheterized. Constipation. The twitching continued, localized more in the abdominal muscles. Nocturnal unrest. To hospital. Cranial nerves, fundi, upper extremities negative. Legs weak; no atrophy. Left slight Babinski, arrhythmic clonic, almost ticlike twitching of entire abdomen, at times also of quadriceps, thirty to the minute, at times somewhat painful. Tactile negative. Pain sense slightly hypo below umbilicus, distinctly hypo below knees. Sensorium lightly clouded, occasionally disoriented, motor unrest, scratched himself much. At night would leave his bed. Intense insomnia. Temp. 36.5-37.5. Pulse 95-120. Spinal fluid negative.

Twelfth, IV, a typical epileptic convulsion. Bladder spasm so great that catheter would not pass. Bladder punctured. Passing horizontal nystagmus, esp. to left. For a few days diplopia. Absent Achilles. Lessened patella on left. Most of these symptoms then passed away, save for the twitching, which continued, though lessened. For a time sudden hemihyperidrosis on entire left side (face included). At time of writing still slight twitchings, weakness, depression, poor sleep, mentally distinct obtuseness, apparently dementia.

Case 4. M. G., twenty-three years old, nervously predisposed. In 1912 influenza. In 1917 purpura rheumatica. After feeling tired for a time and showing restlessness, in which he would scratch his entire body, he suddenly, on the 23, III, 1920, while at work, perceived sharp stitches in the r. upper arm. Had to stop work. The pain drew into the r. hand, and in the next few days also into the l. Then pain in chest. From the 5, IV, daily attacks of ten minutes duration occurred in which he had to leave his bed, he led up and down, the hands cramping to a fist, occasional facial twitching, pulse 50. Relief by pressure over heart region.

Ninth, IV, to hospital. Painful twitching in arms, back, thighs. Great weakness in the legs—couldn't stand. Nocturnal restlessness, would leave his bed, mild delirium ("phantasiert"). Pulse 100-110. Bladder overfilled. Severe constipation. Eyelids slightly ptotic, slight nystagmus on looking to r. Pupils dilated. Reaction O. K. Abdom. and cremaster absent. Patella and Achilles only with difficulty, and not constant. Plantar absent. Leg muscles flaccid, distinctly hypotonic, with hyperflexibility, as in a severe tabes. Slight ataxia of lower extremities. Standing possible only with great effort. Tactile sense O. K. Pain sense from the ribs down decidedly reduced. Here and there temperature sense uncertain.

In abd. muscles ticlike, arrhythmic twitching, twenty to twenty-five in the minute. Diaphragm distinctly implicated, disturbing speech, ructuslike noises. Elect. react. in all muscles normal. Occasionally

lightly disoriented. Constant motor unrest. Scratches himself all over. Sleep only after strong medication.

Twenty-first, IV, vomiting. Spinal punctate clear, negative, a few diplococci, culture sterile. Vomiting intense for two days. In the blood culture a few staphylococci. Diplopia frequent. Nystagmus strong, in all directions. Exophthalmus, Graefe, Stellwagen, dilated pupils, pulse frequent, fine static tremor (*i.e.*, irritat. of sympathetic), aneosinophilia. 9700 whites. Hg. 75. Sensorium more and more clouded. Increased unrest, occasionally to delirium stage. In early May increased unrest of choreatic character, choreic movements, grimaces, much scratching. Finally speech becomes unintelligible, heart weakens. Exitus, 17, V.

Necropsy: Dura neg. Pia hyperaemic. Ventricles not dilated. Microscopically: Meninges show a very few small circumscribed infiltrations. Region of optichthalmus, numerous torn blood vessels, with smaller and larger "ringbleedings," especially strong vessel- and glia-nuclear increase. Small bleedings in the midcortical layers, especially in the motor areas. Nowhere severe changes in the ganglion cells. In the spinal gray, the vessels are increased, dilated and strongly filled. Considerable small cell infiltration about the vessels. Region of the anterior horns, small cell infiltrations, most outspoken in the lumbar region. Here and there there were small hemorrhagic inflammatory focal involvements and oedema in both gray and white areas.

Tiling thought one might call his second case on "encephalitis agitata," combined with tendencies to "encephalitis choreatica," while his first case had lineaments of both, and in addition some of the "encephalitis convulsiva" picture.* The symptoms referable to the spinal cord were due, not to a destructive process, as in poliomyelitis, but to a milder change in which the oedema also possibly played a part (the sensory changes?). The necropsy findings of damage in the midcortical layers, rather than the ganglion cells, is suggestive.

Economo's seventh lethargic-encephalitis case⁷—which, however, did not come to autopsy—also belongs here, with its symptoms referable to cortex, stem and spine. It is of particular interest, however, in being not flaccid, as the above cases, but spastic, and decidedly like, if not identical to, multiple sclerosis. It is cited below (Case 11) in connection with multiple sclerosis. (Stransky's encephalitic *pseudotumor*—mentioned below—is probably also of Economo etiology.)

In a splendid series of diffuse polioencephalitis cases, published by Higier,⁸ one finds several very probably Heine-Medin forms, which likewise belong in this rubric:

Case 5. Patient seven months old (No. 1 of the series), takes sick with mild temperature (38.2) and paralyses of several cranial

nerves. Seen by H. three weeks later: Examination showed bilateral ptosis, especially on the left, paralysis of left rectus internus, strabismus externus, pupils normal, paresis of right facial, all branches. Constant improvement. One month later, under high temperature and stormy general symptoms, a left facial occurs, with faciocervico-auricular herpes, and paresis of the right leg, with lost patellar reflex.

Examination two and one-half years later shows that the facial and rectus have entirely cleared up, but that a partial bilateral ptosis remains and a slightly atrophic musculature in the right leg.

Case 6. Patient seventeen years old (No. 3 of the series), twenty-four hours after severe physical strain (work), suddenly gets temperature, headache and vomiting. In the next few days, under temperature, paralysis of the legs and disturbance of bladder and bowel (retention and incontinence). No pain. No nuchal retraction. There is double vision and ataxia of the left half of the body. The bladder and bowel disturbance cleared up entirely at the end of the second week. Examination about two years later shows a decided left abducens paresis, atrophic paresis of muscles of left foot, also of peronius on the right, weakened patellas, both sides, absent Achilles, abdominals and cremasters, extreme lordosis. Diagnosis: acute diffuse polioencephalomyelitis.

Still another diffuse case of Higier's (No. 2 of his series) may instructively be cited and compared here, even though it does not precisely belong to this "acute disseminated" group, having been a subacute affair. Its importance lies not only in its diffuse involvement, but especially because of the *brain-tumor-like* appearance given here by a slow, feverless, encephalitis, a condition to which Oppenheim was the first to call particular attention.

Case 7. The patient, seventeen years old, began in October to complain of parasthesia in the l. hand and r. foot. During the month severe headache and vomiting occurred, and with this a right hemiparesis, particularly in the leg, paralysis of the r. hand and decrease of feeling on the l. half of the body. Three times there were convulsions, with complete unconsciousness, with stronger involvement of the r. face. At no time temperature. During the next few weeks headache decreases, vomiting stops. One found, however, a spastic condition of all the extremities, intention-tremor and severe ataxia of arms and hands. At the end of the third month there was a mild bilateral optic neuritis. In about the fifth month improvement sets in, and subjectively everything clears up, save a prickling in the left hand and formication in the right foot. Objectively there is a weak spastic gait, right light hemiparesis, inclusive of the face, r. Babinski, brisk tendon reflexes, mild tremor of hands (normal abdominals, speech negative, no nystagmus), a decrease of tactile and pain sense and particularly the muscle sense in l. hand and r. foot.

These findings are noted three years after the disease. The diagnoses considered at the start were acquired hydrocephalus, circumscribed tuberculous meningitis, pseudotumor, acute focal sclerosis, and subacute disseminated encephalitis. Three years after, the residual findings made the last diagnosis the most probable.

Higier's fourth case may also be briefly cited:

Case 8. Patient twelve years old. Ten months previously received a blow on the head. Ten weeks later headache and vomiting developed, becoming severe, with trembling of tongue, nasal, indistinct, explosive speech, l. hemiparesis, ataxia of body and extremities in standing, sitting and lying, exag. reflexes, clonus, retracted fields, choked discs. Condition lasts four months. After a while everything clears up entirely, save right choked disc, without much lessening of normal acuity. Various diagnoses were thought of at first: fracture, with depression of fragment, pachymeningeal haematoma, "late-apoplexy," brain abscess, circumscribed meningitis serosa. Later Higier brought up the possibility of pseudotumor or acquired hydrocephalus, with or without tumor, but felt most inclined to diagnose as late occurring traumatic meningoencephalitis or meningitis serosa.*

Another (probably) *encephalitic pseudotumor* case has very recently been published by Stransky¹⁰ and a still more interesting example (which follows) by Bailey¹¹:

Case 10. Patient sixteen years of age, some time after an attack of influenza, experienced a sudden dimming of vision, with severe headache for a day, later headache returning off and on. When this was severe, she staggered and had impairment of the left arm and leg. There had been considerable vomiting. The optic discs showed obscure margins, and were elevated about one diopter. There was downward and outward squint of the r. eye and ptosis of the right lid. There was some difficulty in swallowing, and the voice had changed in character. The patient had become stupid. There was marked adiadochokinesis in l. hand, and marked ataxia of both left extremities. Patient was operated by Cushing for presumed cerebellar tumor. Neither tumor nor cyst was found. The patient recovered from the operation, but died forty days later, after a spell of several convulsions and severe headache. Necropsy showed a *hemorrhagic leptomeningoencephalitis*.

* In connection with this case the following one of Oppenheim⁹ is of interest (*Case 9*), in which, a month after a fall from a car—no symptoms marked at the time—a condition developed of severe headache, vomiting, double vision. Examined three months later, Oppenheim found choked discs, paresis of r. abducens, moderate stiffness of neck, ataxia of gait, tendency to fall to the r., *absent patellar reflexes*, possible paresis of r. facial, loud pulsing noise in right occipital region. Cleared up considerably on K. I. and inunctions. A half year later return of symptoms. Diagnosis: tumor, cyst, possible aneurism, though last not probable. After operation, O. comes to conclusion this is a chronic meningitis serosa circumscripta.

Let us for the moment leave this clinical picture of tumor occasioned by an encephalitis, or disseminated encephalitis, *i. e.*, pseudo-tumor, and examine another condition which comes to mind through connotation of multiple or disseminated foci, namely, *multiple sclerosis*. Can a disseminated encephalitis give a picture resembling multiple sclerosis, that is, *pseudo-multiple sclerosis*? Or, indeed, is possibly the explanation of multiple sclerosis a disseminated encephalitis? in other words, do all sclerosis multiplex cases begin as disseminated encephalitis? This would be the same as saying that both conditions were synonymous, and might as well be termed acute multiple sclerosis. Here, on the one hand, it has been held that the (microscopic) pathology of encephalitis is different from that of the typical and characteristic findings of multiple sclerosis. On the other hand, the difference has in certain cases not been so great, while, in fact, Stern¹² described a case of epidemic encephalitis in which the foci in the medulla were not such of secondary degeneration, but identical with those characteristic of multiple sclerosis.

This matter was already mooted in a case first examined by Oppenheim's assistants, Flautau and Maas, in which the diagnosis encephalitis was made, which diagnosis, however, five years after was changed to multiple sclerosis by Oppenheim himself, typical symptoms of the latter disease now being present—and autopsy findings later substantiating the fact. Whereupon Oppenheim comments that this case and other similar instances subsequently come upon make it impossible to say whether or not (such) a case apparently encephalitis is not really the first shove of a multiple sclerosis (*l. c.* 4, p. 93).*

Oppenheim's was a sporadic case. Economo, however, saw an interesting epidemic occurrence, and points out its similarity to sclerosis (this is his case 7):

Case 11. Patient thirty-two years old. Takes sick suddenly with headache, nausea and pain in both arms and legs. On the following day she staggers "like intoxicated." To hospital 9/1. Psychically reacts very slowly, slow monotone speech, compulsion-laughter. Slightly bemuddled. Believes she sees many people and things about her. Choreatic unrest, and slight movements in head and body. Paresis of eyes to left and upward. Nystagmus on side vision. Double vision to the right. Pupils react. Vision impaired. Strong ataxia of upper extremities. Tremor of right hand, and athetosis in executing movements. Gait, strongly ataxic. Romberg, positive.

*The results of a post-infectious disseminated encephalomyelitis may therefore remain as stationary sequella, or may progress in recidivating *shoves* identical with multiple sclerosis. Still in other instances the multiple sclerosis is primary, *i. e.*, the acute multiple sclerosis of Marburg.

Reflexes very strong. Clonus. Babinski both sides. Abdominal reflex absent. No sensory dist. Temp. 36.2.

10/1: Strong amblyopia on r. eye; l. eye nasal vision retracted. Neg. fundi. Sopor, apathetic, clouded. Sleeps.

7/2: Greatly improved. Mind clear. Vision clear. Paresis of ocular muscles cleared. Choreatic movements gone. But intention tremor of upper extremity remains, also nystagmus, clonus on left, Babinski on both sides, gait strongly ataxic.

5/3: Sudden attack of dyspnoea, with laryngospasm.

20/3: Dismissed. Still has mild nystagmus and l. abducens paresis. Intention tremor. Mild spastic ataxia of lower extr. Babinski, positive. Clonus is gone. Romberg, positive. Optic nerve shows temporal pallor on left, complete papilla paling on right (l. c., p. 43).

Economo justly comments that, apart from an epidemic, one would be very apt to diagnose this case as multiple sclerosis.*

Let us turn to another problematic case, one of Marburg's:¹³

Case 12. A young man of seventeen, entirely well up to this illness, suddenly goes into a Jacksonian epileptic attack. On the day after, he has a similar attack, which leaves him with a left mouth-facial paralysis. Then headache comes on and mild stupor. The attacks recur without unconsciousness as facial Jacksonian seizures. Objectively, besides the mouth-facial, there is slight deviation of the tongue to the left, the tendon reflexes on the left side stronger than on the right, clonus on both sides, l. > r.

At this time a tumor at the base of the right second frontal convolution was thought of. Soon, however, a rightsided palatal paralysis was noticed, the right abdominal reflex was not obtained, the left being weak, the Achilles clonus had disappeared, the patellar jerk was considerably diminished (compared with the first examination).

The diagnosis now stood between multiple encephalitis and acute multiple sclerosis, and because of absence of temperature, was fastened on the latter.

Marburg's case brings us back to "pseudotumor" again, here pseudotumor occasioned by multiple sclerosis. Several other cases are cited by Marburg which serve as interesting examples of "tumor cerebri" which proved to be multiple sclerosis, and vice versa cases looking decidedly like multiple sclerosis and diagnosed as such, which proved to be a tumor. Let us add to this the cases mentioned above in which what appeared to be tumor cerebri was really an encephalitis, and such cases in which encephalitis is diagnosed and tumor is found. A case like this has not long ago been mentioned¹⁴:

Case 13. The patient, during influenza, developed severe cerebral symptoms, with eye-muscle disturbance and somnolence. Other cases

* Certain forms of multiple sclerosis, on the other hand, have long since been known to resemble an encephalitis involving the pons and medulla.

of epidemic encephalitis being about, the diagnosis of "lethargic encephalitis" seemed tenable, even though the patient became comatose. A tumor, however, was found, which, through pressure on the ventricles, caused hemorrhage into the quadrigeminate region.

When the *pseudotumor* is occasioned by multiple sclerosis, the symptoms may be due to the cerebral patch or patches alone, or to a hydrocephalus caused by the sclerosis.* A meningitis serosa, especially a circumscribed meningitis serosa, may also give a tumor picture.

Very dissimilar, and yet abutting squarely enough into this difficult chapter, are a series of three cases published by Westphal,¹⁵ all of which showed decided similarity to multiple sclerosis, while in the third the differentiation was not possible. Westphal offers the cases especially in lieu of their bearing on the differentiation from epidemic encephalitis, in which quite similar symptoms were often enough noticed:

Case 14. Patient thirty-five years old. Very severe motor restlessness. Patient showed constant choreatic jactitations in arms and legs, even while at rest in bed. Constant facial grimacing. Speech mostly unintelligible, with expulsion of abnormal sounds. Standing and walking were impossible because of the constantly contracting muscles. High patellas and patellar clonus. Foot clonus not constant. Babinski both sides; occasionally a rapid dorsal flexion (pseudo-Babinski?). Abdominal reflexes absent. Pupillary reaction sluggish. Patient could not be tested for nystagmus, nor could fundi be looked at. The chorea would become intensified if patient was spoken to, at times would rise to an almost convulsive height ("Muskelraserie"). Because of this, intention-movements could not be tested out. The movements were constant in this patient, save in very deep sleep. Severe psychic disturbances were not present. Patient is oriented, and little by little one gets some of his history. Says he is sick three years with this condition. Patient observed for two years, then exitus.

Clinically this was a case of severe chronic chorea, with myoclonic additions and pyramidal tract signs. During epidemic encephalitis, it would without question be diagnosed as a choreiform type of this disease. The autopsy revealed a typical multiple sclerosis, with innumerable sclerotic patches in the cerebrum, cerebellum, pons, medulla, centrum semiovale, large ganglia, very especially in the areas neighboring the ventricles.

The second case was clinically one of acute myoclonus, and will be fully discussed in our later study on Myoclonus. Autopsy revealed multiple sclerosis. The third case is as follows:

* In certain multiple sclerosis cases, however, nothing was found to explain the tumor symptoms.

Case 15. Patient twenty-nine years old. In hospital 1919. Well up to then. Jerking noticed in left leg. Examination shows tonic contraction of several muscle groups, esp. the flexors of the knee joint and dorsal flexion of foot and toes. Occasional tonic contractions of the ext. hallucis long. and peronius long. All on left leg; the right is free. Walking is very difficult. Patellar reflexes exaggerated, foot clonus on left, but not constant. Babinski occasionally on left. Abdominal reflexes present. Fine nystagmus. Pupils O. K. Patient says she saw double in beginning; not any longer. Fundi: R. papilla shows temporal pallor; L. papilla in entirety lighter than normal.

Disturbance in l. leg slowly clears up (Jan., 1920).

In March, 1920, athetotic contractions in left upper extremity. Later the movements became more rapid, choreatic-like, and involve the elbow and shoulder. Then one can notice choreatic movements and slow, athetotic, spastic movements with fixation attitudes. Gradually increases to stormy jactitation in the left arm, with intense and very painful contractions in the muscles. Because of this, complete insomnia.

No treatment seems to help patient. Finally Salvarsan is tried. After a time improvement sets in. All pyramidal tract symptoms have disappeared. No atrophy. Nystagmus remains. Fundi as before.

The acute onset and diplopia at the beginning, the similarity of the picture to the "amyostatic symptom-complex," the abnormal choreo-athetotic movements, the epidemic period—all make one think of epidemic encephalitis. It cannot be ruled out. The fundi, however, bring up doubt and discussion (see further on). The findings are not absolutely incompatible with epidemic encephalitis, though they are more common of multiple sclerosis. The choreic movements, though not usually associated with multiple sclerosis, were seen in the two preceding sclerosis cases. The "clearing up" of the earlier symptoms also occurs commonly in sclerosis—but have been exceptionally also noticed in epidemic encephalitis. The passing of pyramidal tract signs are also noticed in the latter disease. The differentiation of diagnosis, consequently, remains impossible.

Our study, therefore, leads us to conclude that *there are three conditions which may occur in masquerade of one another: encephalitis (polioencephalitis or polioencephalomyelitis) disseminata, sporadic or epidemic, acute cerebral multiple sclerosis and brain tumor.* The differential diagnosis may at first prove impossible—or even remain enigmatic until the end. Careful examination of the cases here selected as paradigms also evidences the very serious fact that symptoms and signs heretofore accounted characteristic of definite disease entities, or where grouped in syndrome fashion,

deemed actually pathognomonic of the same, are by no means pathognomonic, and not even as characteristic as we have been taught to believe. Besides, in this group of conditions those very aids upon which we lay so much stress in other acute brain disease, lumbar puncture, temperature and course, either fall short or completely fail.

Let us briefly here collate the facts and determine to what extent our former sign-posts may really serve in pointing out the way:

Save *per exclusion*, lumbar puncture proves negative, or gives evidence of a serous meningeal reaction—which may be present in all. *Temperature* may decide the issue, if this is between tumor and secondary encephalitis, which latter is usually, if not always (occasional exceptions in adults) thus accompanied; but in primary encephalitis, especially of epidemic and Heine-Medin form, there is frequently no temperature at all. In secondary encephalitis of Wernicke's type, temperature is absent, as it also is in tumor and usually in multiple sclerosis—with exception of those cases in which acute processes occur in the pons and medulla, in which temperature very often rises.* Again, it was completely missed in Higier's slow encephalitis case resembling brain tumor. Temperature, therefore, no more than points to *secondary* encephalitis. We may remember that it is present in brain abscess, may, however, disappear and show up again. (Abscess in the pons and medulla are great rarities.) In hemorrhage it may be slightly raised or lowered. It is usually (not always) absent in syphilis, though often present in diffuse pontine and bulbar involvements of the disease. Here a basilar meningitis is frequently associated.

Progression in "shoves," or episodic advances, or so-called intermittent exacerbations, will speak against encephalitis,† but will not help to differentiate sclerosis from tumor. *Regression*, or remissions, and rapid "clearing up," so characteristic of multiple sclerosis, may also occur in a brain cyst, tubercle, chronic meningitis serosa, hydrocephalus, or where the last is occasioned by a tumor and occasionally in hemorrhage.‡ A "clearing up" may only be a "remission." Such was noticed in Oppenheim's meningitis serosa circum-

* Indeed, temperature has frequently occurred with the "shoves" or exacerbations in multiple sclerosis—especially when pons and medulla were involved (*cf.*, the facial paralysis case of Nonne's in No. 19)—as also in the "apoplectic" attacks. It may be remembered that just in acute multiple sclerosis Marburg so frequently found bulbar affections.

† In rare instances it seems to have occurred in *epidemic encephalitis*. *Cf.* the last case in a series of A. Pilcz (Klinik der Ep. En. Neurol. Zeit., No. 12, 1919), C. v. Economo, En. Letharg. Subchron. (W. Arch. f. inn. Med., 1, H. 2), and C. Moewes (B. Kl. W., No. 22, 1921).

‡ Rapid clearing of symptoms is a common occurrence in *Hemiplegia Apoplectica*. This applies especially—possibly only—to the hemorrhage cases.

scripta case. In Higier's first case (probably Heine-Medin) there was improvement for a month and then a renewed outbreak. In tumor cases, symptoms may also disappear for a time, or remissions set in. Higier mentions a cerebellar sarcoma which seemed healed and remained so almost a year, to break out again and rapidly prove fatal. Fluctuations will, however, point more to "pseudotumor," while *constant* progression will point strongly to tumor. Though evidently unusual in epidemic encephalitis, cases have been described in which, after apparently complete recovery, the disease has again flared up and become chronic.¹⁶ (Also cf. Pilcz's case mentioned in the previous foot note.)

Marburg has laid much stress on the *fluctuations in ear disturbances* occurring within very brief periods in multiple sclerosis, lessened acuity of hearing and particularly hypovestibular irritability changing to hyperirritability. Yet, in one of the very cases in which multiple sclerosis was diagnosed and tumor found, there was a bilateral cochlear affection, l. > r., and on the r. a hyperirritability of the vestibular, while there was no reaction at all on the l.

Optic nerve changes may, or, again, need not, give the clue; in several of Marburg's cases, in which tumor was found, *there had been no choked discs or other fundi changes*. Disc changes have been found relatively unseldom in the Oppenheim-Leyden disseminated encephalitis form, and but very seldom in the Economo type.* Yet they may occur. In Higier's second case (of pseudotumor, *i.e.*, most probably a disseminated encephalitis—not "epidemic," however), bilateral optic neuritis was noticed at the end of the third month. Optic neuritis, then, suggests disseminated (nonepidemic) encephalitis. On the other hand, choked discs are rare in multiple sclerosis, though they *do* occur (Bruns, Nonne, etc.), while similar changes may also be occasioned through a sclerotic patch in the optic

* That is, in lethargic encephalitis. In the longer series, such as that of Nonne, Wilson, MacNalty, Lhermitte and Saint Martin, Barker, Morax, Holthusen, Neal, N. Y. Health Dept. Bul., etc., no optic neuritis was seen. On the other hand, Economo found "the temporal edge of the papilla somewhat blurred" in his Case 3, a distinct reddening of the papilla in Case 4, and a retrobulbar neuritis with distinct amblyopia, which later cleared, leaving a temporal paling on the left and a complete papilla paling on the right, in Case 7. This last was an encephalitis disseminata, as already mentioned. In Tiling's disseminated cases there were no fundi changes, while "optic neuritis" seemed present in four of Symond's cases (The Lancet, Jan. 12, 1920), likewise diffuse involvements. Holden, reporting on the histories of one hundred consecutive Mount Sinai cases, found real papilledema in but one (Archives of Ophthal., Vol. I, No. 2, 1921). The latter believes the papilledematous findings in epidemic encephalitis due to increased intracranial pressure, rather than a retrobulbar inflammatory type. This was certainly true in the three cases seen by Winter (N. Y. S. J. of M., Feb., 1921, p. 50).

nerve (as in Westphal's first case), or even, as has been found, in the papilla head itself.* But *temporal pallor*, so quite characteristic, one might even say until now pathognomonic of multiple sclerosis, was present in Westphal's third case (and he is inclined to believe this an encephalitis), while in Stern's encephalitis case, to which we refer above, a proliferative gliosis-like change, as seen in multiple sclerosis, was here discovered in the optic nerve. In Economo's epidemic seventh, so strikingly in every way like multiple sclerosis, the one eye, as already mentioned, showed temporal pallor, the other complete paling. Westphal also recalls that in two of Pflüger's cases of eye changes, during the 1890 influenza epidemic, there were atrophic changes in only the temporal half of the papilli.† Again, choked discs occurred in Higier's fourth case (post-traumatic, probably late meningoencephalitis or meningitis serosa), in Oppenheim's patient (post-traumatic ch. meningitis serosa *circumscripta*), and in Bailey's "pseudotumor" (leptomeningoencephalitis). (The same may happen in brain cyst, and occasionally in abscess and cerebral lues.) The fundi findings alone will, therefore, not help us, though *temporal pallor points more to sclerosis—and choked discs away from it.*‡

The symptom of *ptosis* has no very distinct differential diagnostic value. Wilbrand and Saenger¹⁷ found *ptosis* present in all their cases of diffuse poli-encephalitis, usually bilateral (only once unilateral). It was present in Tiling's second case, absent in the first.

* Recently Henneberg and Bielschowsky reported a case of acute multiple sclerosis which began with sudden blindness. The papilli showed mild prominence and were somewhat blurred. Only five weeks later did cerebral symptoms appear, *i. e.*, slow, progressive, hemiplegia (Klin. Woch. 1, No. 19, p. 971).

† In secondary, particularly influenzal, encephalitis, amaurosis has occurred, here due to involvement of the optic lobes, though a case due to bilateral optic neuritis is on record (Markus, B. kl. W., 1918, No. 48). Oppenheim (l. c.) mentions seeing amaurosis in two cases due to double-sided hemianopsia.

‡ In severe nonencephalitic influenza there may be retinal bleedings extending into the papilla, blurring the edges, often giving the appearance of choked disc of severe type (E. Frankel, D. m. W., June 7, 1920). In Heine-Medin disease, optic nerve involvement is very rare (case of Tedechi, Wickman, Brorström, Hoff, two of Koplik, and two occurring in the 1916 Poliomyelitis Report of the N. Y. Health Dept. [publ. 1917]). An interesting case occurring during antirabic treatment should be remembered, for the resemblance of rabies to epidemic encephalitis may be striking (*cf.* A. Simons and V. Friedmann, Berlin Ges. f. Ps. u. Nerv., 13, XII, 1920).

§ Nevertheless, it should be remembered that not only choked discs, but headache, vomiting and slow pulse have been seen in multiple sclerosis. When choked discs are present without headache, etc., and especially when the fundi show recessions or rapid "clearing up," multiple sclerosis should be diagnosed against tumor. Multiple sclerosis is also probable, as against tumor (Oppenheim), in cases in which the disc changes have by an appreciable time preceded the remaining "tumor symptom."

It was present in Oppenheim's first case. It was present on one side in Kaiser's case. Bilateral ptosis was present in Higier's first case—probably Heine-Medin—and present on one side in Bailey's "pseudo-tumor," which proved to be a hemorrhagic leptomeningoencephalitis. It seems to be very unusual in multiple sclerosis. One must differentiate ptosis from oedema of the lids. In the latter case, trichinosis may give a confusing picture. (The ptosis in sleep is in all probability a cortical dissociation. Cf. No. 2.)

Close study of the skin and tendon reflexes brings out some astonishing facts. As we are just on the eye, let us examine the *corneal reflex* first. This reflex was found absent on one side in the first two (multiple sclerosis) cases of Marburg, and much decreased on both sides in the third. In Kaiser's case of disseminated poliomyelitis, reflex was also absent on one side. *These are facts to be remembered*, as hitherto a conspicuously weakened or absent corneal reflex pointed to pressure in the posterior brain fossa, projected to the pons and compromising the trigeminal. For Oppenheim, indeed, this symptom was of the very greatest significance, and several times was the first symptom to appear in tumor of the cerebellar-pontine angle. Occasionally, however, Oppenheim thought a weakened corneal reflex might be a familial or normal occurrence. The reflex is also absent in unconsciousness and may be after bromide (large doses) medication. At times, too, we know it is an hysterical manifestation.

As to the *abdominal reflex*, it was absent in Economo's seventh encephalitis case, with its great resemblance to multiple sclerosis, in Tiling's second (epidemic encephalitis) case, in Westphal's first chorea case (which proved later to be a multiple sclerosis), and absent on one side in Marburg's first case (probably multiple sclerosis). Finally, it was also absent in Higier's third case (of diffuse poliomyelitis—probably Heine-Medin type). Its absence, therefore, points to multiple sclerosis but needs by no means definitely indicate it. It is here seen to be absent also in encephalitis* (both in Economo and Heine-Medin forms).†

I have found this reflex absent so often in individuals with bloated or obese or flabby abdomens, and who had no other symptoms of multiple sclerosis, that I am not seriously impressed by its absence

* Another similar encephalitis case is reported by Bostroem, D. Z. f. N., Bd. 68/69, p. 90, and still another by Westphal, D. m. W., Sept. 9, 1920, p. 1043.

† In a recently reported pseudotumor case these reflexes were also missing (Klin. Woch. Jr. 1, No. 22, p. 1087), also absent on one side in a case of polyneuritis (D. m. W., May 26, 1922, p. 692).

in such cases.* Others, however, it must be admitted, hold this of very considerable moment. In tumors compromising the eighth to eleventh dorsal segments or roots, the upper or lower abdominal reflex may be missed. I have been watching a patient for some time in whom both upper and lower abdominals on both sides are absent, and who has no other symptoms pointing to multiple sclerosis, but a history strongly suggesting an unusual spinal-root form of lethargic encephalitis. We might also keep in mind that the abdominal reflex is absent in cerebral hemiplegia on the affected side, soon or directly after the stroke. Later it becomes exaggerated. When the skin is anaesthetic or hypaesthetic, the reflex may also be missed. It has also been pointed out that this reflex may be absent in alcoholism.¹⁸

As to the *patellar reflexes*, we found them weakened in Tiling's first case (epidemic encephalitis disseminata), and the Achilles absent, and both obtained with great difficulty in the second. The patellar reflexes were absent in Oppenheim's meningitis serosa circumscripta patient. In Kaiser's case the patellar reflexes were present (but the flaccid paralysis of the arm here is interesting). Higier's first case showed a lost patellar jerk—this being Heine-Medin disease. His third case, diagnosed as a diffuse polioencephalomyelitis, had (two years after recovery) weakened patellar reflexes, absent Achilles, abdominal and cremasteric reflexes. In Marburg's first case (disseminated encephalitis or sclerosis, probably the latter), the patellar reflexes were diminished (with absent r. abdominal and weak l., previously also ankle clonus).

The absence of the knee jerks in Higier's patients is natural enough, these being Heine-Medin cases, with spinal involvement. Their absence in Oppenheim's "pseudotumor" (*i.e.*, meningitis serosa circumscripta) case is, however, interesting, the lesion being central. But other cerebral cases are to be met with in the literature in which these reflexes were absent, in meningitis, hydrocephalus and toxic states (botulism† and trichiniasis‡). Polyneuritis should also be borne in mind, for in the cases where cranial nerves are involved, it may be difficult to rule out encephalitis. For the most part, how-

* Oppenheim (Lehrbuch, last edit.) also mentions finding this reflex absent in normal individuals, and Sahli (Lehrbuch, etc., 1920, Vol. 3) likewise mentions its frequent absence in women with flabby abdomens. Not long ago I found it absent on one side in a young woman with firm abdominal walls, and no neurological abnormalities whatsoever. Nonne, on the other hand, with whom I recently discussed this question, and who has had an extremely large experience, lays great stress on the absence of this reflex—this pointing decidedly to sclerosis.

† Cf. Jennings, etc., J. A. M. A., Jan. 10, 1920.

‡ Cf. J. Meyer, J. A. M. A., March 2, 1918.

ever, we think of exaggerated reflexes in cerebral involvements, just as we do in spinal disease in which the pyramidal tracts are compromised (pressure, myelitis, hemorrhage into the white areas). We are accustomed likewise to look for exaggerated reflexes in multiple sclerosis. But the patellars were diminished in Marburg's first case. This would argue against the diagnosis of sclerosis if it were not for the fact that this very phenomenon has been come upon in proven cases of multiple sclerosis in which the patellars may even be completely absent. This, too, must be remembered. Oppenheim, commenting upon the fact, points out that what is much more important for the diagnosis of this disease—in fact, extremely important—is not the condition of this reflex, *but the incongruence of the variations of intensity in the different reflexes on the same side*: thus, clonus at the patellar with absent Achilles, or absent knee jerk and present ankle clonus; or, again, clonus and no Babinski. (Oppenheim mentions a case in which he diagnosed sclerosis by noticing a hypotonic muscular condition go over into a hypertonic.) However, in Economo's seventh case, there were absent abdominals, with present foot clonus and Babinski. In Marburg's first case there was clonus l. > r. in the beginning, and soon after a disappearance of this and finding of absent abdominal on r., weak on l., the patellars considerably diminished.

In a case of my own, due to a very different lesion, there was absent patellars and present clonus and Babinski. This case being particularly interesting, and not heretofore published, may be worth reporting here in some detail.

Case 16. In September, 1917, I examined a boy of 8.9 years of age, who gave the history of an attack of diphtheria in the latter part of March. He received an injection of antitoxin (3000 units), and, save for some headache, was well three days after. A week or so later he began to vomit. Frequent vomiting (daily), vomitus often coming through the nose, continued up to July 9th. Then tonsillectomy, whereupon vomiting ceased for six weeks.

After this there were few complaints for a time, and vomiting occurred only now and then. For a month and a half previous to his visit to me, however, the boy "walked as if intoxicated," and vomited more often, but did not feel really ill until the two last weeks. Now vomiting occurred every morning after breakfast, and even before breakfast, with pain in the abdomen and head after vomiting. *Otherwise, with the exception of one bad attack, which lasted only an hour, there was no complaint of headache, until a few days ago, when the headache persisted all day, and no dizziness.*

Status (September): Appearance negative. Head tilted slightly forward and to the right; later (on October 24) the head was car-

ried slightly to the left. Percussure sound of skull duller than normal; no pain on percussion, no pain over mastoids. Station: slight tendency to sway to the left and backwards (on October 24 he swayed occasionally to the right and no longer to the left). Can stand on r. leg, but not on left. Gait ataxic, wabbles, distinctly more to left. (On October 24 wabbles toward the right or zig-zags from side to side.) Only slightly increased on closing eyes. Smell and vision normal (20/20/20). Fundi show papilledema r.=1.+3.00D. (Dr. Holden). No deviation of eyes. (October 24): abducens a little weak on l., still more on r. Nystagmus: rapid on looking to r.; coarse on looking to l.; none on direct gaze. Revolving tests to r.: has nystagmus to l.; to l.: has nystagmus to r. (On October 24, rapid nystagmus is absent, and only a few coarse moves now to r. On looking to l., coarse moves somewhat more frequent than to r.) Pupils normal, later dilated; light reflex normal, later (October 24) sluggish. Facial: weakness on the left, also weaker eyelid here. Left cheek looks fuller. Left forehead wrinkled less than on right. Fifth motor normal. Cornea decidedly hypaesthetic on left. Eighth: cochlear O. K.; vestibular: no vertigo [the nystagmus probably due to referred pressure to long fibers from Deiter's nucleus to nucleus of third?].

Barany: R. shoulder, eyes open, neg.; eyes closed, by-points to l.; L. shoulder, eyes open, tendency to by-point to left; eyes closed, tendency greater. Elbow: by-points to l. on both r. and l. sides with eyes closed. Wrist: negative. Legs: doubtful. Caloric (cold) to left ear; patient sways to left; nystagmus more rapid to right; none to left; present on direct gaze. Slightly dizzy. Over-points to r. (with right arm); no by-pointing on left (Dr. Auerbach).

Ninth, 10th, 11th, 12th: O. K. Upper extrem.: no hypotonus; left arm tires easily. Distinct intentional tremor on left; slight irregular movements on both r. and l., but L.>R.—F. to (my) f. test + on l., also f. to f. distinctly + on l. . . . F. to n. + on l. Adiadocho. on l. Otherwise negative. Lower extrem.: *Patellar reflex absent r. = l.* (October 24): a slight quadriceps contraction obtained on r. Achilles doubtful; occasionally obtained on r., occasionally present on l. (less so on l.); later obtained on both sides, but more jerky on *left*. Otherwise negative. All other tests negative. (Wassermann, X-ray, blood, spinal fluid: negative. There had been no temperature.)

Cerebellar tumor was diagnosed, its position in all probability, between the cerebellum and medulla, more to the left or on the left side, pressing forward and to the left.

November 9: Lumbar puncture; intense puncture headache, also pain in back.

Cranial nerves: Vision O. K. 1, 3, 4, 6, 8 negative. The right abducens has cleared up. Nystagmus, both coarse and fine to the right; coarse to left. Pupils dilated. Corneal reflex as before. Left seventh impaired. Left forehead can now be wrinkled again, but still less than right. Upper extremities as before. Lower extremities as before, with addition that *Babinski is now present on*

left, occasionally on right side. Tendency to clonus on left. (These last signs were not present before the lumbar puncture was made.) Patellars absent as before.

Various diagnoses had been made on this patient by physicians seeing him, the previous diphtheria and lost patellars, and the absence of headache and vertigo, no doubt proving confusing. On October 29 I showed the case at a staff conference at which the diagnosis of tumor was seconded by only one or two men, "diphtheritic encephalitis" suggested by one, "diphtheritic polyneuritis" by another, and multiple sclerosis adhered to by the majority.

Several weeks after, the patient was operated at the Presbyterian Hospital (A. Lambert), and a tumor found in the surmised position (noted above).

There is much of interest that could be discussed in this case, but I should like to call attention to only a few facts in lieu of the precariousness of our diagnostic criteria. The vomiting and nasal "regurgitation" soon after diphtheria doubtless had nothing to do with the diphtheria. The vomiting of this boy—here due to a brain tumor, and of daily occurrence, even so stormy that at times it came through the nose—was stopped for six weeks by a tonsillectomy! The absence of headache and dizziness in so far advanced a case (*cf. fundi*) is astonishing. The absence of patellar reflexes is a very unusual occurrence in brain tumor, yet has been seen especially in cerebellar cases (Oppenheim, Gowers, Mackenzie, Selby, Korteweg, Roncali, Dercum, Pitt, etc.). The explanation of the phenomenon is that an overaccumulation of spinal fluid in the central canal, due to prevention of the normal outflow by pressure of the tumor on the third ventricle, soon compresses and injures the lumbar roots,—and such root injuries have several times been found at necropsy, and have been experimentally produced.*

Seen after the clonus and Babinski were present, this patient would evidence the incongruence of reflexes mentioned by Oppenheim as so indicative of multiple sclerosis, namely, absent patellars, with clonus and Babinski.† The nystagmus, even though atypical of sclerosis, the tremor distinctly intentional on the left side, might have helped to mislead one. A facial paralysis may also occur in

* In such cases, in which the patellar reflex is absent on one side—the side the tumor is on—Sahli (l. c.) suggests some neurodynamic disturbance *a distance*.

† Our case, then, is evidence that such incongruence of reflexes need not be due to multiple sclerosis. Oppenheim's circumscribed serous meningitis case (our Case No. 9) also had this incongruence. This case, by the way, shows striking *symptomatic* similarity to our own.

multiple sclerosis, clear up and reappear again.¹⁹ However, considering the fundi, emesis, Bârány, gait and course, multiple sclerosis was easily excluded.*

Speech abnormality did not aid in the diagnoses. Scanning speech was present in Kaiser's case, "explosive" speech in Higier's second, while Westphal notes coming upon a case of "exquisite scanning speech" in epidemic encephalitis. (Still another case is mentioned by Bostroem, *cf.* above.)†

Incontinence points to multiple sclerosis, retention to encephalitis (especially epidemic) yet incontinence may also occur here. *Prostration* points to either epidemic encephalitis or brain tumor, and against multiple sclerosis. *Meningeal symptoms* speak for encephalitis. *Cortical epilepsy* is unusual in encephalitis, save in the young, but does occasionally occur. In multiple sclerosis it is rare, but has also been seen. It may even, though most rarely, be the initial symptom, as in a case of Curschmann's.²⁰ (In this case there were no tumor symptoms. In Marburg's case,¹⁸ tumor symptoms were also present.)

Euphoria may occur in epidemic encephalitis, in multiple sclerosis, and has been noted in frontal tumors. *Psychotic manifestations* will point to either encephalitis or multiple sclerosis, and away from tumor.

Somnolence points to tumor and encephalitis, and away from multiple sclerosis.

It is interesting to note that polyneuritis with disseminated encephalitis is of very rarest occurrence. I have come upon only two cases: that among the series of Wilbrand and Saenger (and that only clinically diagnosed—not from necropsy evidence), and one cited by Ziehen.²¹ The "polyneuritic form" of Heine-Medin disease as described by Wickman is no polyneuritis at all but a poliomyelitis *resembling* polyneuritis. There appear to be no exceptions to this in the (trustworthy) literature. In lieu of these facts the following case‡ is rather difficult and confusing:

Case 17. Patient twenty-seven years old. Two years ago had a rash on back and legs, three to four weeks. On fifth of December, chills, headache, great prostration. The following day could only walk with aid, nor could he close his hands. Diplopia. On 22/12 speech becomes difficult, difficulty in moving the tongue, mis-swallows easily. On 24/12, temperature 41°; profuse sweating. Examined on

* Difficulty of diagnosis might occur in a Heine-Medin case which combines the cerebellar involvement seen by Wickman with a serous meningitis (also described by Wickman). These types in themselves are very rare, possibly only occur in epidemics, and have, to my mind, never been seen in combination.

† In *hemitonia apoplectica* cases the speech may also be distinctly "scanning."

‡ This is cited with spare comment in an issue of the D. m. W.

28/12; complete facial diplegia, complete bilateral abducens paralysis and paresis of both oculomotor and the left trochlearis. Weakness of chewing and swallowing muscles. Total flaccid paralysis of both legs. Cannot rise out of prone position. No pressure in hands; the arms can be moved, but muscles very flabby; hand muscles atrophic. Sensory disturbances; at first none, then hypaesthesia in lower extremities, hypersensitive to pressure in region of femorals, tibiae and lower spine. *All skin and tendon reflexes absent, save weak biceps and distinct Babinski on both sides.* In the facials, crurales and peronei, R. of D. Receives inunction treatment over period of six weeks, and oculomotor clear up, but abducens remains; much improvement in facials, chewing, swallowing, speech. Hand pressure fairly strong. Lower extremities rapidly clear. Etiological factor not discoverable. (Fundi and spinal fluid presumably negative, as they are not mentioned.)

Meningitis in combination with encephalitis (save in syphilis and as a meningitis serosa in Heine-Medin, and in connection with influenza encephalitis) is also very unusual. In epidemic (Economo) encephalitis, however, it seems often enough to occur in a mild degree and rarely as a severer involvement. But here implication of the optic nerve is very unusual. Because of this the cases of Kennedy²² which are presumably of Economo etiology, are exceptional and remarkable. They are of the influenzal encephalitis type with meningitis serosa (*cf.* No. 1). Acute brain swelling, according to Kennedy, possibly plays a part. (*Cf.* on optic nerve changes, above.)

Finally let me also add a case recently seen in consultation with Dr. H. B.:

Case 18. Patient O., forty-five years old. March 13, 1922. History of three "spells" or "attacks" as follows: In August, 1918, first spell: got weak, cold sweat, grew extremely pale and on next day was quite dizzy. No other symptoms; no headache. Second spell: two weeks ago. Came home from work as usual; did not feel right. Had a pain in his back and nape of neck. Thought he had a cold. Could not eat. Took some brandy. Half an hour after grew "sick"; was white as a sheet, drenched in perspiration. After a chill, vomited. After a day was well again. Third spell, one week ago; came home from work in mid-afternoon. Made his own tea and drank it. He was found unconscious, lying on the floor, again "white as a sheet," his body very cold. When asked why he left his work, told several stories which did not tally. The family doctor saw him several times yet only on the third day did he remember that the doctor had been in to see him before. His temperature had been 101 and over, his pulse 50 to 56.

When I saw the patient on the third day he had a subnormal temperature of 97, pulse 64. He complained of frontal headache. Smell

and vision apparently normal. The pupils were tightly contracted (hence reaction test impossible). Movements of eyes to the right slightly less extensive than to left. V, VI, VII, VIII negative. Tongue deviates slightly to the right. Upper extremities, negative save for rather weak grip r. = l. and reflexes somewhat exaggerated r. > l. Chest negative. Abdomen not scaphoid; no taché (but taché easily produced on the back), abdominal reflexes absent both sides, cremaster absent on r. Lower extremities: Knee jerk R. ++ L. +. Tendency to several clonic jerks on r. foot. Babinski definite and constant on r. Negative on l. Stood on his feet, patient sways and falls. Cannot stand unsupported.

Wassermann of blood negative. Everything else negative. Spinal puncture not obtained.

Recovery after two to three weeks on K. I.

Without further data, making a diagnosis in this case would be sheerest guessing. One will, however, especially think of multiple sclerosis or an obscure cerebral lues.

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- ²¹ Bruns, Kramer, Ziehen. Nervenkrankheiten im Kindesalter, Berlin, 1912, p. 615 (this was in a child of two and a half years in the course of pertussis).

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(For further literature, see Kalischer's case, *Zeit. f. Nerv.*, 1895, Vol. VI, p. 252; Goldflam's two cases, *Neurol. Zentral.*, No. 6, 1891; a series of cases found on p. 66 of Oppenheim and Cassirer (No. 4), cases cited by Leichtenstern in his Nothnagel Influenza Study, p. 132. See also the series of cases given in No. 17 (Wilbrand and Saenger), p. 298, also p. 305, etc. On acute multiple sclerosis, Marburg's *Die sogenannte akute Multiple Sklerose (Encephalomyelitis Periaxialis Scleroticans)*, Wien, 1905; Redlich, *Zeit. f. d. Ges. N. u. P.*, 1917, Bd. 37; Schröder, *Monat. f. N. u. P.*, 1918, Vol. 43; Schulze, *Deut. Z. f. N.*, 1920, Vol. 64; Kretchner, *Berl. k. W.*, 1919, No. 35; Baum, *Z. f. d. z. N. u. P.*, 1919, Vol. 51). A case either of multiple sclerosis following grippe or an Economo disseminated enceph. will be found reported in *Gaz. Ckarska*, Vol. 6, No. 6, 1921, p. 75.

SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY ANNUAL MEETING

THE FOUR HUNDRED AND FIRST REGULAR MEETING, TUESDAY,
JANUARY 2, 1923, THE PRESIDENT, DR. FOSTER KENNEDY,
PRESIDING.

A CASE OF EXTRATHECAL ABSCESS OF THE SPINAL CORD

Drs. Alfred S. Taylor and Foster Kennedy presented this patient. K. C., aged fifteen years. *Previous history:* She had had measles, whooping cough, chickenpox. She was never subject to colds or coughs. Her digestion has always been good except for constipation as a child. She has always been athletic. Her teeth have always been perfect. There has never been any urinary disturbance. She has never had any trouble with her periods.

Present illness: Although athletic, playing basketball, football, etc., energetically, she remembers no injury in her play. As far as she knows her illness started without any cause. On November 5, she had considerable pain over the lower left ribs. This pain was often sharp and shooting. She waked up once or twice during the night because of the pain. The following day at school she could not pay attention to her work because of steady pain and chilly sensations. On returning home she went to bed and remained there. After a couple of days the pain wore away, but there was still extreme sensitiveness to pressure over the lower left ribs. A week later the tenderness had diminished but a soft swelling made its appearance where the tenderness had been. During this week she occasionally sat in a chair for a few minutes. Once when she put on her clothes she became greatly exhausted. No thermometer was used, but her mother thinks she had considerable fever, and she was somewhat delirious on one or two occasions. November 17, in the evening, her legs felt dull and numb, and the following morning she could not control them, and could not void urine. November 18, for the first time, a physician was called in. He thought pleurisy was present. The legs became steadily worse, both with regard to motion and sensation. November 20, a consulting physician found her temperature to be 100.1°, pulse 72, and of good quality. There was then complete loss of power and sensation in both lower extremities. There was also loss of sphincteric control and slight rigidity of the neck. A lumbar puncture was done through the fourth lumbar space. When the needle had apparently entered the dura the stylet was withdrawn, but no fluid came. The stylet was replaced and the needle pushed forward until it came in contact with the posterior

surface of the vertebral body. It was then slowly withdrawn, and at this time a pure white pus dripped slowly from the needle. In the evening following the lumbar puncture her temperature rose to 104° F. The following morning she was taken to the hospital where she was seen by Dr. Kennedy. On arriving at the hospital her temperature was 101.6° F. and in the evening arose to 103.6° F. There was then no stiffness of the neck and the arms and trunk showed normal motion. The lower extremities seemed to be paralyzed. There was some motion on the right side in the flexors of the hip, so that the knee could be slightly raised from the bed. There was no motion in the toes. On the left side she could contract the sartorius and vastus internus muscles, and could also flex the toes. There was some slight rotation at the left ankle. There was complete sphincter palsy. The left abdominal reflexes were both absent. The right abdominal reflexes were brisk but easily fatigued. The knee jerks and ankle jerks were absent. Plantar reflexes were absent on both sides. There was marked convexity of the outline of the left side over the lower ribs and upper flank. There was tenderness over the lower five ribs, and there was a small, tender, fluctuating area over the tenth rib in the anterior axillary line. The left kidney was palpable and tender, and there was a large area of dullness to percussion over the left lower ribs, merging with splenic dullness. The lumbar spines were tender to pressure. The spine, as a whole, was not rigid. There was no muscle spasm so that primary bony focus in the spine was not present. Sensation was greatly diminished in the areas controlled by sacral I, II, III, IV, and V. Diminution was greater in III, IV, and V, than in I, and II. The lumbar roots seemed not to be involved.

Because of the curiously irregular motor paralysis and somewhat irregular sensory disturbance with the tenderness over the left lower ribs, a diagnosis was made of extrathecal abscess compressing the lower sacral roots, which abscess was either metastatic, or, more probably continuous with the subcostal abscess.

Examination of the chest by Dr. Williams showed that the lung itself was normal except for some compression at the left base.

Operation: By Dr. A. S. Taylor, November 21, 1922 (New York Hospital), under ether anesthesia. The laminae of lumbar II, III and IV were removed by a typical laminectomy. When the skin was divided the subcutaneous tissues were found to be filled with inflammatory edema. On separating the muscles from the spinous processes on the left side, there was a gush of thick, yellowish-white pus from the space between the spinous processes of lumbar II and III. A finger slipped along the bony groove to the left of the spinous processes detected eroded bone on the upper border of the lamina of lumbar III and the lower border of lumbar II. Considerable pus flowed from beneath these elevated muscles, apparently coming from the left side. When the laminae had been completely removed the epidural fat was found to be infiltrated and here and there were found small pus foci. When the dura was pushed away from the left side of the spinal canal, a white pus, rather thick, escaped with

apparent freedom. After this pus pocket had been evacuated, and it was seen that the inflammatory area, both above and below, had been completely exposed, drainage was put into the wound which was left wide open. The maximal thickness of the epidural tissues was beneath the laminæ of lumbar III, where the infiltration was nearly 1 cm. thick. This thickened material was removed. After the laminectomy wound had been dressed, an incision was made over the left tenth rib where the fluctuating swelling was present. When the skin and muscles had been divided, a large amount of pus, which was at first white and creamy, and later somewhat reddish-brown in color, was evacuated. The sinuses led between the tenth and eleventh ribs and inside of the ribs a large, irregular cavity could be palpated, running downward to the twelfth rib and upward to the eleventh rib; all of which had been denuded. The lower posterior part of the cavity seemed to lead directly toward the lumbar spine and probably this was the position from which direct extension to the spinal canal occurred. A portion of the tenth rib was resected to allow free drainage. Two small flexible rubber tubes were inserted and then sterile dressings were applied. She was returned to bed in fair condition, the operation having lasted about one hour.

On the second day her morning temperature was 99.6° F., respirations 28; evening temperature 102.2° F., respirations 28. Until the twelfth day her temperature varied from 99 in the morning to 101.6° F. in the evening. On the thirteenth and fourteenth days her temperature jumped to 102.6° F., at which time there was slight backing up of pus in the chest wound. From the fourteenth day through to the twenty-sixth day her temperature varied between 99 and 100° F. From the twenty-seventh to the thirtieth day her temperature remained nearly flat, at 99° F., and on the thirty-first day through to the thirty-fifth day it began to increase in the afternoon, running up to 100.8° F.

Urine Examination: December 4, cultures of urine show *B. coli communis*. December 9, cultures of urine show *B. coli communis*. From the start it was necessary to use a catheter, and after a time the urine became turbid. On the tenth day a specimen was sent for culture and it was reported to be loaded with colon bacilli. Several later cultures showed the same result. On the thirty-second day a specimen was sent for estimation of the number of colon bacilli, and the report was 704,000,000 per c.c. She was first given active urotropin medication which seemed to have no influence upon the number of colon bacilli, and after six days the medication was changed so as to cause active alkalization of the urine. In spite of this, there seemed to be no change in the number of colon bacilli. Just how much of the temperature might have been due to the bacilluria could not be determined. The variations in the temperature, however, seemed to be more definitely related to the backing up in the drainage from the left chest wound.

Cultures: November 23, cultures from pus showed staphylococcus aureus. November 27, Gram stained smears and cultures from vaginal discharge: negative for gram negative cocci. Decem-

ber 6, cultures from posterior wound showed staphylococcus aureus. December 6, cultures from left side showed staphylococcus aureus. Following the cultures from the wound we had an autogenous vaccine made up and she was given a complete series of vaccine injections.

Blood Examination: November 21, Hgb. 75%; R.B.C. 3,500,000; W.B.C. 18,000; Polys. 86%. November 28, Hgb. 60%; R.B.C. 3,050,000; W.B.C. 9,000; Polys. 77%. December 4, Hgb. 70%; R.B.C. 3,350,000; W.B.C. 9,000; Polys. 76%. December 19, Hgb. 75%; R.B.C. 3,650,000; W.B.C. 9,000; Polys. 78%. December 26, Hgb. 70%; R.B.C. 3,500,000.

The laminectomy wound started to fill in rapidly with granulation tissue, and drained fairly freely. It was treated with Dakin's solution for the first week and then was given ordinary treatment to avoid wetting of the patient. Drainage ceased gradually and the wound healed well. On the second day her sensory disturbances were obviously less marked and she made steady progress up to her present condition. Also on the second day she began to show some motion in the left thigh, and an increase in motion in the right lower extremity. The return of motion has been much slower in proportion than the improvement in sensation, although she has gradually developed the capacity to move herself in bed with much more freedom than she could before. She has had practically no pain except during the dressings and for the occasional exception of some pain in the left side when the drainage from the thoracic wound is not quite satisfactory. On the twenty-seventh day, for the first time, she voided a small quantity of urine voluntarily, and from that time on also at irregular intervals. After the fourth week the nurse noted that the bowels could be emptied much more completely and easily than at any preceding time.

Copy of Dr. Kennedy's Report, Dated January 11, 1923

Lower extremities, right: Flexion at the right hip is possible but weak. Extension is strong. Abduction and adduction of the right thigh are both good. Neither flexion nor extension possible at the right ankle. No movement of the right toes can be performed. At the left side: extension of hips is present, but weak; flexion also is present but weak. Flexor and extensor movement is present at the left knee. At the left ankle extension and dorsi-flexion are present. Left toes move freely. Eversion is present, but weak; inversion is present and fairly strong. Right knee jerk is brisk; left knee jerk cannot be obtained. Neither ankle jerk is present. The plantar reflexes are absent. Abdominal reflexes are present.

Pain and touch are normal in the first sacral areas. Over the sacral root areas three, four and five, there remains only a relative loss of pain and touch sensation. There is no loss of sensation of position in either extremity and deep pain sensation in the calf muscles is increased. She has no knowledge of imminent micturition; she has, however, sensation during the act, but lacks control. The rectal sphincter is paralyzed.

A CASE OF VERTEBRAL DISLOCATION: REDUCTION

Drs. Alfred S. Taylor and Foster Kennedy presented L. Z., aged thirty-five years; on October 25, 1922, was thrown from an automobile, landing on her head. She suffered from a small scalp wound on the back of the head, and loss of power and sensation in the trunk and lower extremities. She also suffered great pain, and frequent muscle spasms of the body, legs and neck. Examination by Drs. Pool and Kennedy showed evidences of a transverse lesion at the level of the sixth cervical segment. There was tenderness over the sixth cervical vertebra. Motion was absent in the legs and trunk. In the arms, the biceps and deltoid, both right and left, were intact. The triceps was partially paralyzed on both sides. The hand and forearm muscles were completely paralyzed on both sides. All deep reflexes were abolished. Plantar reflex was absent on the left side and gave slow flexion on the right. Pain (superficial) and touch were abolished to the level of the sixth cervical segment. Loss of appreciation of temperature was at a level about 3 cm. higher than touch or pain. There was a vague sensation of deep pain in the legs and of movements of the toe joints. Pictures taken by a portable X-ray machine showed extreme dislocation forward of cervical V on cervical VI, with some crushing of the articular processes on one side. The neck, all about the region between cervical IV and VII was extremely tender, both in front and back, but most tender over cervical V and VI, where there was some deformity not exactly determinable because of extreme tenderness.

There was a fulness in the front of the neck at the level of cervical VI. Breathing was entirely diaphragmatic. Any movement of the head, neck or body caused extreme pain. Her temperature on admission was 97°, pulse 64, respirations 20. Her general health had always been good. She had always been a hard worker. There was a vague story of trouble with the kidneys many years ago.

On October 27, 1922, an attempt was made to reduce the dislocation without anesthesia. Stretching of the neck preliminary to the reduction was so painful that a moderate amount of ether was used. After stretching the neck for about five minutes the reduction was accomplished without difficulty. Pictures taken upon the spot and developed at once showed that the alignment, both laterally and anteroposteriorly was practically perfect. The articular processes did not seat entirely home, but were in perfectly good position. She was then put in a plaster jacket involving the whole thorax, shoulders, neck, chin and occiput. From the moment of reduction her pains and muscle spasms disappeared and she could move her head laterally and rotate it slightly in her cast without discomfort. Four days after the reduction another picture was taken in order to make sure of the position and there was perfect alignment, even the articular processes having seated home into their normal positions. She made a slow, but uninterrupted recovery.

The day after admission her temperature reached 99° F. The day after the reduction of the dislocation (October 27) her tempera-

ture reached 101.2° F. and the next day 101.4° F., her pulse remaining at 82, respirations 24 to 28. Thereafter her temperature steadily descended and became normal after the eleventh day, her pulse rate averaging from 64 to 78 and her respirations 18 to 24. Her urine throughout the whole period was perfectly normal in every way. Her appetite was good and her bowels were kept regular by means of enemata and occasional medication. On the morning after the accident there was slight return of superficial sensation in the legs and thighs that was not present immediately after the accident. The day following the reduction the patient had decidedly more strength in the muscles of the upper extremities which she had been able to use before reduction had occurred. On the sixth day following reduction there occurred definite movement in the toes of the right foot and very slight movement in the great toe of the left foot, although this last was open to question. There was also a shadow of movement in the thumb of the left hand. On the twenty-second day the patient flexed the third and fourth digits of the right hand. On the twenty-eighth day she moved the second and third digits of the left hand. Movement of the fingers of the right hand is very much more definite and strong than on the left. There is a slight suspicion of movement in the second and third toes of the left foot. While at first breathing was entirely diaphragmatic, within three weeks the intercostals seemed to be working again, although one could not be perfectly sure of it because of the plaster jacket. On the thirtieth day the patient felt sure that her breathing was back almost to normal, and one could make out definite excursion of the ribs during respiration. From this time on movement progressed pretty steadily. She began to develop power to raise the left leg off the bed. On the thirty-fifth day there was very definite increase in strength in the thumb and the first and second fingers of the right hand. She began to use the right hand in various ways, especially for rubbing her nose and attempting to do a little scratching, etc. On the thirty-eighth day she could move the left big toe very definitely and raise the knee slightly from the bed. On the forty-fifth day another radiograph was taken and the spine was still found to be in perfect position. On the forty-ninth day she complained of cramps in the bladder and passed some urine spontaneously. On the fiftieth day she voided a large amount of urine voluntarily. From this time on she was able to void more and more voluntarily. There was also steady, definite but slow improvement in all of her muscles in both the upper and lower extremities. On the fifty-fifth day the cast was split and removed long enough to take an impression for the making of a leather collar and support. Afterward the plaster cast was replaced and held with adhesive plaster.

October 26, 1922. Transverse lesion of the cord at the level of the sixth cervical spinal segment. Tender cervical VI vertebra; motion impossible in both legs and trunk. In the arms the biceps and deltoid, right and left, are intact in power; the triceps are crippled; the hands and forearm muscles are paralyzed. All deep reflexes are abolished. So far the patient has not passed water. There is no

plantar reflex on the left; that on the right is a slow flexion—not a normal but a pathological sign. Pain (superficial) and touch are abolished according to diagram. The line of loss of temperature appreciation is 1.5 higher than that of pain and touch. She feels vaguely deep pain in legs and movement at the toe joints. There is no complete crush of the cord; it is not possible to be sure that she has not a hematomyelia but I think her lesion is a bony compression at the level of cervical V and VI vertebræ. Would advise waiting for radiograph.

November 7, 1922: Pupils normal. She can move the right arm at shoulder, elbow and wrist, and has a slight flexion but no extension of the four fingers. There is less recovery at the great joints on the left side. Movements in the left hand are absent. There is loss of pain and temperature sense on the right leg and trunk—level not determined. There is no loss of sense of position in the toes, nor in deep pain sense over the calves. The root changes in sensation over the cervical VII and cervical VIII are still present. There is some power of flexion and extension in the right toes. The sphincters are still palsied.

January 1, 1923: There is no defect in any cranial nerve. The intrinsic right hand muscles have excellent power. There is great weakness, however, of the right triceps and weakness to a less degree in the flexor muscles of the right forearm. The extensor muscles of the right forearm have excellent power. In the left upper extremity the triceps action is good though still much impaired. The power of the biceps muscle is about equal on the two sides. Only faint flexor and extensor movement at the left wrist, and weakness of the left intrinsic hand muscles is evinced by her feeble effort to spread the left hand.

All movements are present and strong in the right lower extremity. The left leg is very spastic; despite this spasticity, flexion, extension, abduction, adduction can be performed at the right hip. Flexion and extension movements are present at the left ankle, knee and toe.

Reflexes: The supinator jerks are absent on both sides. The biceps jerk, left greater than right. Triceps fairly active on the right, faintly present on the left. The knee and ankle jerks are present though exaggerated on the left side. There is left ankle clonus. Babinski's sign is present only in the left foot. Abdominal reflexes are absent. There is a diminution of appreciation of superficial pain and touch in the areas controlled by the two cervical spinal roots. This diminution though slight is still present on both sides. On the right side of the trunk below the level of the lesion and over the right lower extremity, pin prick is felt as touch, and temperatures are not appreciated at all as such. There is no alteration to these sensations on the left leg or trunk. Sense of position is present in both legs. Deep pain sensation is acute on the left and considerably diminished on the right. In the past five days there has been a resumption of bladder control, the passage of urine, however, being felt only on the left side of the urethra.

Discussion: Dr. Foster Kennedy said: In regard to the first case, I can subscribe to Dr. Taylor's remarks, except that I would not be sure that she is making an entirely satisfactory convalescence. She has improved. At the present moment there is slight sensation in the lower sacral area, but no loss in the lumbar and upper sacral areas. Ankle jerks and knee jerks are absent and there is complete paralysis of one foot. Her recovery on the motor side has been considerable within the last two weeks. I would like to have Dr. Taylor's opinion regarding the methods of freeing the extrathecal area from pus and granulation tissue. The pressure is slight, but it seems excessively difficult to drain this area and to get sufficient space for adequate drainage.

Dr. Alfred S. Taylor said: The drainage seems to have been satisfactory for these reasons: the temperature has gone down steadily from 104° F. to 101.3° F., and during the same time the blood count has changed from a count of 18,000 W. B. C. with 88 per cent polys, to 8000 W.B.C. with 78 per cent Polys, so I feel that the chances are that the infection has been pretty well overcome. We left the spinal wound wide open, packed with gauze covered with rubber tissue to prevent rapid closure. I think the spinal wound has cleared up. I don't think there are any deep pus pockets in the spinal canal. With the inflammatory condition there present, we are bound to have granulation tissue and scar tissue, and we may get pressure later. I believe we should wait several months to see if, in spite of treatment, with massage, heat and light, there is permanent cicatrization in the deep tissues, sufficient to cause permanent nerve disturbances. If after that there is pressure it would be fair to go into a clean field and try to relieve pressure by secondary operation. As the condition is extradural we have fair hope of success. My worry has been in regard to the chest. The diaphragm rapidly adhered to all the ribs except where the drainage tubes were, thus preventing satisfactory drainage of much of the abscess. However, the general condition has held up well and definitely improved. The use of autogenous vaccine has helped to overcome the handicap. The ribs were denuded but not sufficiently necrosed to present a serious problem. I think it is worth while to wait and see what develops.

Dr. Foster Kennedy said: In regard to the second case, as to the neurological findings, she was unable to feel pain or temperature on the right side of the body. She also had considerable motor paralysis of the left leg. The right leg has recovered power. The left leg is still spastic. Sphincteric control returned after two days. She can feel the passage of urine on the left, but not the right side of the urethra. A word should be said regarding the method of reduction: Dr. Taylor had a set of ropes from the extension apparatus, and braced this round his own hips, so that, with his hand under the girl's neck, and leaning his whole weight backwards, he was able to exert a steady pull until he obtained a perfect reduction of the fracture. The entire procedure took about one hour and ten

minutes, a period so long that no steady manual traction could have been maintained.

Dr. Charles A. Elsberg said: These are two very beautiful cases of Dr. Taylor's and he ought to be complimented on the way in which he has managed both of them. In regard to the first case, I think he had luck with him. My personal experience has been less fortunate with extradural cases. By the time the patient is operated on, he is paraplegic, and after operation remains so. The cases I have seen have usually been due to acute osteomyelitis of the vertebrae.

The second case is interesting, and, I think, promises very well. The X-ray shows an ideal reduction. There is one point, however, to be noted in these cases of dislocation between the fifth, sixth, and seventh cervical vertebrae. One sometimes sees an enormous amount of dislocation in patients who improve and get well. I have seen two such cases—one in a high diver, and one in a football player. Both showed a much more marked dislocation than that shown by the X-ray in Dr. Taylor's patient. This, of course, has no reference to the ideal reduction of the vertebrae obtained in this case of Dr. Taylor, which promises ideal results. I compliment him on the operative results in both cases.

Dr. I. Abrahamson asked whether lumbar puncture was done in the second case. Dr. Taylor said no.

Dr. Abrahamson then asked what was the bacteriology in the first case, and Dr. Taylor replied that it was a staphylococcus aureus infection.

Dr. Taylor (closing) said: I have seen dislocation with marked deformity persisting in a man who made a perfect neurological recovery after the accident. Then, later, he was brought to see me because of a difficulty in locomotion. He began to have spasticity in the legs. This occurred after a long time (eighteen months). It has been my feeling that if one had this sort of angulation persisting, in time the upper edge of the lower vertebra would cause pressure on the anterior columns and spasticity would develop as in this one case which I have mentioned. The technic Dr. Kennedy described I have used in three different cases. It is original. It suggested itself to me in this case. We did the same thing a number of years ago in a boy who had an almost perfect recovery, except for some slight spasticity in the legs in the morning. It is a perfectly simple procedure and very well controlled. It gives a very satisfactory anatomical result.

Dr. Foster Kennedy (closing) said: In regard to the first case, it is a difficult matter to decide whether the extrathecal abscess was a direct extension from the front of the chest, or whether it was a metastatic process. There was evidence of compression of the lower chest, bronchial breathing and dulness to percussion, but apart from that it was fairly clear that had it been a metastatic, lymphogenous, perineural infection from the lower ribs on the left side, an abscess would have occurred at the mid-dorsal region, on account of the obliquity of the intercostal nerve.

SENSORY DISTURBANCES IN TUMORS OF THE SPINAL CORD AND MEMBRANES, AND THEIR DIAGNOSTIC SIGNIFICANCE

Dr. Charles A. Elsberg read this paper. It was based upon 87 pathologically verified spinal cord tumors of which 59 were extramedullary, 15 extradural, and 13 intramedullary.

Some dissociation of cutaneous sensibilities is very frequent in extramedullary tumors, almost as frequent as in intramedullary growths and in the latter all types of sensation are frequently equally involved. The more typical disturbances of sensation in extramedullary, as compared with intramedullary disease are the following: Unless there is a loss of all sensation below the segmental level in many extramedullary growths the maximum of sensory disturbance is in the most peripheral dermatomes and the minimum of disturbances near the level of the lesion. In intramedullary growths, on the other hand, the maximum of sensory disturbance is often at, and below the segmental level. This difference between the sensory disturbances observed in many intramedullary and extramedullary growths can only be explained upon the basis that there is a grouping of fibers in the spinothalamic tracts according to limbs and parts of limbs. Clinical evidence supports the view that in the spinothalamic tracts, the most eccentric and most posterior fibers are those that are distributed to the sacral and lower lumbar dermatomes, that in front and somewhat internal lie the upper lumbar and lower thoracic fibers, still further forward and internal, the upper thoracic, and so on.

The described types of sensory disturbances are more characteristic of extramedullary and intramedullary tumors than the dissociation of sensibility that is ordinarily described. The occasional absence of cutaneous sensory diminution over several dermatomes below the segmental level can also be explained on the basis of a pressure from behind which has not yet been transmitted to the most anterior portions of the spinothalamic tracts. Similarly, in tumors on the anterior aspect of the cord there may be no sensory disturbances in the lower sacral dermatomes and the sensory disturbances therefore are very similar to what is seen in intramedullary tumors.

The relative degree of involvement of tactile, pain and temperature sensibility varies considerably. Tactile sensation is rarely more affected than pain and temperature sensibility. Pain and temperature sensibility are sometimes equally diminished, at other times temperature sensibility is more disturbed than pain. There is often marked dissociation between the ability to recognize hot and cold, and in many cases the patient is unable to recognize hot at a time when he is still able to recognize cold, and it is very interesting that cold may be felt as pain over areas in which pain as tested with a sharp needle has been entirely abolished.

There is also frequently a dissociation between vibratory and articular sensibility. Vibratory sensation may be undisturbed while

articular sensibility is profoundly affected or vice versa, or vibratory sensibility may be profoundly affected on both sides of the body, while articular sensibility is disturbed on only one side. There are also many variations in the Brown-Séguard picture and in many tumors this type of motor and sensory disturbance is poorly marked. There is generally more motor disturbance on the same side and more sensory changes on the opposite side.

In fifteen of the author's series, cutaneous sensation was equally diminished on the two sides of the body, while motor power was more affected on the same side as the tumor, and in five patients both motor power and sensation were most affected on the same side of the body.

The author then described the clinical picture which he has called "Reverse Brown-Séguard Syndrome." He finally stated that in these patients when bilateral signs become marked, the condition may be one of "Bilateral Brown-Séguard" picture.

Discussion: Dr. I. Abrahamson said: Dr. Elsberg has approached the subject from a standpoint that is neither stable nor valuable. The stage of the disease when the sensory examinations were made was not mentioned. We all know that late manifestations of tumors of the cord, as well as tumors of the brain, are misleading and that conclusions drawn from them are very hazardous. The better method of approach is the anatomical-physiological method, starting with the first signs of the disease and studying the morbid processes in the order of their development. Variations in sensory changes are not accidental or incidental, but conditioned by the consistency of the tumor and its position in reference to the level and to the circumference of the cord. The softer tumors, with more widespread root signs, cause tract losses of sensation, earliest and severest just below the level of the disease and diminishing in intensity as they spread downwards, oftentimes sparing the sacral segments; the hard tumor, with limited root signs, causing the maximum tract sensory disturbances over the lowest sacral distribution and ascending with diminishing intensity as we approach the level of the disease.

The position of the tumor with reference to the cord, is equally important; lateral pressure causing early and more marked Brown-Séguard syndromes; anterior or posterior pressure causing disturbances of the posterior column sensibility early and intensely, and only later in the disease, irregular disturbances of the pain and temperature sensibility resembling the Brown-Séguard picture.

There are other dissociations between sensory and sensory, and sensory and motor disturbances, and these also depend on the site and the degree of the cord compression.

Dr. Abrahamson said he felt that the signs and symptoms are due, primarily, to circulatory changes within the cord, caused by pressure and interference with the various circulations and not by the direct pressure on contiguous portions of the cord. He had postulated lamellation of the spinothalamic and other pathways for years; but the type described by Dr. Elsberg, bearing a relationship to the

circumference of the cord and not to vascular supply, did not coincide with his views on the matter. The paper of Dr. Elsberg's, while interesting, would be apt to create confusion in the mind of all but the very expert. The confused sensory charts require proper keys or small diagrams illustrating the position, age and density of the tumor.

Dr. G. Rosett said: I wonder how frequently Dr. Elsberg found that there was sensory and motor disturbance on the same side. In going over the records of a number of cases with Dr. Tilney, I noted a number of cases of lesions of the upper part of the spinal cord in some of which there seemed to be an anomaly. In some of the pyramidal tract lesions there seemed to be about 5 per cent of the cases in which there were sensory and motor disturbances on the same side. This might account for the finding of Dr. Elsberg in which he encountered these disturbances on the same side.

Dr. Friedman said: I was glad to hear Dr. Elsberg dispose of the notion that the so-called syringomyelic type of sensory disturbance is found only in intramedullary tumors.

With regard to the question of lamellation in the spinothalamic pathways, I want to say that we have been making observations similar to those of Dr. Elsberg in the neurological service of Dr. Kennedy at Bellevue Hospital. We have also found that in extramedullary compression of the cord from side to side, there is the type of sensory change spoken of by Dr. Elsberg. We have termed this "long tract pressure sign." That the fibers from the lower dermatomes range themselves peripherally in the cord is also shown by the type of sensory change seen in those tumors of the cord which exert pressure anteroposteriorly. In these cases we get exclusion of the sacral areas with the type of sensory change seen in intramedullary tumors.

I might also suggest that in the few cases in which the motor and sensory signs seem to be on the same side, the mechanism might be that of a contre-coup, the motor signs being due to homolateral injury of the pyramidal tract and the sensory changes, the result of lesion of the opposite spinothalamic pathway through jamming of the cord against the spinal column.

Dr. Elsberg (closing) said: When there is a tumor of the anterior aspect of the cord near the median line, one is in doubt whether it is an intramedullary tumor. When the tumors lie mesially on the anterior aspect of the cord, the disturbance is rather of the intramedullary than the extramedullary type.

NEUROLOGY IN GREATER NEW YORK

Drs. Charles L. Dana and Thomas K. Davis presented this paper which was a condensed report of a survey of the neurological hospitals and hospital services in Greater New York. This survey has been a part of the study of all hospital conditions in New York, and was carried out in 1921 under the auspices of the Public Health Commission of the New York Academy of Medicine. The neuro-

logical services considered were Bellevue Hospital, King's County Hospital, City Hospital, Metropolitan Hospital, Central and Neurological Hospital, Montefiore Home, Mt. Sinai Hospital and the Neurological Institute.

There is shown to be great need of increasing the neurological bed capacity for all classes of cases, but especially for the subacute and chronic. A second very special need is for more physiotherapy. Of the hospitals inspected, only the Neurological Institute, the Montefiore Home and the Mt. Sinai Hospital had enough facilities for this work. In Bellevue the equipment is considerable, but in view of the volume of such work to be done, it is inadequate. In all the other institutions, the facilities are woefully insufficient.

Occupational therapy is not used enough in a majority of the hospitals.

There is need for a higher standard of medical recording throughout, but especially in some of the institutions where chronic cases are cared for. A fourth finding relates to the need of much greater attention in all the hospitals to psychiatric complications. In brief, at the present time, measures directed toward the needs of the chronic and subacute neurologic patients of New York, coincide with the best interests of the specialty of neurology.

Discussion: Dr. T. K. Davis said: I should like to emphasize one point, and that is that we owe to the chronic case more care than it receives, even when the case is hopeless.

Dr. G. Hyslop (by invitation) said: It is just recently that I have passed from the class of "slovenly residents" and I should like to say a few words.

As things are at present, the functional cases—many of them hysterical—are thrown in among the organic cases, and through this association often absorb some of the atmosphere of depression from them. However, there is one virtue in throwing all cases together: if one is in doubt as to whether a new patient has much functional overflow, all one has to do is to let him alone for two or three days. If the complaints of the patient are functional he will, by that time, have joined the flock of hysterics. Seriously, however, if the hospitals are to treat functional cases properly there must be provision for adequate privacy. Another point to be remembered is that the handling of functional cases demands a great deal of time. The staff of visiting physicians is usually sufficiently bedevilled by their own problems to prevent them from spending much time on the ward with functional cases or from giving the resident interne much help or instruction with such cases. It is necessary to teach the average resident how to handle such people and it seems to me that on the visiting staff of a neurological service some one should be appointed whose chief interest is in functional cases.

Dr. Frederick Tilney said: This report makes an appeal to all of us. The facts are as they have been stated. We know that the chronic case is a forlorn hope today and that there is no adequate care provided for it. If it goes to the Central and Neurological Hospital it is inadequately cared for because of lack of equipment

and means devoted to a hospital of this kind. Another point is that we should be much more alert about a closer alliance between neurology and psychiatry. We do need the psychiatrists and we should encourage a much more definite bond between that branch of science and our own, in the handling of old chronic cases. These two branches should be much more affiliated than they are at present. I think this report should be the means of arousing a painstaking and careful investigation into the conditions of this city. It calls for more than a passing comment on our part. I should like to suggest that very definite steps be taken whereby this society should put itself on record as being ready to further any action by which a neurological service might be built up. We should also endeavor to bring about a closer union between the branches of neurology and psychiatry. It is too important a matter to be allowed to pass with mere compliment.

Dr. C. E. Atwood said: In seconding Dr. Tilney's remarks, I would like to add just a word in reference to the so-called hopeless chronic cases. I believe that after pigeon-holing the case in its proper category we should carefully estimate whether there may not be some symptoms present which are improvable, and if so, vigorously treat them. It is obvious that the mental state of discouragement, depression and worry will be improved commensurately. To illustrate my meaning, I will mention only one case. A woman of 38, a victim of spastic paraplegia, and with moderate hydrocephalus, following meningitis at the age of 2, unable to walk without assistance, and with cross-legged progression, who had been dubbed hopeless by London neurologists, and received only massage, was placed in a sanitarium and subjected to gymnastic and mechanical treatment. After some months she became able to walk alone; and after a year and a half she began to ride horse-back. The double pyramidal tract lesion symptoms remain, of course, and the exercises have to be kept up; but the patient is happy and contented with her lot, and certainly vastly improved. I believe that specialized forms of treatment should not be lost sight of (along with the ability to properly diagnose and record cases), even in the chronic neurological wards of our public hospitals, if the ideals mentioned in the paper are to be fully realized.

Dr. Osnato said: I suppose Dr. Davis considered the point of ways and means to improve these services. There were 160 patients of this type in King's County Hospital when I had a service there and only one interne. There were too few nurses. There was a large visiting staff on paper, and only a few who did any real work. To get additional internes, and nurses, and proper equipment, one must get appropriations from the city. It is very hard to get money for a proposition of this kind where you offer the citizen so little in the way of results. The difficulty might be insurmountable without a method which, while dangerous, might be useful. We need a certain amount of newspaper propaganda. The human side of the question would have to be played up and the heart interest stirred. The ultimate result to the citizen would be an increase of taxes. The

necessary care would mean expenditure of many, many thousands of dollars. We have to prepare the citizen to strengthen the hands of the commissioner who has to ask for the appropriation. There are such snarls and bickerings over appropriations that the president of the City College was asked recently to return one-third of his salary because they thought he was living in too fine a house at the expense of the city. The situation is harder because, as these cases are chronic, we cannot promise results to the men who hold the purse strings of the state and city.

Dr. Dana (closing) said: The difficulties mentioned certainly do exist but the problem can be solved if we go about it in the right way. It may not be necessary to get money first from the city. We might work out an ideal plan using a small group not necessarily in the city. Further, the help of some foundation might be secured. It is necessary to work out a definite plan.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

DECEMBER 21, 1922, DR. E. W. TAYLOR PRESIDING

CASE OF CEREBELLAR TUMOR: OPERATION: RELIEF OF SYMPTOMS

Dr. E. W. Taylor presented this case. Apart from certain signs of general increased intracranial pressure, there are absolutely no indications of cranial nerve paralysis or other neighborhood symptoms. The patient was well so far as he knows up to three months ago. He then had certain difficulty in the management of the left leg with a slight tendency to limp and to turn toward the left in walking. A week after the onset he noticed clumsiness of the left hand. These signs increased somewhat in severity. He was admitted to the Massachusetts General Hospital about two months after the onset. For several days previously he had vomited excessively, for the most part irrespective of food, and often in a projectile manner. He had also had considerable vertigo, which he at times somewhat vaguely described as headache. He was mentally perfectly clear during this period. The physical examination at the hospital showed entirely normal reflexes and sensation. The optic discs were slightly clouded. He was much disturbed by a sense of vertigo and occasional vomiting. There was horizontal nystagmus in both eyes on lateral fixation. His strength was unimpaired, but there was very marked disturbance in the left side, characteristic of cerebellar asynergy. Dysmetria, adiodokinesia, Holmes rebound phenomenon in less degree and past pointing toward the left were all markedly present. He became unable to walk without assistance and when helped, always with a strong tendency toward the left. He stood as well in the Romberg position with open as with closed eyes. The sphincters were at no time involved and he remained mentally clear.

The diagnosis of left cerebellar hemisphere lesion was made,

presumably tumor, possibly cyst. Operation by Dr. W. J. Mixer on November 29 showed after exposure of both cerebellar hemispheres a very marked pressure with particular bulging on the left. Incision of the hemisphere led to a considerable evacuation of yellowish fluid. Palpation revealed a tumor which proved to be gliomatous in character. Following the operation the patient improved considerably in his general symptoms from the relief of pressure. The cerebellar signs, however, persist, but in somewhat less degree. Treatment by X-ray may relieve the situation somewhat, but the prognosis is obviously grave. An unusual feature of the case was the lack of choked disc in spite of extreme intracranial pressure. The rapidity of development of the tumor is also noteworthy, probably to be explained by a secondary cyst formation.

Discussion. Dr. W. J. Mixer: The tumor in this case was deep-seated beneath the cortex of the cerebellar hemisphere, associated with a cystic cavity. The tumor was soft and friable and absolutely impossible of removal. It proved to be a glioma under microscopic examination.

Dr. H. C. Solomon: I would like to ask what the value of X-ray is in the treatment of a case of this type.

Dr. W. J. Mixer: I feel unenthusiastic about the effect of X-ray in this case. In general, however, I am convinced that it helps in a considerable number of instances, particularly with the soft, embryonic type of tumor.

CHRONIC LEAD POISONING VS. TABES DORSALIS

Dr. George Clymer presented a patient, a man of 55 years. In hospital from October 22, 1919, to December 8, 1919. His occupation for thirteen years was that of a sign painter, but for ten years he had been unable to work, and during that time there was no history of exposure to lead. His past history shows a record of an accident at the age of 20 in which his right knee was crushed, since when it has been weak. Venereal discharge for two weeks sixteen years ago. Syphilis denied. His wife has had two miscarriages. No living children.

His complaints were: (1) Abdominal pain located in the region of the umbilicus, occurring two to three times a week, coming on ten to fifteen minutes after meals. The pain was gnawing in character. It would disappear for three or four months at a time, and then return more severe than ever. (2) Dizzy attacks without loss of consciousness about once a month in which he would fall to the floor, recovering after a minute or two. (3) Pain in extremities of ten years' duration with tingling sensation in one foot and leg, and pain 'like being squeezed in a vise' in the other leg. This pain was constant, with periods of greater severity lasting 2½ hours, occurring at first every two to three weeks, recently every three to four days. (4) Dyspnea and palpitation of the heart for ten years without edema. Some orthopnea at night. He was told eight years ago that he had heart trouble, and ten years ago that he had lead poisoning.

(5) Four months ago first began to have stabbing precordial pain with sensation of numbness in left arm. Considerable belching of gas, constipation, and nausea for past two months. While in bed in the hospital his dizziness disappeared, but his other symptoms, especially abdominal pain, became worse. He also complained of having a dry cough for months and had noticed that his voice was growing hoarse.

Physical examination at that time showed right pupil larger than left, both regular, and reacting to distance but not to light. Many teeth missing. No lead line. Spine—double right scoliosis. Heart—apex impulse seen and felt in 5th space, slow, occasional extra systole, sounds poor quality, late systolic murmur, A2 not heard, 1st sound sharp and loud at apex. No diastolic. Pulses equal, good tension. Artery walls palpable. Abdomen—suggestion of mass in epigastrium. Liver dulness 5th space to 5 cm. below costal margin. Its edge felt three fingerbreadths below costal margin, not tender. Extremities—right knee, very resistant swelling, patella dislocated to right. Reflexes—knee jerks absent. No clonus, Babinski or Kernig. Rectal—large boggy nontender prostate.

Laboratory Findings: Blood Wassermann negative. Lead found in urine. Renal functions, Oct. 24, 10%; Oct. 25, 25%; Oct. 28, 40%; Oct. 31, 5%; Nov. 3, 0%; Nov. 23, 60%. Blood—white count, 4,400; red count, 3,872,000. Smear—no stippling seen on three examinations. Red and white cells appear normal. N.P.N. 54.32. Creat. 1.3. Stools—lead present. Spinal fluid—10 c.c. clear fluid, normal pressure, no cells. Proetin and globulin negative. Wasserman negative. X-ray entirely negative. Bismuth enema showed extra loop in descending colon, otherwise negative.

During his stay in the hospital at that time he was seen by eleven consultants. The opinions recorded varied from a positive diagnosis of lead poisoning to a positive diagnosis of tabes dorsalis, and to a double diagnosis of lead poisoning and tabes.

He now returns to the hospital with a perfectly definite Charcot knee. The other symptoms are pretty much as they were in 1919. He came to the hospital this time because while walking the day before his admission he felt as though something had slipped in his knee, and he has been unable to bear any weight on it since.

The laboratory findings at present are as follows: Blood Wassermann negative. Lumbar puncture 10 c.c. clear fluid, normal pressure. Cells 6, Alcohol plus (NH₄) 2S040, T.P. 44; Gold Sol. 0123321000. Wassermann negative. Urine negative. Blood—polynuclears 59, Lymphocytes 36, large mononuclear 5. Red cells slightly achromic. Platelets normal. Stools negative.

The X-ray bears out the clinical diagnosis of Charcot knee and the lancinating pains which he has at present are perfectly characteristic of tabes.

It now appears that the laboratory tests for lead which were being done at the time of his previous admission were positive in the presence not only of lead but of manganese, so that the laboratory reports showing lead at that time cannot be taken as conclusive, and

in the absence of any other evidence of lead poisoning, or any exposure to lead within the past ten years, it seems as if we could probably rule it out as a factor in his clinical picture at that time. The serological findings which he showed then and now are characteristic of the relatively inactive stage of tabes in which we frequently find Charcot joints developing. These cases unfortunately respond little if at all to antiluetic treatment. At the suggestion of Dr. J. B. Ayer he has been given sacral injections of 65 c.c. physiological saline solution with considerable relief of pain. This case emphasizes the point that it is very easy to be led astray by laboratory findings. These on his previous admission apparently showed the presence of lead and the absence of syphilis. We now believe that lead was probably not a factor in the case, and that the picture was due wholly to syphilis.

HYOSCIN IN PARKINSONIAN RIGIDITY

Dr. George Clymer presented a man of twenty-two, who three years ago was suddenly taken sick with headache, fever, sleepiness, weakness, dizziness, and diplopia. He was in bed for three days. These symptoms passed off, but in the course of a month or two it gradually became difficult for him to take deep breaths. Eighteen months ago he noticed a slowness of all movements, although there has at no time been any mental retardation. When first seen he was a typical picture of Parkinson's disease, even to a slight tendency to drool. He was admitted to the hospital for serological and other examinations, which are as follows: Urine negative. Blood normal. Blood Wassermann negative. Lumbar puncture—10 c.c. clear colorless fluid, cells 2, ammon. sulphate 0. Alcohol 0. Wassermann negative. Gold sol. 0000000000. T. P. 45, pressure normal, sugar .0625.

His treatment has been: December 16 and 17, hyoscin hydrobromide gr. 1/150 t.i.d. subcutaneously. December 18 and 19, hyoscin hydrobromide gr. 1/100 t.i.d. subcutaneously. December 20, hyoscin hydrobromide gr. 1/100 t.i.d.p.o. As a result of this he now shows no rigidity whatever, and his movements are normal. He feels perfectly well.

I do not think for a moment that any permanent benefit has been derived from the treatment, but offer the case simply to show what palliative results may be obtained from this mode of treatment.

BROWN-SÉQUARD PARALYSIS FROM DISLOCATION OF CERVICAL VERTEBRA

Dr. Henry R. Viets: A boy of sixteen struck his head on the bottom after diving into a shallow pool. He was stunned without unconsciousness, but immediately and for some weeks later he suffered from severe, sharp, and intermittent pains in the neck, upper back, and arms, causing him many sleepless nights. He could not raise his arms above his head, and movements of the hands were

awkward and clumsy. His fingers, as well as the lateral aspects of his thighs, were numb. Micturition was not affected. He walked about with his head forced forward in a semiflexed position and was unable to turn it to the right or left. X-rays in the anterior-posterior position were taken before he entered the Massachusetts General Hospital, but failed to show any fracture or dislocation.

When seen at the hospital two months after his injury, he carried his head in the position described above. No definite dislocation was noted in the anterior-posterior x-rays, though the space between the fourth and fifth cervical spines was increased without lateral displacement. The lateral plates, however, showed a forward displacement of the fourth on the fifth cervical vertebra, without fracture. Pupils were equal. Triceps and radial reflexes were equal and active, but the biceps could not be obtained, while the arms, except the hands, showed some weakness. Both legs were slightly spastic, with both knee jerks increased, bilateral ankle clonus, and suggestive bilateral Babinski signs. There was also some swaying in Romberg position. Splotchy hypesthesia was questionably demonstrated over the upper third of the left thigh.

At operation (Dr. W. J. Mixer) three and a half months after injury, evident bilateral forward dislocation of the fourth on the fifth cervical vertebra was disclosed, with pressure on the spinal cord by the laminae of the fourth. The vertebrae were strongly fused and could not be moved laterally by manipulation, nor would traction change their relation. A decompressive laminectomy of the third and fourth cervical vertebrae was done.

Three months after operation the patient's condition is greatly improved, since his head is straight and can be flexed and rotated, at least in part, without pain. He shows a partial Brown-Séquard paralysis, the right side of the body being partly anesthetic, especially pain and temperature sense, up to the level of the fourth cervical segment, the line of demarcation being fairly sharp. On the left side he shows some spasticity of the leg, with increased reflexes, ankle clonus, and Babinski sign. The arms show no definite sensory loss, though there is some paresthesia of the fingers. Both deltoids and biceps are weak, though they respond to faradic stimulation and are slightly improving.

The Brown-Séquard paralysis clearly points to a lesion in the fifth cervical segment of the spinal cord, more definite on the left than on the right. This localization also corresponds to the paresis of his arm muscles. The diaphragm does not seem to be involved, and this would suggest that the fourth segment was not seriously injured. The Brown-Séquard paralysis is of the usual incomplete type, with paresis on the side of the lesion, associated with spasticity and loss of muscular and joint sense, with a contralateral loss of pain and temperature sense. There is some diminution of the sense of touch on both sides.

In the x-rays I would lay special emphasis on the value of the lateral x-ray as essential to the diagnosis of the lesion. X-ray examination before the patient entered the hospital failed to reveal the

dislocation because it was limited to the anterior-posterior field. (Dr. Viets showed the original paper by Charles-Edouard Brown-Séquard [1817-1894] from the *Compt. rend. Soc. de Biol.*, 1850, Par., 1851 II 70.)

Discussion. Dr. W. J. MIXTER: This case permits one very definite lesson, namely: the danger of spinal cord surgery where moderate pressure is already being exerted on the cord. I used the utmost care possible in removing the laminae above, which were pressing against the cord, and yet I increased the paralysis very much. The other point is that after a dislocation of the neck for some months, bony union takes place to such an extent that it is absolutely impossible, except by actually cutting the bodies apart, to reduce the dislocation. This is easily seen in the x-ray picture in which the bony union is apparent.

VERTIGO AND ITS TREATMENT

Dr. C. L. Woolsey: Vertigo is the result of stimulation of the vertiginous centers in the cerebrum, through the vestibular end organ, its tracts, or associated tracts. Vertigo is of two types: subjective, when the individual experiences a sensation of posture change in relation to the objects about him; and objective, when the objects seem to change their position in relation to the individual. It may be accompanied by a disturbance in the emotional realm or giddiness, nausea, and vomiting. It is essential to ascertain just what the patient means by "being dizzy"; quite frequently visual blurring is mistaken for vertigo. Vertigo may be caused by injuries to the vestibular end organ or its tracts.

Case I. Mr. S. came to the Neurological Department of the Massachusetts General Hospital on account of attacks of severe vertigo accompanied by nausea and vomiting. Several weeks previously he had received a fracture of the base of the skull, with profuse bleeding from both ears and nose. After several weeks he returned to his former position of locomotive engineer, but experienced severe vertigo and vomiting when taking curves. The neurological examination was negative with the exception of tinnitus in the left ear and a left horizontal nystagmus. Fundi were negative. The treatment in this case began by rotating the patient morning and night in the horizontal plane. Three complete rotations of the body, then rest in bed; each successive day the number of rotations is increased slowly, so that the patient accommodates himself to the stimulus producing the vertigo. After six weeks' treatment this patient was able to resume his duties as locomotive engineer and since that time has experienced little or no inconvenience from vertigo. The rotation treatment should not be attempted if the fundi indicate cerebral pressure. Only chronic cases should be treated by this method.

Case II. Margaret N., aged fifty-eight, came to the clinic complaining of severe objective vertigo. No history of head injury. For several weeks the patient had experienced severe attacks of

vertigo, accompanied by nausea, vomiting, and an extreme emotional upheaval. Neurological examination revealed a rotatory nystagmus with a corresponding synchronous head movement identical in direction with the eye nystagmus. The x-ray report of the teeth showed several root abscesses. These teeth were removed and within four weeks the vertigo, nausea and vomiting had ceased.

Case III. G. O., aged thirty-five, was healthy up to the age of twenty-seven, when she developed pulmonary tuberculosis. She was confined in a state hospital for tuberculosis for a period of one year. During her treatment at this hospital she developed vertigo with nausea and vomiting. Soon thereafter she noted a horizontal movement of the head. The vertigo had persisted at intervals and this brought her to the Neurological Department of the Massachusetts General Hospital. Physical examination indicated an active tuberculous process in the apex of the left lung. The neurological examination was negative, with the exception of a left horizontal nystagmus accompanied by a horizontal head movement synchronous with the eye nystagmus. Fundi were negative and lumbar puncture showed no increase in intracranial pressure, consequently the patient was treated by rotation. After eight weeks' treatment the patient feels that she has been greatly benefited.

Case IV. J. J. C., aged twelve, came to the clinic on account of severe dizziness, accompanied by nausea and vomiting, which had extended over a period of two weeks. The first symptoms noted were gastrointestinal pains and diarrhea. This was soon followed by vertigo, nausea, and vomiting. The nausea was increased by a sudden change of position. The patient experienced a sensation of falling forward and to the right. At the time of examination no abdominal symptoms were noted. The pupils were round, equal, and reacted to light and accommodation. Fundi were negative. There was a slow pull of the eyes upward and to the right with a resulting quick nystagmus downward and to the left. A movement of the head was noted identical and synchronous with the eye movement. This patient was treated with luminal $\frac{1}{4}$ gr. t.i.d., within twelve hours was improved, and within a week was entirely free from vertigo.

Case V. A. R., a young man of thirty-three, came to the clinic complaining of attacks of vertigo. For the past six years the patient has experienced severe attacks of vertigo, nausea, and vomiting, coming on at first at infrequent intervals. Lately the attacks are so frequent and severe that the patient is unable to earn his livelihood. He has a typical Raynaud syndrome, involving both hands and feet. When this is most pronounced his vertigo is most severe. Pupils are round, equal, and react normally. Fundi are negative. At times there is diplopia and a right rotary nystagmus, with tinnitus and some deafness of the right ear. Caloric tests indicate some interference in the right vertical canals or their tracts in the pons. This patient has been treated by rotation, luminal and other drugs, with little or no improvement until given sodium nitrate gr. 1 t.i.d., and since the treatment was given he has experienced less vertigo.

Discussion. Dr. Ayer: Regarding the rotation treatment: Is it original with you?

Dr. C. E. Woolsey: I know of no one else who has used the rotation treatment. I have communicated with men who have used douching with great relief. If the lesion is on one side only, rotation is contraindicated because it would stimulate both end organs.

THREE CASES OF FOCAL EPILEPSY

Dr. W. J. Mixter. The following three cases, which have come to operation in the past three months, have presented certain strikingly similar features. The condition reported is not uncommon but is well worth keeping in mind. The histories in brief are as follows:

Case I. Baby S., age eight months, seen with Dr. Bronson Crothers. Hard forceps delivery; apparently normal until four months old. Since then he has not gained well; has seemed rather dull and has had an increasing number of convulsions starting in the left side of the body. Complete examination including cerebrospinal fluid, etc., negative except for slight left facial weakness, and increase in tendon reflexes on the left.

Case II. Mrs. L., age twenty-eight, seen with Dr. F. C. Lord. A long history of attacks of weakness in the right arm, which have not been disabling up to two months ago. Since that time the attacks have become epileptiform in character and have involved the right side of the body. During the past few days she has been aphasic and has shown definite weakness of the right side. For twenty-four hours attacks have been much more frequent, now occurring at about three-minute intervals. Examination negative except for the following: Temperature 101, pulse 110; unconscious; epileptic convulsion starting in right face and arm every three minutes, lasting about a minute, and becoming general after the first few seconds. Left side of body flaccid between attacks. Reflexes vary; active at times but abolished after the convulsions.

Case III. Mrs. D., age fifty-eight, seen with Dr. H. C. Solomon. For past four years she has had epileptic convulsions starting in left arm and face and becoming general. She has had periods of weeks when she was free from convulsions, and at other times they have been very frequent. During the past few months there has been very definite slowing of her mental processes, forgetfulness, etc. Examination negative except for the following points: Increased density in the right temporal bone shown by x-ray; slow and forgetful; gait a little unsteady; no reflex changes.

All these patients were operated upon, an osteoplastic craniotomy being done over the affected area in each case. All of them showed a lifting up of the arachnoid, the space between the arachnoid and the cortex being filled with clear fluid. The area affected was definitely localized, and in all three cases was anterior to the motor cortex. In one case (Mrs. L.) there was a marked increase in blood supply in the affected area. Numerous small incisions were made in the arachnoid, permitting the fluid to run off, and in the

case of Mrs. L. the enlarged veins were ligated in several places. In all three cases improvement following operation has been striking. Baby S. is a large healthy boy, apparently normal except for the scar in his head. Mrs. L. is apparently a perfectly normal woman. She has had no attacks since the day following operation and is now able to use her typewriter, some two months after operation. Physical examination is negative. Mrs. D. is now three weeks post-operative. During the first five days she had numerous convulsions and it became necessary to turn down the bone flap and remove a thin clot which had formed beneath it. Since that time she has made an uninterrupted convalescence and is now far more alert than when she came to the hospital.

The pathological process found in all three cases is difficult to understand. There must be some underlying cause for the collection of fluid beneath the arachnoid, but as yet we have no real information as to the type of fluid or what the underlying cause is. It may be cerebrospinal fluid which has collected beneath the arachnoid owing to some fault in absorption of this fluid.

Discussion. Dr. E. W. Taylor: One of these cases which I had an opportunity of studying suggested a purely psychogenic origin of the attacks. What, in general, is the ultimate outcome in cases such as you have described?

Dr. S. J. Mixter: Most of the cases have done well but a good many have recurred. I think that is the usual history. These three are satisfactory so far but it would be interesting to show them three years hence; I surmise they would not then be so satisfactory. The second case, alluded to by Dr. Taylor, is of rather peculiar interest on account of the very rapid recovery. I also have a strong suspicion that a very considerable part of her trouble was functional. It is true of these three cases and many others that in none has there been a choked disc. One might think of cortical or dural tumor with pressure on the cortex but whether choked disc has been present or not recent cases have led me to hazard a diagnosis of fluid under the arachnoid, whatever its origin may be.

SUBTENTORIAL CYST OF MENINGES WITH NECROPSY

Dr. James B. Ayer presented this case: M. G. H., No. 252695. Mrs. H. M., Armenian, twenty-three years of age. Admitted October 24, 1922. While in Constantinople, two years previously, began to be troubled with headache, which increased in severity up to time of admission. Sixteen months before she had married and come to the United States, where a healthy full-term baby was born. Since delivery, *i.e.*, for seven months, headache had greatly increased, being bitemporal and suboccipital; at this time also dizziness had set in, and for four months there had been difficulty in walking. For two months she had complained of difficulty in the use of her hands and for two weeks imperative micturition and nasal regurgitation. Recently she is said to have been forgetful and to repeat herself.

During the period October 24 to November 21 the following findings were noted:

Physical Examination. The patient was well developed and well nourished. Except for scars of previous variola, some pyorrhea alveolaris, and a compensated mitral regurgitation, nothing abnormal was found. Stools showed neither blood nor ova. Urine negative. Blood Wassermann negative. There was a slight secondary anemia, but leucocytes were normal in number and on differential count.

Neurological Examination. Cranial Nerves: Vision was present in both eyes and no marked contraction of the fields was present, as judged by the finger test, perimetry being unsatisfactory because of lack of coöperation. Fundi showed bilateral choked disc of 4-5 diopters. Vertical and horizontal nystagmus was constantly observed. Ptosis of the right eye was inconstant and of slight degree, as was also slight right facial weakness. There was no subjective or objective disturbance of sensation of the face or weakness of the jaws. Hearing present on both sides, but bilateral tinnitus was constant. Ear drums normal. At times there was difficulty in swallowing and nasal regurgitation of liquids. Gag reflex absent. The tongue protruded straight and showed no atrophy or tremor.

Cerebrum: There was constant awkwardness in the use of both hands but particularly the right, hypermetria and asynergy being especially marked in the right hand. No spontaneous past pointing was at any time observed. Unfortunately lack of coöperation made Barany tests unreliable. The gait also was unsteady, the right side being especially affected. There was constantly a tendency to fall to the right side.

Sensation: Usually normal throughout for cotton-wool, pain, heat, cold, and deep sensibility. On two occasions needle prick suggested hyperalgesia over the whole left side, tactile sense being normal.

Reflexes: Arm reflexes, K-j and A-j equal and lively. At times suggestive Babinski and Oppenheim reflexes were obtained on both sides, but never ankle clonus.

On November 17 pneumoventriculography showed the following: "Ventricles are rather large. Right appears to be somewhat larger than the left. No definite abnormalities in outline visible." (G. W. Holmes.)

On November 21 cerebellar decompression was performed by Dr. J. S. Hodgson. Marked increase of intracranial pressure was found, but no pathological lesion discovered.

The patient died November 25.

Necropsy No. 4433 (Dr. Oscar Richardson). The head only was permitted. The brain presented marked flattening of convolutions, indicative of increased intracranial pressure. "On the right side, section of the tentorium exposes a cystlike tumor, the pedicle of which springs from the region of the dura, along the right hand side of the sella turcica and is continuous with the cyst wall, which rests between the basilar process and the brain-stem. It presses upon

the right crus and the upper part of the pons, and down along the pons on the right and the superior surface of the right cerebellum. The brain tissue in this region presents a pressure cavity." Otherwise the brain was not abnormal.

After hardening in formalin the cyst was further examined. It was ovoid, 5 x 4 cm. Its contents were found to be yellow and gelatinous, and to contain numerous cells containing fatty granules. No hooklets could be found. The pedicle of the cyst was about 1 cm. in diameter and composed of cells of uniform character, showing small oval or round nuclei and large granular protoplasmic bodies. Interspersed with these cells were bundles of fibroglia and connective tissue fibers. No mitotic figures were seen. In the tumor no areas of degeneration were visible. The cyst wall was of almost uniform thickness, 3-4 mm. in width, the outer capsule smooth and covered with connective tissue, the inner wall rough, but showing no transverse bands. Microscopically the wall of the cyst resembled the pedicle.

Summary. This patient presented an unmistakable clinical picture of progressive brain tumor, with localization correctly diagnosed in the right cerebellar fossa. The cyst, which unfortunately was not found at operation, is somewhat unusual. It did not at any point invade the brain, and certainly did not arise from the acoustic nerve. Its origin seems to have been in the meninges, and its obvious attachment was the dura in the neighborhood of the sella turcica. In the absence of a complete postmortem examination it is not possible to state that we are not dealing with metastasis, but the evidence at hand suggests that it is a primary tumor of the meninges, pathologically benign in character.

THE HEART AND ARCH BY X-RAY IN NEUROSYPHILIS

Dr. C. A. McDonald: On forty unselected cases of neurosyphilis at the Out Patient Department at the Massachusetts General Hospital an x-ray of the heart and arch was taken. Eighteen of the forty cases showed by x-ray specific aortic disease; and of these eighteen, the records showed signs of cardiovascular disease present in six cases and symptoms of cardiovascular disease present in four cases. Sixteen cases were interpreted as arteriosclerosis of the arch, and of these the records showed no signs or symptoms of cardiovascular disease. Two cases showed other heart conditions, and in one of these cases there were signs of heart disease. One case showed no arch cardiac pathology. In two cases there were no x-ray interpretations, and in one case the x-ray interpretation was given without cardiac measurements. In these three cases signs and symptoms of cardiovascular disease were not recorded.

Conclusion: (1) This study of the records of forty cases of neurosyphilis shows signs of cardiovascular disease present in 15 per cent of the cases and symptoms present in 10 per cent. (2) The x-ray examination showed specific aortic disease present in 45 per

cent of the cases, and arteriosclerosis of the arch present in 5 per cent of the cases. (3) Therefore, in 90 per cent of the forty cases there was demonstrated by x-ray cardiac pathology.

RÉSUMÉ OF WORK OF SOCIAL SERVICE IN NEUROLOGICAL CLINIC AT MASSACHUSETTS GENERAL HOSPITAL FOR 1922

Charline F. Buck: The total number of patients in the Neurological Clinic to whom social service has been rendered thus far in 1922 is 391. Our aims are threefold: (1) To assist the doctor by making treatment available and effective to the patient. (2) To teach students and volunteers the processes of social work. (3) To contribute material for medical social research.

Our methods vary according to the type of cases medically, which we have grouped as follows:

I. Toxic-organic: in which there are 209 patients, including syphilitic 69, choreic 40, epileptic 35, paralysis agitans, multiple sclerosis, etc., 65. In this group our efforts are especially directed toward making medical care possible and continuous or arranging institutional care elsewhere if advisable. For instance, financial arrangements for antiluetic treatment for the syphilitic: either loans to the patient or the provision of state medicine, or intensive supervision of the hygiene of the choreic, or change of employment of the epileptic.

II. Hypophrenic: in which there are 47 patients. Our efforts here are centered on investigating the home care of the child, persuading the family to appreciate the advantages of institutional care, to secure special class training in the public schools, and to arrange special supervision over the adolescents.

III. Functional: in which there are 135 patients. Our efforts in this group are directed, first, toward gaining a thorough understanding of the patient's personality, habits, characteristics, and environment. Then, under guidance of the doctor, we attempt to alleviate the deficiencies and difficulties in his home, work, or play life, instruct him in mental hygiene (again under medical supervision), and arrange for convalescence or vacation when it is needed.

In addition to the usual difficulties encountered, which group under Dr. E. E. Southard's classification of disease, ignorance, vice, legal entanglements, and poverty, a few of the resistances which must be overcome are: (1) Lack of institutions for the chronic. (2) Lack of convalescent or vacation resources for men. (3) Unwarranted prejudices against public institutions. (4) Lack of "light" jobs. (5) Lack of welfare, education, and recreational resources in local communities. (6) Inability to secure the cooperation of social agencies in cases with favorable prognoses (feeble-minded adolescents).

We as social workers have come to depend on definite medical recommendations as a basis for our social work. This is necessarily sometimes hard to get. This handicap has been overcome this year

in the group of psychoneurotic patients by the establishment of an advisory committee of two staff doctors who go over the case medically, hear the results of social investigation and action, and give a definite opinion of further action which is outlined for us.

For convenience of statistics we have grouped the results of our efforts on 344 patients (the other 47 cases are too incomplete to judge the results as yet) into cases with:

1. Satisfactory adjustments	151 or 43%
Group I.....	94 or 51%
Group II.....	22 or 55%
Group III.....	36 or 31%
2. Partially satisfactory adjustments.....	135 or 36%
Group I.....	64 or 31%
Group II.....	16 or 40%
Group III.....	56 or 49%
3. Failures	58 or 16%
Group I.....	25 or 13%
Group II.....	2 or 5%
Group III.....	21 or 18%

Discussion. Dr. E. W. Taylor: Certainly if these figures are correct this is a most satisfactory showing as compared with what was done fifteen years ago, when we did nothing socially for patients of this type.

Dr. C. M. Campbell: In a general hospital one can do a great deal more than at a psychopathic hospital. Social service done in a department of a general hospital must have a very widereaching effect.

Dr. J. B. Ayer: These cases would seem to show that the organic cases were better adjusted. What does Miss Buck think is the group in which social service does most for the patient? The first group would require half an hour's time; a functional case might require ten hours' time or more. Which group do you do the best job in, and to what cases do you think you ought to devote most time?

Miss Buck: To give a selfish answer, I prefer the work with the functional cases. The statistics look discouraging, but what one accomplishes with an individual is often most satisfactory.

Dr. C. M. Campbell: One of your three aims is scientific; to see what the study of these cases means for developing social service as a thing in itself; which group?

Miss Buck: I should say the functional group.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

Amato, L. D. PROGRESSIVE MYASTHENIA GRAVIS. [Policlinico, Oct., 1921, XXVIII, Med. Sect., No. 10.]

This also is a case report of a young man whose first symptoms followed after a severe chilling, two weeks after recovery from an infectious sore throat. Then atypical Erb-Goldflam myasthenia syndromy developed. The symptoms then began to disappear and the patient improved so much later that the earning capacity has been restored for two years to date. The only treatment had been a course of epinephrin.

Broadwin. MYOTONIA ATROPHICA; REPORT OF TWO CASES OCCURRING IN BROTHERS. [N. Y. Med. Journ., Jan. 29, 1921, CXIII, No. 5.]

Case report of two cases with similar histories and neurological findings. The onset with weakness occurred in both patients at about fourteen years. The myotonia was noticed in the older brother at sixteen and in the younger at eighteen; in both there was extreme wasting. No muscular hypertrophies had at any time been observed. There were atrophied testicles and the atypical and scanty distribution of hair. The muscular atrophies were also alike in their distribution.

Kaufmann, F. ADIPOSIS DOLOROSA. [Sch. Arch. f. Neur. u. Psych., 1921, IX, No. 1.]

Two case histories are here recorded. One in a neuropathic woman, and a second in which there were marked familial indications of obesity for three generations. In the first case, a diffuse type of adiposus beginning at nineteen, slowly became manifest. In both the pains were not spontaneous, but occurred only on deep pressure of the fatty swellings. General weakness of body and mental deterioration became evident in both. A hemorrhagic tendency was also present. Improvement followed thyroid treatment, but the adiposus dolorosa did not seem to be modified.

Smith, H. L. PROGRESSIVA LIPODYSTROPHIA. [Bull. Johns Hopkins Hosp., 1921, Vol. XXXII, p. 369.]

The literature on this subject is here reviewed, and the author also reports a case of lipodystrophia progressiva in a woman thirty years of age, associated with arteriosclerosis, chronic nephritis, hypertension, and a moderate thyropathy as shown by the slight enlargement of the thyroid

gland, the slight lid lag, the tremor, the slight nervousness, the increase in the pulse rate, the acrocyanosis, and the accelerated metabolic rate. The condition began to develop when the patient was fourteen years of age. Lipodystrophia progressiva, Smith summarizes, is a relatively rare condition, beginning insidiously and usually in early life; caused possibly by endocrine dysfunction; not hereditary; does not endanger life; and is more commonly and characteristically developed in the female. It is characterized pathologically by a slowly progressive, almost complete and probably permanent disappearance of the subcutaneous fat from the head, face, neck and upper extremities, and from the trunk as far as the pelvic bones and groin folds, and, especially in the female, by an increase in the subcutaneous fat of the buttocks, thighs and legs. Treatment has been unsuccessful. It has included the administration of thyroid, pituitary, and ovarian extracts, massage, hydrotherapy and overfeeding.

Janson, G. PROGRESSIVE LIPODYSTROPHIA IN GIRL OF SIX. [*Hygiea*, May, 1921, LXXXIII, No. 10.]

This case report of a child, with syphilitic mother, who showed the typical emaciation of the face and neck which did not extend below the navel. Below this the contours of the body were of the average girl of her age. The skin is dry and the lymph glands prominent.

Hitzenberger and Richter-Quiltner. THE METABOLISM IN VASCULAR HYPERTONUS. [*Wien. Arch. f. inn. Med.*, February 15, 1921.]

These two investigators have made a systematic examination of the blood sugar in a number of cases of hypertonus during the past few years. They divided their cases into three groups: (a) Primary hypertonus, (b) secondary hypertonus due to chronic glomerular nephritis, (c) hypertonus associated with diabetes mellitus. Hyperglycemia was a regular occurrence both in primary and secondary hypertonus. This form of hyperglycemia differed from that met with in diabetes mellitus chiefly in being independent of alimentary factors. It was not due to a disturbance of sugar assimilation they argue, but to a persistent overproduction of sugar. In cases in which vascular hypertonus was associated with diabetes mellitus hyperglycemia was out of all proportion to the sugar excreted in the urine. In vascular hypertonus there was frequently also an excess of uric acid in the blood. The writers think that the syndrome of hypertonus, hyperglycemia, and hyperuricemia may depend on an increase of secretion of adrenalin with its consequent hyperadrenalemia.

Winkin, C. S. AN ANALYSIS OF THE NERVOUS CONTROL OF THE CARDIO-VASCULAR CHANGES DURING OCCLUSION OF THE HEAD ARTERIES IN CATS. [*Am. J. Physiol.*, 1922, LX, No. 1.]

Occlusion of the head arteries gives a complete anaemia of the brain. To this the organism responds by a series of vigorous reactions of which

the most prominent is a prolonged rise of blood pressure. This response was analyzed experimentally in cats under artificial respiration. The response is controlled essentially by the splanchnic nerves. It is abolished by lesions which interrupt completely the continuity between the medulla and the coeliac ganglion, that is to say, either by section of the splanchnics before they enter the coeliac ganglion, or by section of the spinal cord high up in the thoracic portion. The level at which the splanchnic out-flow leaves the spinal cord differs in different individuals. Most of the fibers leave the cord in the region of the sixth to eighth thoracic. Some fibers, however, leave the cord higher up, and in some individuals they may leave at the high level of the second or third thoracic. Ligation of the adrenal glands does not prevent the response but modifies it somewhat. This fact is interpreted as signifying that the activity of the adrenal gland contributes to the rise in blood pressure. This adjuvant action, however, is stated to be due not to an increased liberation of adrenalin from the adrenals, but depends on the amount of circulating adrenalin. It is also believed that there is evidence of some other product of adrenal activity appearing in intact animals as the result of repeated extreme splanchnic stimulation. The most important conclusion is that the vasomotor response through the sympathetic is completely dependent on the integrity of the brain stem and the maintenance of conductivity within it. The vasomotor responses transmitted by the sympathetic nervous system, are in respect to their complete dependence on the higher nervous levels of the central nervous system, comparable with skeletal responses. In other words, the central nervous system is not "autonomic." [Med. Sc.]

Koskowski, W. NICOTINE AND THE INHIBITORY NERVES OF THE HEART. [Comptes Rend. de l'Acad. des Sciences, April 10, 1922, Vol. CLXXIV, p. 1039.]

After bilateral vagotomy in the neck in dogs, the writer found that intravenous injection of nicotine produced its usual action on the heart; it was proved on neuropsey that all the fibers of both vagi nerves were completely degenerated below the point of section. He concludes that the intracardiac ganglia are trophically independent of the vagi nerves, and that nicotine acts, not by way of the vagi, but directly on the intracardiac ganglia. [Leonard J. Kidd, London, England.]

Bonilla. TACHYCARDIA AND THE INTERNAL SECRETIONS. [Siglo Méd., Sept. 11, 1920, LXVII, No. 3483.]

Excessive functioning of the thyroid is considered by this clinician as a factor in all forms of tachycardia. Under war conditions previously healthy soldiers developed suddenly the clinical picture of exophthalmic goiter after emotional stress; the character of the emotion being an individual one. Cannon and Achucarro's work on the relation of thyroid and

adrenals to emotional stress is quoted and Bonilla concludes, every emotional tachycardia is of thyroid origin, from excessive functioning of the thyroid. Persons inclined to hypothyroidism do not develop tachycardia; they appear apathetic. The tachycardia may be the only symptom of the hyperthyroidism or there may be hypertension as well, from excessive functioning of the suprarenals in addition.

II. SENSORI-MOTOR NEUROLOGY.

1. PERIPHERAL NERVES.

Naffziger, Howard Christian. METHODS TO SECURE END-TO-END SUTURE OF PERIPHERAL NERVES. [Surg. Gyn. Obstet., March, 1921.]

End-to-end suture of peripheral nerves is the aim of the surgeon in those cases of nerve division which come to operation. When this is impossible "auto-cable" grafts offer the next best prospect. In lesions of the large nerve trunks—ulnar, median, musculospiral, the great sciatic and its internal and external popliteal divisions—it is rare that end-to-end suture cannot be obtained. Of the methods found most useful in obtaining apposition of the divided nerve ends are:

1. Free mobilization of the proximal and distal portions of the nerve is obtained by long incisions, identification of normal nerve above and below the point of injury, free dissection of nerve from sheath and when necessary lengthening of nerves to muscles by dissecting them from the main nerve trunk. This does not interfere with their function.

2. Transposition of the nerve to a shorter route than the normal one.

(a) Ulnar nerve. Transposition from behind the internal condyle to the flexor surface beneath the deep fascia and pronator radii teres without sacrifice of branches to the long ulnar flexors. Free the nerve well above the point of penetration of the internal intermuscular septum.

(b) Musculospiral nerve. Transposition to a position beneath the biceps and on the anterior surface of the humerus is used in extensive injuries to the posterior surface of the arm as well as to aid in overcoming nerve gaps. A high internal axillary incision and an incision on the outer surface of the lower third of the arm are used. The branches to the outer head of the triceps are sacrificed by this procedure.

(c) Median nerve. Dissection upward of the muscular branches and transposition to a more superficial position.

3. Favorable posture of the extremity to shorten the distance to be overcome. *Ulnar*, by flexion of wrist and elbow. Adduction and a forward position of the arm. *Musculospiral*, flexion at elbow, adduction and forward position of the arm with internal rotation. *Median*, wrist and elbow flexion. Adduction of arm. *Sciatic nerve*, extension of hip, slight abduction, full flexion of knee. A method of exposing the entire sciatic by reflexion of the gluteus maximus and permitting sutures within the sciatic notch is given.

4. Gradual lengthening of the nerve by a two-stage operation. At the first operation by mobilization, transposition and favoring posture as much of the involved portion of the nerve as possible is resected and the ends sutured together. The extremity is gradually straightened over a period of about two months when a second stage operation permits resection of the remaining scar and end-to-end suture. Interrupted fine silk sutures including only the neurilemma are used with no through and through sutures. Attempt is made to avoid rotation of the nerve by matching the intrinsic vessels of the nerves. Rinjers solution and cotton sponges for freeing the nerve of clots are used. No foreign material or auto-grafts of tissue are used to protect the suture line. An attempt is made to have it lie between muscle planes. After treatment. Removable splints are used to maintain desired postures with gradual extension of joints. One or two months are allowed for lengthening the nerve. During this time massage and joint movements within the permissible range are practiced. Length of nerve gaps overcome. For the ulnar nerve by a combination of all methods outlined—10 cm. For the musculospiral nerve, 10 cm.; median, 9 cm. Sciatic and its two main divisions, each 10 cm. Larger gaps may be overcome by two-stage operations. By the adoption of these methods nerve grafts are rarely necessary. [Author's abstract.]

Voegtlin, C. RECENT WORK ON PELLAGRA. [U. S. Public Health Reports, 1920, XXXV, 1435. Chem. Abstr., 1921, XV, 1340.]

No direct proof has ever been brought forward that pellagra can be transmitted experimentally to man or to animals. Direct proof supports the hypothesis that a causal relation exists between pellagra and a restricted vegetable diet. In pellagra, definite changes from the normal metabolism occur and indicate decreased gastric secretion and increased intestinal putrefaction. Diet is the essential factor in the treatment and prevention of this disease; an appropriate change in diet suffices without any change in the other sanitary conditions. A diet of the composition used by pellagrins prior to their attack by the disease produces malnutrition and certain pathological changes similar to those occurring in pellagra. However, typical pellagrous dermatitis has not been observed in animals. Continued consumption of a restricted vegetable diet has produced pellagrous symptoms in man. While the nature of the dietary defect has not been discovered, certain observations point to a combined deficiency in some of the well-recognized dietary factors as the cause of the pellagrous syndrome. A bibliography of 46 references is appended to the article.

Allenbach, E. SARCOMA OF SCIATIC NERVE. [Revue de Chirurgie, 1921, Vol. LIX, No. 2.]

This comparatively rare condition has been found in twenty-four cases by this author. He adds another to the list with the following

history: A fifty year old man felt a small lump in the back of the right thigh. It increased to the size of a man's head in four months. On operation it was found that the sciatic nerve entered and emerged from the tumor. Another tumor developed in the cicatrix, and the thigh was amputated. Seven days later fatal tetanus developed. In his review of the recorded cases he found the youngest patient was nineteen, the oldest fifty-nine, and 80 per cent were men. Pain was the first symptom in 80 per cent. The absence of pain in 20 per cent was no criterion of lack of malignancy. In some the tumor extended from the hip to the knee.

Foggie. PERIPHERAL NEURITIS OCCURRING IN PREGNANCY. [Edin. Med. Journ., April, 1921. B. M. J.]

This author records a case of typical general peripheral neuritis occurring idiopathically and in definite relation to pregnancy, and not as a mere coincidence, representing a condition which is only an occasional accompaniment of pregnancy. All the usual causes of neuritis were excluded, and, apart from local pelvic paralyses due to mechanical efforts or to inflammatory extension, such paralyses are the result of infection or are of toxic origin. In the case recorded septic infection was excluded, and clinically it was similar in type to alcoholic neuritis, the underlying condition being a degeneration of the affected nerves resulting from a circulating toxin. Hyperemesis and obstinate constipation, with loss of memory and at times delirium, occurring during the early months, are among the points of interest, and this association of hyperemesis and neuritis frequently occurs in severe cases. Treatment consists in active regulation of the bowels and improvement in the action of the kidneys, the prognosis being good unless the neuritis affects any nerves vital to life, when induction of premature labor may be needed, though delivery does not always mean a rapid amelioration of the condition. In this case the patient was delivered of a healthy child at full time, the various symptoms continuing through the pregnancy, and clearing up completely about four months later.

Roqueta and Umbert. TUBERCULOSIS OF NERVOUS SYSTEM. [Rev. Españ. d. Med. y Cir September, 1920, Vol. III, No. 27. J. A. M. A.]

Roqueta and Umbert describe six atypical cases, including one of a physician of thirty-five who developed neuralgia in the arms and skull, with a tendency to paresis and contracture in the legs. The symptoms proved rebellious to all treatment, except morphin, and the martyrdom kept up till death. This experience was repeated in another case in which the pains shifted about, yielding only to two daily injections of morphin, with death the fifth month. In a third case the symptoms of toxic polyneuritis became complicated with symptoms resembling those of sclerosis in patches. In three other cases the men died not long after the onset of the nervous symptoms suggesting ascending paralysis, arthritis from septicemia or brain tumor. In all the six cases there was nothing to

suggest syphilis, and tentative treatment on this basis only aggravated conditions. All of these patients, however, had an unmistakable small tuberculous lesion somewhere, so that toxins of the tubercle bacilli may well explain the condition. In the first case the neuralgia developed soon after the abrupt, spontaneous subsidence of an extensive tuberculous skin eruption. In one of the other cases, enlargement of glands and conjunctivitis accompanied the nervous disturbances. Improvement was realized in one case under heliotherapy, but the patient refused to complete the course. The lungs did not seem to be affected in any of these cases, but in reality there was probably some pulmonary focus in all.

Pastine. RADIUS EXTENSOR REFLEX. [Policlinico, June, 1921, Vol. XXVIII, No. 6.]

The author makes the clinical observation that pathological processes affecting the seventh cervical root are liable to modify the reflex obtained by tapping on the styloid process of the radius or on the lower end of the outer margin of the radius. The radius periosteal reflex.

Requier. FIBERS IN PERIPHERAL NERVE TRUNKS. [Policlinico, February 28, 1921.]

Following the excellent work of Dustin in Belgium on nerve fasciculation, by W. Krauss in America, Requier contributes a study to the arrangement of the groups of fibers in peripheral trunk nerves.

de Villaverde, J. M. PAINS IN POSTERIOR ROOT LESIONS. [Siglo Médico. June 4, 1921, Vol. LXVIII, No. 3521.]

Pains in the posterior roots are, according to this study, most often due to a syphilitic process. These pains are frequently thought to be reflex from disease of a viscus. If the syphilis is not suspected the differential diagnosis is difficult, especially when more than one root is involved. The complete case history is given of a man of twenty-nine who complained of pains in the left shoulder extending to the hand. They grew severe and loss of power and atrophy, with vasomotor disturbances, developed. Lumbar puncture will distinguish between radiculitis and intercostal neuralgia. Tabes may develop with monosymptomatic

Rubens. SODIUM SALICYLATE IN POLYNEURITIS. [Deut. med. Woch., June 2, 1921.]

Polyneuritis has so frequently been found as a symptom in influenza that this author is inclined to give it a major rôle in this syndrome. He suggests that in chronic cases of supraorbital neuritis the toxins of influenza may still circulate in the blood, and he finds confirmation of this hypothesis in the success he has achieved by the intravenous injection of sodium salicylate. He gives at one injection twelve sterilized bulbsful, each containing 0.43 gram sodium salicylate, 0.05 gram caffeine, and water to 3 grams. The injection is repeated daily, and, as an illustrative case shows, every injection was followed by improvement, and after the

fifth the patient could sleep undisturbed by pain. She was discharged as cured after twelve injections. In two comparatively obstinate cases each required twenty-four injections. The author adds, as a technical "tip," that a vein will be more easily found if, just before an injection, the patient is given a cup of coffee or a glass of wine.

Léri. NEUROFIBROMATOSIS OF THE TRUNK. [Bull. d. l. Soc. Méd. d. Hôp., December 30, 1921, Vol. XLV, No. 39.]

A clinical report of a case in a young man with normal skin but numerous subcutaneous nodules along the course of the superficial nerves. Nevi were also present.

Brown. SUTURE AFTER NERVE INJURY. [Journ. Orthopaed. Surgery, June, 1921. B. M. J.]

The author here discusses the possibilities of suture after extensive nerve injuries, since the prognosis of grafting being bad it is important to obtain end-to-end suture when possible. By extensively freeing the nerve from its fascial connections in order to take advantage of its inherent elasticity it is possible to gain $1\frac{1}{2}$ inches in the median and ulna in the arm and 2 inches in the sciatic. By fixing the joints in suitable positions considerable gaps in the nerve can be dealt with, giving a further 1 to 2 inches in most instances. Advantage can be gained in some cases by altering the course of a nerve—for example, by bringing the ulnar nerve in front of the elbow it can be relaxed from 2 to 3 inches by flexion at the elbow, as compared with 1 inch gained by extension of the elbow while the nerve is in its normal bed. Similar benefits in length can be gained by transposition of the musculospiral, the median, and the posterior tibial. Still further gain may be obtained by stripping up the branches from the main nerve, the maximum being obtained when the branches arise above the lesion. In this way the triceps branches of the musculospiral, the motor branches of the median, branches of the ulnar, the hamstring nerve from the sciatic, the branches to the gastrocnemii from the internal popliteal, and all the branches of the posterior tibial nerve can be traced to one bundle for each, which can be stripped from the main nerve for a considerable distance. The advisability of sacrificing branches may have to be considered, or even shortening the bones of the limb should apposition still not be obtainable. Failing these measures, further extension may be obtained by stretching in a two-stage operation. By the above means gaps in the median nerve in the arm of $4\frac{1}{2}$ inches, in the ulnar of 5 inches may be bridged.

Clark. NEUROFIBROMATOSIS WITH ALCOHOLISM. [Braz.-Med., November 26, 1921, Vol. II, No. 20. J. A. M. A.]

The clinical diagnosis was Recklinghausen's disease in a hard drinker, and the ascites, emaciation and splenomegaly were ascribed to atrophic cirrhosis of the liver, as the severe dropsy exemplified the proverb, "If you live in alcohol, you'll die in water." Necropsy, however, showed the

liver and spleen comparatively normal, but the stomach had shrunk to the diameter of the duodenum. Clark remarks that fully 50 per cent of the cases of cirrhosis of the liver escape detection until death from inter-current disease, but in this case, although the clinical picture indicated cirrhosis, yet the liver was comparatively sound. His experience has been that violent hematemesis or melena in an adult is almost certain to be traceable to cirrhosis of the liver, especially if the Wassermann test is positive. Alcohol and syphilis are the main factors. The assumption of complicating tuberculous peritonitis as responsible for the ascites with cirrhosis of the liver has been discarded as erroneous, and the preponderant syphilis is now recognized. Treatment for syphilis may induce great improvement. Splenectomy has often rendered good service, but in the case described the inanition from the alcohol addiction had entailed insufficiency of the heart, and this was chiefly responsible for the ascites and edema.

Marchal. POLYNEURITIS AFTER INJECTION OF SERUM. [Arch. Méd. Belges., December, 1921, Vol. LXXIV, No. 12.]

A unique cause for polyneuritis is here reported as occurring in a young officer, following an injection of antitetanus serum. He had had diphtheria at the age of eight, accompanied by a neuritic palsy in the muscles of the larynx and of the left shoulder. The present attack of neuritic palsy was in the same region as the old diphtheritic one.

Audova. MUSCULAR ATROPHY AFTER NERVE DIVISION. [Schweiz. Arch. f. Neur. u. Psych., 1921, Vol. IX, No. 2.]

A careful analysis in lower animals, rabbits, of the various factors involved in muscular atrophy following nerve section. In the rabbit, the loss in weight may amount to 50 per cent after four weeks. The chemical composition undergoes marked modifications. Hypertrophy of corresponding muscles in the sound limb rarely occurs.

Barré and Gunsett. TREATMENT OF SCIATICA. [Journ. de radiol. et d'électrol., November, 1921.]

A clinical report of the results obtained by X-ray treatment in 20 cases of radicular sciatica caused by vertebral arthritis. Twelve were cured, 5 improved, and 3 no relief. The forms most susceptible to amelioration by X-rays were those in which pain was prominent. Amyotrophy or changes in the reflexes were not present in these cases. Radiculitis of meningeal origin did not appear to be definitely affected by the treatment. In radicular pain associated with pyramidal tract symptoms X-rays generally had no effect on the latter. Recent cases were more susceptible to amelioration. Small doses repeated once a week gave the best results.

2. CRANIAL NERVES.

Bistis, J. RECURRING PARALYSIS OF THE MOTOR OCULI. [Grèce Médicale, May-June, 1921, Vol. XXIII, Nos. 5-6. J. A. M. A.]

The recurring paralysis was preceded by local pains each time. The first attack had been at the age of twelve; the young woman seems otherwise healthy. The ptosis lasts from one to several days. The intervals average only a week or two. The pain begins in the temporal region, extends to the brow and the back of the neck, and is generally accompanied with nausea and malaise but has no neuralgic character. In the cases compiled by Mingazzini, the first onset occurred between ten and twenty in seventeen, between twenty and thirty in eight, and in one case in the sixties.

de Monchy, S. J. R. RHYTHMICAL OCULAR CONVERGENCE-SPASM IN A QUADRIGEMINAL REGION LESION. [Nederland Tijdschr. v. Geneeskunde, June 18, 1921, H. 1, 3366.]

A boy, fourteen years, of good health, with healthy parents but nervous relatives, developed normally, but in December, 1919, became thin and ill, had headache, giddiness, and tinnitus in left ear. A month later became acutely worse, fever to 40° C., vomiting, severe headache and tinnitus; fever declined, but he remained ill, had strabismus and somnolence, sometimes sleeping all day. Admitted two months later; for the next six months showed the following picture: broad, short, with thick layer of fat; puffy, with fatty deposit on thorax and lower abdomen; increased weight by 7 kilos. No fever nor subfebrile temperature. Slight concentric limitation of visual fields. Bilateral choked discs (R. 3½ D., L. 4 D.). Pupils equal, shape regular, no hippus; no light reaction left, hardly any right; good reaction to pain and convergence. Rhythmical convergence-spasm, with a quick phase as convergence and a slower as divergence. Convergent squint. Almost complete palsy of conjugate up and down movements of eyes. Adduction and rotation of eyeballs normal. Very little complaint of diplopia, but it is objectively demonstrable; the images are occasionally oblique, but this is very variable. Sensory trigeminus normal; good corneal reflexes. Right masseter and temporal less strong than left, but no R.D. Jaw-jerk low. Left orofacial branches possibly slightly weak; no electrical changes in facial muscles. Slightly diminished hearing on left, with shortened bone conduction; slightly turbid right tympanic membrane. Speech somewhat difficult, slow, slightly scanning. Head, arms, and legs show incessant slight, small, irregular movements; in the arms this occurs both during rest and on volitional effort; clumsiness in writing, buttoning, etc.; slight intention tremor, resembling ataxy. Slight left dysadiodochokinesis; no pointing error. Tendon-jerks low. No sensory changes. Right lower abdominal reflex minus. Genitalia small, both penis and testes; very little pubic hair. Cremasteric reflex present. Gait and station rather wobbly, but he stands well on one leg. Normal urine, also Wassermann and Sachs-

Georgi reaction. Nonne sometimes weakly positive. Pandy's reaction often positive. Cell content of the spinal fluid usually about 40 per cubic millimeter (lymphocytes and plasma cells). Lumbar pressure averages 50 c.m. These findings were uniformly present. A weakly positive von Pirquet reaction. Sella turcica apparently not enlarged. Reaction to Barany tests very strong, with prompt vomiting. Intelligence not notably defective; highly emotional, cries at once; is often unmanageable during lumbar puncture. Strong tendency to hysterical reactions. But for the most part he is in very good condition, has little vomiting or headache, and laughs, talks, and goes for walks with other patients. (Later, de Monchy saw him once at his home; he was then in a twilight state, probably hysterical, which began and ended suddenly after another doctor had frightened him by suggesting operation.) There were no signs of a diffuse meningeal affection. A diffuse cerebral affection, such as disseminated sclerosis was unlikely because of the long existing, progressive choked discs and the disturbances of internal secretion. The same holds good for the diffuse periaxial encephalitis of van Schilder, a disease with a vague symptomatology, and seldom diagnosed till necropsy. A sharply circumscribed process, either a tumor or an inflammatory affection was ruled out. Many of the signs point to the quadrigeminal region, viz., the obstinate choked discs, the conjugate vertical eye movement palsies, the A.R. pupils, the slight disturbances of hearing (due to the posterior corpora quadrigemina), the slight defects of equilibration in standing and walking, the somnolence at the onset, and the speech disturbances. The later motor fifth paresis points to involvement of the foremost part of the floor of the fourth ventricle. The internal secretory disturbance, which resembles the adipose-genital dystrophy, may have been due to spread of the lesion to the floor of the third ventricle, for this dystrophy may occur without any pituitary involvement whatever. But such an extensive process need not be postulated, for pineal lesions can give a similar clinical picture. The writer thinks that there may have been here a peculiar form of internal hydrocephalus which damaged the pituitary. The rhythmical, shock-like spasm of convergence was not quite regular in time, and its frequency was rather less than that of a true nystagmus; it was best elicited on looking straight forward, but was less easily seen on voluntary fixation. Possibly the condition was one of a paresis of divergence (a question on which opinions differ greatly). Convergence-spasm is most commonly ascribed to hysteria. Once it was seen in acute meningitis (Dejérine). Straub regarded brain tumors and abscesses as the causes of divergence-paresis. The rhythmical nystagmus retractorius of von Körber was once seen by Barany in one eye in a case of a quadrigeminal tumor; the retraction was synchronous with the true nystagmus in the other eye. Elschnig found this nystagmus retractorius twice in cases of lesions of the Sylvian aqueduct. De Monchy has failed to find any record of the peculiar rhythmical, shock-like convergence of the eyeballs here described by him. [Leonard J. Kidd, London, England.]

BOOK REVIEWS

Pfister, Oskar. DIE LIEBE DES KINDES UND IHRE FEHLENTWICKLUNGEN. [Ein Buch für Eltern und Berufserzieher. Ernst Bircher, Bern, 1922.]

Pfister writes with his well known ability to be both instructive and interesting as he presents a wide material from a background of personal culture and practical experience. He follows literature from the prophets of old to the teachings of modern educators to discover what valuation they have given to love especially as to its place in child life and the training of the child. He finds the culmination of recognition of the love life and its place in development in the work of psychoanalysis. He conceives love as the active force of all development as in its sexual form it forms the core of life. It is therefore all important for the child's expansion of its powers into all forms of active serviceable living that this love should be freed from the inhibitions to which unwise training has subjected it. Failure of development of the child depends upon failure of development of its love life and this is due to one thing alone, the "imprisonment" of love. The book is well arranged in briefly discussed topics. It is illustrated with extracts from case histories presented in the convincing manner of one who speaks from a successful use of psychoanalysis in the educational field. Not the least instructive part of the book is the simple discussion of what psychoanalysis is and what it is not. The latter is food for thought for ill informed critics.

King, D. MacDougall. NERVES AND PERSONAL POWER. SOME PRINCIPLES OF PSYCHOLOGY AS APPLIED TO CONDUCT AND HEALTH. [New York, Chicago, London and Edinburgh: Fleming H. Revell Company, 1922.]

A philosophy of life built upon its realities inspires this book as it represents also the attitude with which its author personally faced both life and approaching death. It is the record of a physician's desire to leave a message of practical psychological living. At the same time through its writing he filled out his own productive activity. He describes the physiological development of the body, especially of the nervous system, as that of an organism prepared for the carrying out of energetic activity. Life to him is positive. Seeking of pleasure and avoiding of pain are legitimate grounds of activity. They must, however, be coordinated to the adaptation of the organism to its environment. Therefore, in man they appear in the form of a higher control, a moral sense. There is here some tendency in the writer to advocate mental and moral control in the

form of maxims rather than with sufficient penetration to enter into a search for the buried desires and impulses which are the springs of action. Changing of desire and attainment of control are not quite so simple as presented. Yet the book reveals an outlook in the right direction. Its teaching is clear, its stimulus is a healthful one toward self knowledge, self appreciation and directed activity.

Bisch, Louis E. *YOUR INNER SELF.* [Doubleday, Page and Company, Garden City, New York, 1922.]

Bisch has written a most vigorous presentation of the principles of the mental life, its content and mechanisms, as they should be understood for practical control of the self. His statements are clear, simple, very direct. While he has some form of statement more peculiarly his own, as the four divisions he makes of the libido, his work is an outflow of the knowledge of the mental life which psychoanalysis has given. It is, as he states, a brief suggestive presentation which is designed not for a complete treatise but to set his readers to thinking and investigating in the interests of better practical living.

Rasmussen, Vilhelm. *CHILD PSYCHOLOGY—I. THE SOUL LIFE OF A CHILD IN ITS FIRST FOUR YEARS.* [New York: Alfred A. Knopf, 1922.]

The writer of this book is a man with a sympathetic point of view for observing child life. It is a pity that his insight has not been further awakened. He has an open mind toward comparison of the child's development with that of the race, he shows a better appreciation of the child's attitudes than commonly found with the adult. He approaches children with the respect of one who genuinely believes that he can learn from them. But he passes all unmentioned the profounder activity of impulse and emotion with the effect this has upon child ideas and the other forms of child expression. One would think from his writing that no such deeper things existed in child life. Unwittingly he gives material for such probing in one of his own little subjects for observation and thus testifies to the need of a psychology of the unconscious.

Montet, Ch. de; Bersot, H. *PSYCHOLOGIE ET DÉVELOPPEMENT DE L'ENFANCE A LA VIEillesse.* [Essai de Recherches collectives. Ernest Bircher, Société Anonyme, Berne, 1922.]

The writers have produced a rather sterile book in a field where the soil is rich with promise. Psychology and development considered from infancy to old age must take account of vastly more than the expansion of ideas intellectually considered. The authors, through their examination of the compositions produced upon a given subject, have done barely more than indicate that ideas do gradually extend themselves to larger relationships. The newer psychology which finds all thought welling up in the midst of a vast instinctive and emotional life seems to be remote. The writers seem to have

heard faint echoes of something larger than the older shallow descriptive statements but they do not pursue the newer suggestions. "At the base of all education and of all development one finds the vital process in its totality, *in its interdependence.*" This they have said but one finds but little of the fact in their report.

Warren, Howard C. ELEMENTS OF HUMAN PSYCHOLOGY. [Houghton Mifflin Company, Boston, New York, Chicago, San Francisco; The Riverside Press, Cambridge, 1922. Price, \$2.25.]

This is a very clearly expressed book on general psychology. It is well adapted as a textbook or for the reader who would become familiar with the academic formal terms and principles of psychology. The relation of psychic activity to the nervous system is not overlooked so that the book becomes also a useful elementary treatise upon the structure and physiology of the nervous system. The writer, however, has gone too negligently over the great dynamic nature of the human psyche. His easy skimming of the surface in the spirit of the older superficial psychology is too often actually misleading because of what it leaves unsaid. Problems of the psychic life are too profound, too pressing to be summed up even in so excellent an external description as he has given. Repression as a force interfering with psychic activity and therefore causing new complicated activity he almost entirely passes by. Such a statement as this, "Day-dreaming may be repressed by reading or by trying to solve some useful problem" does little to explain or to remedy the serious conflicts of life in its manifold impulses. The author's use of the word "subconscious" is also illustrative of his incompleteness in getting hold of the profound material and inner mechanisms of the mind. It reminds one of Richard Semon's thoughtful plea for the use of the word "unconscious" instead as so much more comprehensive of psychological facts.

Bittler, Alexander. KRANKHEIT UND SEELENLEBEN ALS FOLGEN GESTÖRTER ÄQUIVALENZ DER REIZBEANTWORTUNG. [Otto Gmelin, Munich.]

The therapeutic art, as a program, may be seen most explicitly, in its extreme tendencies. At one pole may be revealed those who seek universals and would attempt to heal the ills of the flesh by a large gesture of philosophic importance. Such speak in terms of universals and general principles. At the opposite pole are those who would pick up this or that detail, and by relieving symptoms as they occur, offer relief to the maladjusted organism. It is to the latter that this extremely interesting small brochure of 68 pages would make its special appeal. *Similia similibus*, the so-called homeopathic formula, here finds an intelligent advocate. In its furtherance, however, the author would attempt a broad philosophic résumé of the principles of a therapy founded upon an adjustment of disharmonic stimuli. Combat these on the basis of a "*similia similibus*" and the trick is turned. Is it?

OBITUARY

CONSTANCE E. LONG, L.S.A., M.D.BRUX.

LONDON

We are indebted to the *British Medical Journal* for an account of Dr. Long's career and achievements. Dr. Constance Ellen Long of London died in New York on February 16 from pneumonia. She was born in Reading, and studied at the London School of Medicine for Women, taking the L.S.A. in 1896 and the degree of M.D.Brux. in the same year. She practiced in London, and was formerly clinical assistant at the Royal Free Hospital and the New Hospital for Women, and medical officer to Dr. Barnardo's Home, Hawk-hurst. She had held the office of president of the Association of Registered Medical Women, and represented the Medical Women's Federation on the Insurance Acts Committee from 1911 to 1914. Dr. Long was one of the earliest exponents in England of psycho-analysis, particularly interested in the thoughts of Jung of Zürich, and edited a volume entitled *Collected Papers on Analytical Psychology*, which included translations of many of Jung's articles. She wrote several papers on psychoanalysis and allied subjects, and a number of her contributions were published in a book, in 1920, with the title of *The Psychology of Phantasy*. She had been in indifferent health for some time, and had been making a prolonged visit to the United States as the guest of her friend and colleague, Dr. Beatrice Hinkle of New York.

Dr. H. Crichton Miller writes: By the death of Dr. Constance Long the profession loses a notable pioneer and a somewhat remarkable figure. She was best known as the first exponent in this country of the analytical views of Jung and the Zürich school. Just ten years ago she brought to England the first restatement of psycho-analysis, which had hitherto been practiced only on strictly Freudian lines. As the editor of the English translations of Jung's books; her name soon became widely known. By her original papers, by her lectures, and by her book *The Psychology of Phantasy*, she enhanced this reputation. During her seven years of general practice she not only built up a very valuable connection, but she established a surgical nursing home that possessed many features well worth perpetuating. In these years she learned to recognize the frequency with which the functional factor enters into common complaints, and this

brought her to the study of suggestion. Under the influence of Dr. Lloyd Tuckey she became a successful practitioner of hypnotic suggestion, and in 1912 she contributed to the discussion on insomnia at the annual meeting of the British Medical Association. But she remained unsatisfied by suggestive therapeutics, as was bound to be the case with anyone so bent on progress. Thus she came to the analytical phase of her life which was its culmination. Such was the road by which Dr. Long arrived at specialization in the teaching and practice of analytical psychology. Those who know her will agree that it was not the path of least resistance. She was not one of those for whom the new and the unconventional has a strong attraction. The intellectual interest of psychological work was not a compelling force with her, for she had not a specially critical mind, and its bent was practical rather than speculative. Indeed the analytical work she did was not cheaply achieved, but rather through indomitable and earnest application. Those who admired her most will agree that the driving factors in her makeup were unfailing generosity and sincerity. Nobody could ever imagine that Dr. Long was acting from any ulterior or selfish motive. While she talked and wrote a great deal about that spiritual freedom which analytical treatment is intended to procure, her life showed forth much more evidently a selflessness attained in a much more old-fashioned school. Brought up as she had been in the tradition of middleclass and Nonconformist puritanism, she no doubt had many "complexes" to submit to analytical treatment; but she also had that heroic urge towards the "better-than-what-is" that made her contribution to her day such a notable one. During the twenty-six years of her professional career she found time to take a considerable share in work for the profession. She was president of the Association of Registered Medical Women, and was a member of many special societies. In all these offices her place will no doubt be filled; but her place will not readily be filled in the hearts of many friends and patients who had learned to appreciate her wisdom, her integrity, and her sympathy.

Dr. James Young writes of Dr. Long: By her death the profession loses one who strove always to further the interests of medical science, and who bravely fulfilled the arduous function of pioneer in its most difficult and exacting department—that of medical psychology. She will be mourned by all those, friends and patients alike, who knew her for what she was—a woman of kindly and sympathetic understanding, who maintained an untiring devotion to duty in the teeth of the adversities of ill health and of those incidental to all attempts to broaden the basis of knowledge in any branch of human thought.

NOTES AND NEWS

SIR FREDERICK MOTT.

Sir Frederick Mott recently accepted the appointment of honorary director of the pathological laboratories of the Birmingham City Hospitals and lecturer in the University of that city on morbid psychology. He has undertaken to pay frequent visits to Birmingham, where he will have a whole-time assistant director. It is hoped eventually to associate various other mental hospitals in the Midlands with the scheme. The laboratories will be established at first at one of the city hospitals, but the intention is that they shall as soon as possible be transferred to the university buildings, as it is considered very desirable that the staff of the psychiatric laboratory shall have the advantage of working side by side with other pathologists. Sir Frederick Mott retires from the office of pathologist to the London county mental hospitals and director of the pathological laboratory on March 31st, and will then cease to be a member of the service of the London County Council. He will, however, continue to act in an advisory capacity at the Maudsley Hospital for a further period of six months. He joined the service of the London County Council in September, 1895. He reached the usual age for retirement four years ago, but for various reasons, chiefly in connection with the establishment of the Maudsley Hospital, and more recently the setting up of a course of lectures and practical instruction for the Diploma in Psychological Medicine—a proposal in which Sir Frederick Mott took a very active interest, and urged on more than one occasion upon the London County Council—his services have been retained beyond the age limit, greatly to the advantage of the Council's work. He had already won high distinction as a neurologist and pathologist when he was selected for appointment by the Council, as he entered the service at a later age than usual. The Council is proposing, subject to the consent of the Minister of Health, to add six years to his actual term of service for the purpose of computing the superannuation allowance to which he will be entitled on ceasing to be an established officer. The Mental Hospitals Committee has suggested to the Council that the circumstances attending his comparatively late entry into the Council's service constitute a "peculiar professional qualification" which is provided for in assessing pensions under the Asylum Officers' Superannuation Act, 1909. It is also proposed that an honorarium of 250 guineas should be paid him for the services which he will render at the Maudsley Hospital in an advisory capacity from April until October next.

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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ORIGINAL ARTICLES

MULTIPLE CRANIAL NERVE PARALYSIS—SYNDROME OF THE RETROPAROTID SPACE WITH SPECIAL REFERENCE TO A DUAL EFFERENT INNERVA- TION OF THE FACIAL MUSCULATURE¹

By BYRON STOOKEY, A.M., M.D.

NEW YORK

Nerves of wide diversity in distribution and function and physiologically of great significance are closely grouped in the retroparotid space where any or all of them are peculiarly exposed to extracranial injury. The last four cranial nerves and the superior cervical sympathetic are arranged almost as a plexus a little below the jugular foramen and beneath the parotid gland where injury by bullet or by pressure of tumors, calcareous glands or infections may give rise to their paralysis with symptoms involving the eye, tongue, larynx, pharynx, the vasomotor status of the face, the cardiac rate, as well as impairment in movement of the upper extremity. In order to stress the close anatomical relationship of the glossopharyngeal, vagus, spinal accessory, hypoglossal and cervical sympathetic nerves beneath the parotid gland, it is suggested that this group of nerves which here communicate with one another be designated as the retroparotid plexus. This term may be apt since Villaret has called the symptom complex resulting from injury of these nerves in this region the syndrome of the retroparotid space and this latter term has already gained currency.

Vernet (1915) has called attention to a clinical entity characterized by paralysis of the glossopharyngeal, vagus and spinal accessory nerves as they make their exit from the foramen lacerum to which he has applied the term syndrome of the foramen lacerum (syndrome

¹ Read before The New York Neurological Society, February, 1922.

du trou déchiré postérieur). Collet (1916) and Sicard (1917) have described the syndrome resulting from injury of the glossopharyngeal, vagus, spinal accessory and hypoglossal nerves as the syndrome du carrefour condylo-déchiré postérieur and Villaret (1917) the syndrome of the retroptarotid space when to the above group of nerves the cervical sympathetic is added.

Paralysis of the last four cranial nerves in one or more combinations was reported by Avelis, Schmidt and Hughlings Jackson. The pathology of the syndromes known by these names is intracranial, frequently nuclear in origin, and does not involve the peripheral extracranial course of the nerve. Consequently these syndromes are not comparable to those due to injuries in which the only neural involvement is extracranial.

Extracranial paralysis of the last four cranial nerves and the cervical sympathetic was described by Frankel (1875). Bull and Harris (1915) reported a case with paralysis of the last four cranial nerves due to tuberculous glands. A calcified gland with marked infiltration of scar tissue caused pressure upon the nerves. Vernet (1917) collected twenty-two cases of various extracranial paralyses involving the glossopharyngeal, vagus and spinal accessory nerves, twelve of which were traumatic with the others due to tumors or infections. Pollock (1920) in this country reported three cases of multiple cranial nerve injuries, in two of which the facial nerve was injured in addition to the glossopharyngeal, vagus, spinal accessory and hypoglossal. In the third it was thought probable that the lesion was intracranial since the eighth nerve was also implicated. The cases reported here correspond to the anatomical distribution of the paralysis as found in the true syndrome of the retroptarotid space, unassociated with intracranial injury or complicated by paralysis of other cranial nerves.

Vernet (1917) has called in question the more usual conception of the anatomical distribution and function of the glossopharyngeal and vagus nerves. He has described a new sign said to be typical of glossopharyngeal paralysis and referable to the innervation of the superior constrictor muscle of the pharynx, heretofore, held to be under the domain of the vagus. In glossopharyngeal paralysis according to Vernet, the dorsal wall of the pharynx is relaxed on the side affected and in attempting to say "ah" the wall is drawn obliquely to the sound side "much as a curtain is drawn back." For Vernet this is a positive sign of glossopharyngeal paralysis and is more reliable than the loss of taste on the dorsal third of the tongue. The result of paralysis of the stylopharangeus muscle is not quite

evident. I regret that since Vernet's report I have not had an opportunity to investigate personally this sign as an indication of isolated paralysis of the glossopharyngeus. Those cases I have



FIG. 1. Patient with paralysis of the glossopharyngeal, vagus spinal accessory hypoglossal and cervical sympathetic nerves. Note narrowed palpebral fissure on left side, enophthalmos and anisocoria. There is a slight droop of the left angle of the mouth and slight atony of the left face.

seen, as those here reported, have involved the vagus as well, so that it has been impossible to isolate efferent changes referable to either the glossopharyngeal or the vagus.

Vernet furthermore considers the vagus nerve "comme ayant un nerf entirement sensitif," unconcerned with the innervation of the palate, pharynx or larynx musculature, and receiving its motor fibers for these structures from the medullary portion of the spinal accessory nerve as well as its cardioinhibitory and visceromotor fibers. This view does not seem to me to be tenable. Investigations have shown that the vagus does participate in the efferent innervation of the pharynx through fibers arising from nucleus ambiguus and through the superior laryngeal nerve. The point is perhaps academic since the nucleus ambiguus of the glossopharyngeal, vagus and medullary portion of the spinal accessory constitutes a morphological unit of splanchnic motor cells whose function is efferent innervation of the striate musculature of the palate, pharynx and larynx. This morphological and functional association is manifested further peripherally by the formation of the pharyngeal plexus from which the muscles of the palate and pharynx are supplied, with the exception of the tensor palati and the stylopharyngeal muscles. Consequently dissociation in innervation and function in this part of these two nerves is difficult to determine, and perhaps of little importance.

However, of greater significance is the view expressed by Vernet and apparently accepted by some that the vagus is entirely a sensory nerve. Such a view is not supported by or in harmony with either anatomical or physiological investigations. Efferent fibers from two nucleii in the medulla enter into the formation of the vagus; fibers from the nucleus ambiguus and from the dorsal preganglionic nucleus.

The investigations of Marinesco (1897), and those independently done by Onuf and Collins (1898) and later confirmed by Van Gehuchten (1898) and Cajal have definitely established the motor character of the dorsal preganglionic nucleus, the ambiguus nucleus and their relation to the vagus. Section of the vagus was rapidly followed by chromatolysis of the cells forming the dorsal nucleus and also the nucleus ambiguus, thus showing that in the vagus efferent fibers from these two motor nucleii are present. Marinesco believed that the dorsal preganglionic nucleus supplied fibers for smooth muscle and the ambiguus for striped muscle, probably the pharynx. The efferent character of the vagus nerve is undoubted.

Winkler has divided the dorsal preganglionic nucleus into two parts, one consisting of slightly larger cells, magnocellular, and the other of smaller cells, parvocellular, the former supplying preganglionic fibers to the smooth muscle of the viscera, etc. and the small cell group supplying blood vessels and cardiac musculature.

The visceral character of the dorsal nucleus is further supported by the fact that in it the great majority of collaterals are nonmyelinated, probably, therefore, collaterals from the terminal afferent nuclei of



FIG. 2. Same as Fig. 1. Tongue protrudes to left, there is marked atrophy and the mucous membrane is thrown into numerous folds. The angles of the mouth are equal and in volitional movements there is no facial weakness.

the glossopharyngeal and vagus nerves, and carrying afferent mucosal fibers.

Table 1 shows in tabular form the branches of each nerve which give rise to recognizable signs, the structures supplied, the origin or

COMPOSITION AND DISTRIBUTION OF GLOSSOPHARYNGEAL, VAGUS AND SPINAL ACCESSORY NERVES
 SPLANCHNIC EFFERENT IX, X AND XI NERVES

BRANCHES	STRUCTURES SUPPLIED	ORIGIN OF FIBERS	CLINICAL MANIFESTATIONS
IX Direct muscular branch to stylopharyngeus muscle	Stylopharyngeus muscle. Superior constrictor of pharynx (Vernet)	Nucleus ambiguus of IX	Paralysis of the superior constrictor, evidenced by relaxation of dorsal wall of pharynx pulled in oblique direction to sound side " mouvement de rideau " of Vernet
IX and X Pharyngeal middle constrictor muscle of pharynx Composition (1) Pharyngeal br. of IX (2) Pharyngeal br. of X from the ganglion nodosum (according to Vernet really from the XI)?	Muscles soft palate Pharynx (excepting stylopharyngeus and tensor palati)	Nucleus ambiguus IX, X and XI	Nasal regurgitation of fluids—deviation of uvula—paralysis of soft palate Dysphagia—especially solid food—paralysis of the pharynx
X and XI Superior Laryngeal nerve External laryngeal branch Inferior laryngeal or recurrent branch	Inferior constrictor of pharynx. Cricothyroid muscles. Laryngeal musculature	Nucleus ambiguus or medullary portion of XI (Laryngeal nucleus of Edinger)	Hoarseness—cadaveric posture of vocal cord. Paralysis of laryngeal muscles
X Esophageal Cardiac Pulmonary Abdominal	Esophagus Cardiac Respiratory Intestinal tract, viscera, etc.	Dorsal preganglionic nucleus (contains few medullated fibers mostly nonmed. from afferent nuclei of IX and X) Parvocellular group—heart Magnocellular group—visceral	Change in volume and rate of heart action—tachycardia, asthmatic cough, etc.

BRANCHES	STRUCTURES SUPPLIED	ORIGIN OF FIBERS	CLINICAL MANIFESTATIONS
IX Tympanic branch via tympanic plexus to otic ganglion thence auriculotemporal nerve of V to parotid	Parotid gland	Nucleus salivarius (preganglionic fibers to otic ganglion)	Lessened salivary secretion and dryness of mouth on side of lesion
XI External branch or spinal part	Sternocleidomastoid and trapezius. While this is striate musculature must be considered splanchnic in origin	Spinal nuclei of XI	Disability in elevation of the arm—weakness upper extremity—rotation of scapula
SPLANCHNIC AFFERENT IX, X AND XI NERVES			
IX Jackson's nerve tympanic branch (contains both efferent and afferent fibers)	Mucous membrane tympanum, mastoid, Eustachian tube	Ganglion petrosum to tractus solitarius and nuclei commissuralis, rotundus and dorsal sensory	
IX Pharyngeal	Direct to mucous membrane of pharynx	Ganglion nodosum.—tractus solitarius and nuclei commissuralis rotundus and dorsal sensory	Loss of sensation palate and pharynx—gag reflex diminished
IX and X Pharyngeal plexus	Indirect to mucous membrane of pharynx	Ganglion jugulare? Nuc. ventralis fasciculus solitarii	
IX Tonsillitic (circulus tonsillaritis)	Mucous membrane tonsil, soft palate and pillars of fauces	Nuc. commissuralis, nuc. rotundus and dorsal sensory	
IX Lingual	Posterior third tongue (taste)	Nuc. gustatorius or nuc. dorsalis fasc. solitarii	Taste lost dorsal third of tongue

BRANCHES	STRUCTURES SUPPLIED	ORIGIN OF FIBERS	CLINICAL MANIFESTATIONS
X Superior laryngeal lateral branch and œsophageal, cardiac, pulmonary, visceral and abdominal	Mucous membranes, etc.	Nuc. commissuralis, nuc. rotundus, nuc. dorsalis fasc. solitarii	
SOMATIC EFFERENT IX, X AND XI NERVES			
None	None	None	None
SOMATIC AFFERENT IX, X AND XI NERVES			
IX and X Arnold's nerve	Dorsal wall of external auditory meatus	Gang. jugulare IX and X to spinal V tract	Anesthesia dorsal wall of external auditory meatus

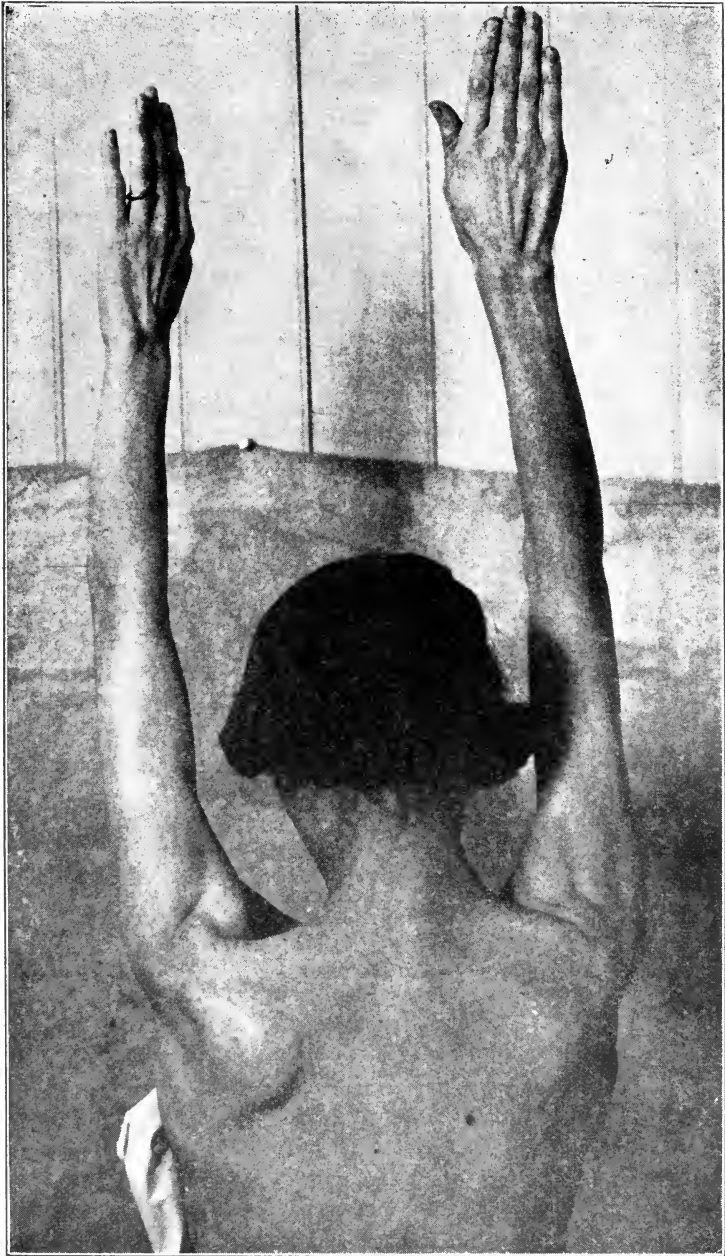


FIG. 3. Same as Fig. 1. The unequal position of the upper extremities is obvious, the entire left extremity is rotated inward and is not elevated to the same extent as the right. Note the prominent scapula, obliteration of the normal contour of the neck of the left side and the prominent clavicular head of the pectoralis major muscle. This part of the pectoralis major is an important elevator of the humerus and in function should be considered as a separate muscle.

termination of the fibers, and the signs which may arise from interruption of them.

Salivation, which is attributed to the vagus by Vernet, rightfully belongs to the glossopharyngeal. The efferent preganglionic fibers to the parotid gland arise from the nucleus salivarius situated in the reticular formation, medial to the nucleus ambiguus, and leave the brain stem through the glossopharyngeal forming the tympanic branch thus reaching the otic ganglion, whence they are relayed as postganglionic fibers passing to the parotid gland through the auriculotemporal nerve of the mandibular division of the trigeminal.

The hypoglossal nerve innervates the intrinsic muscles of the tongue; the remaining distribution is by fibers from the first and second cervical nerves whose cells do not belong to the hypoglossal nucleus.

The contribution of the cervical sympathetic is perhaps of greater importance than we have heretofore presumed. In both patients here described a slight drooping of the left facial musculature was found, yet with no injury to the facial nerve, and no apparent loss or impairment in the voluntary or emotional control of the facial muscles. A moderate degree of atony in the facial muscles was found, so much so that the physician who first saw one of these patients noted the deformity as a "facial paresis." Similar changes in the facial musculature have been noted in a few patients with cervical sympathetic paralysis without any special attention having been paid to this point.

Approaching this subject from the opposite angle attention is called to a group of complete, peripheral, facial palsies in whom even after years some tone is retained and relatively little deformity is found, yet complete volitional and emotional paralysis of all branches of the nerve exists. If such a patient be operated and the nerve cut the deformity immediately after section is always markedly increased. Yet prior to operation there has been no evidence of any function. Thus in a certain group of facial palsies tone is not lost, while on the other hand, in cervical sympathetic palsies tone in the facial musculature is lost without injury to the facial nerve itself. It is possible that in these two conditions there is a common factor.

Recent investigations, particularly by Agduhr (1916), have shown conclusively that the striated muscle fiber possesses a dual innervation; on the one hand, efferent fibers from the ventral gray cells, and on the other efferent postganglionic fibers from the sympathetic system. It has also been shown that in the striate muscle two substances are found, sarcoplasm and sarcostyles, sarcoplasm having

to do with slow contractions and tonic phases, the sarcostyles, of more recent acquisition with the rapid, quick, muscular contractions. Furthermore, the biochemical waste products of tonic states of contraction differ from those of rapid, quick contractions. Thus there is evidence of the existence in striated muscle of a dual system. It is thought that the sympathetic innervation may control tonic phases and slow forms of contraction of the striate fiber. This is the older and more primitive function, and the nonmedullated fiber is also the older and more primitive fiber.

In consideration of these facts I wish to offer the suggestion that the facial muscles may receive their sympathetic innervation through the cervical sympathetic, and that in cervical sympathetic paralysis this part of the innervation of the striated fiber of the facial musculature is lost, resulting in a slight degree of atony, such as is found in these patients, yet with volitional control retained. On the other hand in certain groups of facial palsy it is suggested the injury to the facial nerve may involve the medullated efferent fibers without involving the nonmedullated, sympathetic efferent fibers, so that while there may be a complete loss of volitional control a certain degree of tone may still be retained.

This interpretation of a dual innervation of the facial musculature is presented only as a suggestion with the hope that it may encourage observations which may help to a more positive view.

Observation 1

History. G. N. age 28, Married, Swedish. Occupation housewife. Small stature, poorly developed and nourished. Has been in this country ten years.

Complaint. Weakness left side of face, inability to open left eye and hoarseness. Duration thirteen years, during which time there has been no actual improvement nor has her condition become worse. There has been no change in the character of the complaint.

Present Illness. Thirteen years ago when sixteen years of age an operation was performed in Sweden for cervical adenitis, said to be tuberculous in origin. Glands about the size of a "hen's egg" were present beneath the angle of the jaw. These were removed. Immediately following the operation the patient states that she regurgitated liquids, found great difficulty in swallowing solid foods so that for more than a month she was unable to eat solid food. This difficulty gradually disappeared and in two months she could drink and eat without great inconvenience. Her left eye was partially closed and could not be opened. At first the closure of the eye was more complete than at present. She noticed that the left side of her face was warmer but this gradually changed so that this side (injured side) is colder than normal and does not perspire. The left side of

the tongue felt wrinkled and gradually became smaller. No change has been noticed in the salivation on the affected side. Immediately after the operation she was unable to elevate her arm, and only after a year could she raise the arm at all. This gradually improved. Patient thinks that the left side of the face droops a little, though this does not bother her as much as the inequality in the appearance of the eyes. Immediately after the operation her voice became husky so that she spoke with marked hoarseness. This has persisted and bothers her greatly. This hoarseness has not improved, though with effort she can talk louder than formerly. She complains that people have difficulty in understanding her, since her enunciation is not clear (this is especially noted with the linguals).

Past History. No data available concerning early childhood. Has had no illness other than the present complaint and tuberculous adenitis for which operation was performed. Influenza three years ago.

Family History. Married five months ago. No miscarriages, no pregnancies. Father sixty-six, living and well. Mother sixty, living and well. Three brothers and six sisters, living and well. Husband healthy and strong. No consanguinity.

Habits. Sleeps well, appetite good, bowels open, leads normal sexual life. Menstrual history normal. No urinary symptoms.

VOLUNTARY MOTOR SYSTEM

Abnormal Attitudes and Deformities. Left side of face shows slight drooping. Left upper lid droops and cannot be raised.

Gait, Coördination and Skilled Acts. Normal.

Abnormal Involuntary Movements. Slight fibrillary twitching of left half of tongue.

Deep and Superficial Reflexes. Normal other than the ciliospinal reflex which is lost on the left side.

Muscle Strength. Normal except for impairment in movements of left upper extremity.

Muscle Status. Complete atrophy of right half of tongue and atrophy of the middle and inferior portions of the trapezius.

GENERAL SENSORY

Somesthetic sense shows no alteration except on the dorsal wall of the external auditory meatus which is anesthetic. There is also a small area of anesthesia over the angle of the left jaw, probably due to the operative scar.

CRANIAL NERVES

Olfactory. Both subjective and objective smell normal. Patient recognizes usual odors accurately.

Optic, Oculomotor, Trochlear and Abducens Nerves and Optic Apparatus. Vision 20/20 both eyes; fields not contracted except due to ptosis. Fundi normal; pupils react to light both direct and con-

sensual. Reaction to convergence normal. Left pupil is smaller than right. The left cilio-spinal reflex is lost. The movements of the eyes are normal. There is some enophthalmus on the left. The palpebral fissure on the right greater than the left. Ptosis of the left lid is marked. Horner's syndrome present on the left.

Acoustic Nerve and Ear. Normal acuity in both ears with air conduction greater than bone and referred equally. Vestibular tests give normal responses. No abnormalities of the external ear or tympanum.

Trigeminal Nerve and Mouth. No motor changes. Trigeminal sensation normal. Corneal reflex present.

Facial Nerve and Face. Left side of face shows slight drooping when at rest. No change in volitional movements or in emotional reaction. No actual paralysis. Taste normal on ventral two-thirds of tongue on both sides. Vasomotor and secretory status of face differs, left side colder and does not sweat.

Glossopharyngeus and Vagus Nerves, Pharynx and Larynx. Paralysis of left side of the superior constrictor with "movement de rideau" of dorsal wall of pharynx. Partial paralysis of left palate. Taste lost dorsal one-third of tongue. No change noted in salivation. Palatal and pharyngeal reflexes diminished on left side; on right side response is immediate. Left vocal cord paralyzed. Swallowing is now done apparently without difficulty. Oculocardiac reflex shows no appreciable difference on right or left side. Loss of sensation dorsal wall external auditory meatus.

Spinal Accessory Nerve. Accessory portion—see above. Spinal portion—partial paralysis of the sternocleidomastoid and cervical portion of the trapezius. Complete paralysis of the lower two-thirds of the trapezius with slight winging of the vertebral border of the scapula which is more prominent than that of the opposite side. There is some drooping of the left shoulder. On elevation of the arm the scapula is suddenly rotated through its complete arc of rotation when the arm reaches sixty degrees of elevation.

Hypoglossal Nerve and Tongue. Tongue protrudes to the left, shows numerous folds and constant fibrillary twitching. Atrophy of the left side of the tongue musculature.

General Status. Mental and systemic status apparently normal, with fair intelligence, memory and emotional reactions normal. Heart shows enlargement with apex in sixth space and loud systolic murmur at the apex. Pulse 85. Blood and urinary examination negative.

Observation 2

Complaint. Drooping of right upper eyelid, some weakness of right face at rest, atrophy of the right side of the tongue, hoarseness; right side of face dry and cold, slight weakness in right arm, especially in attempting to lift arm to vertical position.

History. S. G. D., twenty-five years old, wounded with shrapnel November, 1915. The wound of entrance below the tragus of the

right ear. No wound of exit. Patient thinks that wound of exit may have been in the throat, for immediately after the injury there was some bleeding from the mouth. Wound healed without infection. Immediately after the injury patient was unable to speak, except with a very hoarse voice. There was considerable disability in swallowing liquids. Both milk and water were taken in teaspoonfuls. Solid foods could not be taken at all. There was diminution of saliva, and right side of mouth seemed somewhat drier than normal. Right side of tongue immediately seemed wooden, and when looked at turned toward the right. Patient thinks that this side of face was at first warmer and flushed, but this gradually changed, so that right side of face is now colder than normal and does not sweat. The eyelid on the right side hung down and he was unable to open the lid completely. Patient did not notice any difficulty with respiration. There was no cough, and patient does not know if his heart beat was more rapid. During about a year after the accident he was unable to elevate his arm, but this he can now do, though it is not as strong as on the left side.

Examination—Local. Wound of entrance beneath the right tragus. No wound of exit to be seen. No wound or scar in throat apparent at this time—eighteen months after the injury. No evidence of suppuration judging from the appearance of the wound of entrance or tissues about it. X-ray negative. No foreign bodies seen.

Systemic Examination. Well developed and nourished young man. Intelligent, cooperative and memory good. *Face:* Right side of face shows slight drooping at rest. No weakness in volitional movements or in emotional states. Patient states that this inequality in the appearance of his face was not present before the injury. Right pupil smaller than left. Both contract to direct light and consensual as well as accommodation. Movements of eyes normal. Ptosis of right upper lid with narrowing of palpebral fissure. Some enophthalmos. Right side of face does not perspire and seems colder than normal. *Mouth, Nose, and Throat:* Tongue shows marked atrophy in right side with mucous membrane thrown into folds. Tongue protrudes to the right. There is marked fibrillation of tongue musculature. Slight paralysis of left palate, and some diminution of gag reflex on right side. Right vocal cord in cadaveric position. Taste on ventral two-thirds normal, on dorsal one-third taste lost on right side. Voice is hoarse. *Chest and Abdomen:* Nothing abnormal noted. Heart sounds of good quality and regular. No murmur. Pulse 82. Slight tachycardia. Respiration normal. Nothing abnormal noted in abdomen.

Extremities. Upper left and both lower normal. Slight weakness in elevation of right arm. Scapula rotates more completely on right side than on left. Some atrophy of the trapezius, especially middle and inferior portion. No atrophy noted of the sternocleidomastoid. Right arm can be elevated but not as completely as on left. Right arm is drawn further forward. If weights are added right arm cannot be elevated, whereas left is lifted readily.

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ON THE PHYLOGENETIC ORIGIN OF DEEP REFLEXES

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The doctrine of evolution which has proved to be an inexhaustible source of deductions, not only for biological science but also for the science in general, should have been in a full degree utilized in neuropathology pretending to be a biological discipline. This has, however, not occurred. While the data of evolutionary theory have been sufficiently considered by the students of anatomy and physiology of the nervous system they have been rather neglected by clinicians. The symptoms and signs of nervous diseases have been investigated and described without any consideration of their biological significance.

In a series of papers and lectures I have attempted to explain some facts concerning the symptomatology of nervous diseases from the point of view of comparative anatomy and physiology. Thus I have endeavored to show* that Babinski's sign observed physiologically in infants and pathologically in pyramidal tract lesions is a rudiment of grasping function proper to the foot of all phylogenetic ancestors of man, while the "normal" plantar reflex is the newest acquisition connected with perfect plantigradity peculiar exclusively to man. Being a new cortical encephalic acquisition this normal reflex disappears in pyramidal tract lesions to be replaced by a phylogenetically old automatized spinal reflex, *i.e.*, Babinski's sign.

The evolutionary method I attempted to apply likewise to the explanation of many other signs of pyramidal tract lesions, such as hemiplegic contracture, associated movements, etc.

In the following pages I intend to apply this method to the analysis of deep reflexes. I am going to establish some facts concerning the biogenetic origin of some phenomena and to use them for the explanation of normal as well as pathologic reflexes. One of the most striking features of the deep reflexes is that they are far from being universal, *i.e.*, the deep reflexes cannot be elicited from every tendon but only from some; in other words, they are not universal. In general they are more constant and more easy to elicit in the

* Astwazaturow. Babinski's Sign from the Point of View of Comparative Anatomy. *British Medical Journal*, 1916.

extremities than in the trunk. Again, in the extremities there are quite certain some groups of muscles which exhibit constant tendon reflexes while others show hardly any or none whatever. Thus in the lower extremities the absolutely constant deep reflexes are the knee and ankle jerks whilst from the antagonists (flexors of leg and extensors of foot) no tendon reflexes can be obtained.

Assuming that tendon reflexes are a manifestation of the tonus of the corresponding muscles, we may claim that the musculus quadriceps femoris and the plantar flexors of the foot are endowed with the greatest reflex tonus. This prevalence as to the degree of reflex tonus in the above-mentioned muscles is also manifest in pathological conditions. With the general increase of all reflex phenomena in pyramidal tract lesions, the greatest effect is observed in extensors of the knee joint and flexors of the foot. In fact these two groups of muscles exhibit the most conspicuous sign of exaggeration of deep reflexes—the knee and ankle clonus. The same deep reflexes are well pronounced in infants and children. “The knee jerk is very brisk in infants and young children; ankle clonus and a clonic knee jerk are said to occur in a large proportion of healthy children.” (Sherrington.)

Thus the knee and the ankle jerks being generally the most constant deep reflexes are particularly exaggerated in cases of pyramidal tract lesion and likewise in the physiological states characterized by underdevelopment of the cortical mechanism. It follows that the anatomical cause of the great reflexibility of the above-named muscles lies in the intracortical segmental apparatus. In other words, there exists a special spinal tonus for the muscles participating in the deep reflexes. The biological significance of this spinal tonus is set forth by Sherrington in his study on decerebrate rigidity. The tonic contraction of all four extremities seen in decerebrated animals, is, according to Sherrington, a postural reflex. “The muscles exhibiting the steady contraction executing this general reflex, although they are widely distributed in the body, compose, nevertheless, a homogenous system. They all by their contraction contribute to one common result. They each and all by contracting counteract gravity in the ordinary erect position usual to the animal, the *usustatus*.” Sherrington defines this postural reflex as a standing executed purely reflexly. He further remarks “a residuum of that reflex status is obtainable as a purely spinal reflex.”

The foregoing inferences point to the conclusion that the spinal reflex apparatus executes some elementary act, *i.e.*, the components of act of standing. Now the decerebrate rigidity being a condition

somewhat analogous to the clinical state resulting from the lesion of the pyramidal tract it is important to call attention to the fact that in pyramidal tract disease the muscles exhibiting a steady contraction are the same which are normally characterized by constant and easily obtainable deep reflexes. It is a well known fact that hemiplegic contracture is characterized, in the lower extremity, by extension of knee joint and plantar flexion of the foot and in the upper extremity by flexion of forearm, pronation and flexion of wrist and fingers. Thus all the muscles active in hemiplegic contracture normally exhibit the constant and easily obtainable reflexes.

Bearing in mind the analogy between hemiplegic contracture and decerebrate rigidity and dependence of the latter on the spinal tonus adapted for some elementary function, we may suppose that the greater spinal tonus of certain muscles as evidenced by their contracture in hemiplegia and by constancy of their deep reflexes in normal conditions is likewise an adaptation for some function. The opinion that the deep reflexes must be a manifestation of functional adaptation may be based also on a general biological principle. It is seen among many muscles of the body but some exhibit a special readiness of responding to a stimulus, it must be admitted that in the phylogenetic past of the race there must have been factors instrumental in repeated responses to this stimulus. This is but a manifestation of a general principle formulated by Crile as follows: "The facility with which energy is discharged in response to any stimulus is the result of the evolution of the responding mechanism through natural selection (phylogeny), and of individual's own past life (ontogeny)."

Now the stimulus by which the deep reflexes are to be elicited is a mechanical one adequate to the proprioceptors. And whereas some proprioceptors are more excitable than the others, we may admit that the muscles corresponding to these more excitable proprioceptors have been more functionally employed in the course of phylogenetic evolution.

All the foregoing arguments point to the conclusion that the deep reflexes are but a manifestation of some functional adaptation elaborated in the process of phylogenetic evolution. Therefore, in order to decide the question of the nature and origin of deep reflexes, we must take into consideration the way and manner of functional adaptation of extremities in phylogenetic evolution.

The phylogenetically oldest function of extremities in mammals is the supporting of the weight of the body. The thoroughly stable limbs of mammals is a very important feature distinguishing them

from amphibians and reptiles. "The limbs at first support the body only during the act of propulsion; when the movement is over, the body sinks to rest upon the ground. In the next phase the support of the body by the limbs becomes permanent; the demand for stability in the limbs is increased." (Wood Jones.)

For the support of the body the limbs must be extended, and this erect attitude of the limbs is common not only in standing but also in progression. Sherrington denotes in the act of walking a static component. "This static component is closely related to that which constitutes standing, so closely in fact, that such acts as walking and running may for analysis be conveniently regarded as the postural act of standing upon which there are grafted rhythmic flexion-extension movements of each limb in turn resulting in locomotion."

Thus in the lower mammals the fundamental function of all four extremities, both in standing and in progression, is their erect attitude. It is evident that by means of evolutionary adaptation there must have been developed an automatic spinal mechanism which in fact is represented by the spinal tonus of extensors. In the case of the decerebrate rigidity, this spinal tonus of extensors becoming exaggerated and no more controlled by the cortex, leads to the steady extension of all four limbs.

In the next course of evolution of mammals there arises an essential functional difference between fore and hind limbs. This difference consists in the adaptation of the fore limbs to grasping function. Some indications of this grasping function of the fore limbs are to be noticed in lower mammals; it is more developed in lemurs; but a conspicuous grasping function is represented in the monkey which "seizes its food with its hands and not with jaws as the lemur does." (Elliot Smith.) All the further evolution of the primates as to the function of their extremities may be characterized as a gradual assumption of the erect attitude in which the function of the supporting of the body becomes more and more limited to the hind (lower) extremities, while the fore (upper) extremities become specialized for grasping function. Wood Jones has denoted this process as emancipation of the fore limb. This emancipation of the fore limbs attains its full perfection in man, characterized by the accomplished erect attitude in which the function of the supporting of the body is exclusively limited to the lower extremities, the upper limbs being rid of this function and adapted to various skilled movements of which the most essential and fundamental is the act of grasping.

The gradual assumption of the erect attitude of the body with

elaboration of standing function in lower extremities and adaptation of the upper extremities to the skilled actions characterizing the phylogenetic evolution, is likewise manifested in the ontogenetic development of the human individual.

Now, the analysis of the manner of fixation of the erect postured body in the knee joint shows that very solid tendons (ligg. cruciata and ligg. collateralia fibulae et tibiae) exclude any possibility of the bending of the limb forward, inward or outward, the only possible impediment of erect attitude on the level of knee joint being a falling backward. To prevent this impediment there has been necessary a reflex tonus of musculus quadriceps femoris. This spinal tonus represents an automatic mechanism destined to return forward the gravity of the body every time there arises a risk of impediment of the erect attitude of the lower extremity, *i.e.*, of the fundamental element of standing function.

As to the calf muscles, it must be borne in mind that although these muscles do not seem to participate directly in the act of standing, they do so as a "static component" of walking function. In the act of walking of man there exists a moment when the whole body is to be supported by one lower extremity fixed on tip-toe—a posture requiring a great degree of strain of the tendon Achilles to prevent the impediment of erect attitude in the sense of bending forward in the ankle joint. Moreover, in all lower mammals the calf muscles participate directly in standing function maintaining by their action the erect attitude of the limb.

Thus both in phylogenetic and ontogenetic evolution of man certain muscles have been particularly active in fundamental functions of the extremities. These muscles having been stimulated in the evolutionary past, the threshold of the excitability of their receptors has become lowered in comparison with the receptors of the other muscles, *viz.*, tendons.

In the upper extremity such muscles especially employed in phylogenetic and ontogenetic evolution are those corresponding to the grasping function; in the lower extremity those corresponding to the act of standing. Thus it happens that in the upper extremity the muscles exhibiting the most constant and obtainable deep reflexes are the biceps, pronator and flexors of wrist and of fingers, while in the lower extremity the most constant reflexes are the knee and ankle jerks.

The interpretation of the tendon reflexes as a manifestation of phylogenetic adaptation to elementary motor functions by means of elaboration of a sensible spinal tonus, explains some facts concerning

the normal and pathologic deep reflexes. Firstly, the unequal constancy of deep reflexes in various muscles—this question has been sufficiently dealt with previously. Secondly, this point of view may explain the brevity of the period of contraction seen in knee jerk. This brevity was considered as an argument against the true reflex nature of knee jerk and in favor of its being a direct muscular excitation. In our opinion the brevity of the period of contraction in knee jerk is a result of a perfect adaptation of the spinal reflex mechanism for the purpose of accomplishing a very important fundamental function, that of sustaining the body. It is interesting to mention that the so-called extensor thrust reflex of the dog, being undoubtedly a true reflex (Sherrington), appears on measurement to be as brief as the knee jerk. After having pointed out these facts Sherrington remarks "it is interesting that this brief lasting reflex (thrust reflex) also has, as has the knee jerk itself, the extensor muscles of the hind limb for its seat of expression."

Thus both the brevity of thrust reflex in dog and of the knee jerk in man are but manifestations of a highly developed readiness of contraction of the extensors of the leg. Without this adjustment there would be no possibility to bring about the act of standing and progression as acquired automatisms. And an important element of the perfection of this reflex mechanism is the quickness of its activity.

A number of pathologic conditions may be properly interpreted in the light of the foregoing arguments. Being an expression of automatic spinal tonus the tendon reflexes become increased in the case of severing of the communication between the cortex and the segmental apparatus (in the lesion of the pyramidal tracts). As in this case the greatest increase is manifested by muscles which possess a specially elaborated spinal reflex tonus, it follows that in pyramidal tract lesions (in hemiplegia) a greater reflex excitability is to be observed in the same muscles, which normally exhibit the most constant and obtainable tendon reflexes. Moreover, as there is no voluntary innervation, the extremities assume a reflex attitude, or to use the clinical term, there arises a contracture. And since, according to previous arguments, the most constant and obtainable reflexes correspond to the muscles with some fundamental functions, it follows that the attitude of the extremities in hemiplegic contractures is but a manifestation of their elementary function. In the upper extremity the hemiplegic contracture is characterized by flexion of the forearm, pronation and flexion of wrist and fingers; this is an attitude proper to the act of seizing an object by the hand and carry-

ing it to one's own body. In other words, the attitude of the upper extremity in hemiplegic contracture is a manifestation of a rudimentary grasping act. As to the lower extremity its most characteristic feature in hemiplegic contracture, is the extension in the knee joint, an essential element of the standing function.

The tendency of the extremities in hemiplegia to assume reflex attitudes corresponding to their fundamental functions can be demonstrated also in other ways. In cases of advanced spasticity there may be observed a phenomenon which could be designed as general reflex of the extremity. If, after having related the contracture of the upper extremity by tapping a region beyond the extremity but quite nearly to it, for instance, the middle region of the scapula, one observes a reflex movement of the extremity. This consists in reassuming an attitude corresponding to that of rudimentary grasping act. If, on the contrary, one taps the same region without previous relaxation of the contracture, one can thereby augment the existing contracture but never produce the reflex contraction of the antagonist.

Likewise the most common reflex movement of the lower extremity, its general reflex in spastic paralysis, the the extension in the knee joint. The tendency to such a movement is so great and conspicuous that one can elicit same by tapping the regions rather remote from the knee joint. It is particularly remarkable that it can sometimes be elicited by tapping the tendons of the flexors after passive flexion of the lower extremity. This phenomenon might be designed as a paradoxical knee jerk and can be observed in cases of paraplegia with intense spasticity.

The rudimental fundamental functions of extremities are also to be discovered in many associated movements seen in lesions of the upper motor neuron. Thus many symptoms seen in uncontrolled reflex mechanisms of infracortical segmental apparatus are but rudiments of elementary function proper to the corresponding extremity.

As a general conclusion from the above recorded facts, we may assume that the deep reflexes, in their normal and pathological manifestations, are determined by an automatic spinal mechanism. This is a reflex spinal tonus elaborated in the process of phylogenetic evolution as an adaptation to the automatic accomplishment of some elementary movements necessary for the activity of corresponding extremity.

The main purpose of this contribution is to illustrate the method of application of evolutionary data to the explanation of symptoms of nervous diseases and also to call attention to the value of this method.

in the analysis of clinical facts. We are quite aware that in their details, our arguments may be incomplete. But we nevertheless believe that the method fundamentally should not be disregarded, for its neglect is the very reason why the nature and origin of many nervous symptoms remain unexplained.

For many years we were endeavoring to justify such an opinion and we are happy to learn that we are not standing alone. In the ingenious works of Crile we find a valuable support of our attempts to introduce the evolutionary method into clinical investigation. We will close our considerations by quoting the following sentences of Crile: "In view of the fact that most sciences have availed themselves fully of the opportunity offered by the doctrine of evolution to coördinate their data, it seems odd that medicine should have lagged so long to find inspiration in its revelations. Phylogeny, or the study of the ancestral life of species, will probably play a more important rôle in future medical research."

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A CASE OF MORBID SLEEP

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This case is reported primarily because of its etiology, epidemic encephalitis, and the definite evidence of involvement of the vegetative nervous system.

There is little doubt that the causal condition was encephalitic, although there is no absolute proof that the causal organism was identical to that of epidemic encephalitis. The condition was certainly due to an acute infection involving the central and vegetative nervous systems. The illness commenced during the winter when epidemic encephalitis was prevalent, and had none of the characteristics of any other known acute infection. On these grounds, and because of the predilection of that disease for producing disorders of the vegetative nervous system and of sleep, it is maintained that in this case the morbid sleep was a residual effect of epidemic encephalitis.

Brain tumor, myxedema, anemia, neurasthenia, gastro-intestinal intoxication and myasthenia gravis are all obviously impossible as etiological factors. The patient presented absolutely no evidence of hysteria, either on examination, during observation, or on the score of psychic trauma preceding the illness. Epidemic meningitis is excluded because the patient's private physician and consultant did not consider it at the onset of the illness.

The somnolence observed in this patient was quite different from the lethargy so familiar in epidemic encephalitis. The facial expression was normally mobile, there were no catatonic symptoms and response to environmental stimuli was always prompt, whereas in the common encephalitic lethargy the sufferer, although perfectly conscious of what is going on about him, exhibits what seems to be a greatly prolonged reaction time.

The somnolence occurring in the presence of intracranial tumors, hydrocephalus, and auto-intoxication, and following skull injuries, has been attributed to pressure or circulatory alteration in the region of the diencephalon (the floor of the third ventricle) and the pituitary body. Epidemic encephalitis offers possibly the best illustrations of the intimate association of function between the

diencephalon and the pituitary body. The site of the lesion causing the somnolence in this patient is probably in this region. Somnolence thus is seen to occur due to mechanical, toxic or infectious causes, which, each in its own manner, disturb the function of the diencephalon and the pituitary body.

Case Report. The patient, Mary S., age twenty-seven, entered Bellevue Hospital April 27, 1921. She complained of the necessity for from fourteen to sixteen hours of sleep a day. The condition began in February, 1920.

The only illnesses were pertussis when four years old, and scarlet fever at the age of twelve. She had always been constipated and her menses were delayed and quite painful. Mentally she was an active, quick type of person. She worked successfully at several occupations and during the war was a welfare worker. Her duties at a government shipyard taxed her strength, so that she feared she was in danger of a breakdown. She lost appetite and weight and slept little for several months. She resigned and after a few weeks rest felt perfectly well, so that she secured a new position. Within a week she was attacked by an acute illness which was followed by the condition for which she sought relief at Bellevue.

Present Illness. On the way home from work early in February, 1920, the patient was seized with a chill. In the middle of the night she awoke with severe aching pains in the body and limbs, and pains in the eyes as though foreign bodies were in them. High temperature and delirium ensued, lasting four days. On the second day of the illness menstruation began and the patient entered a state of unconsciousness which lasted one month. She had absolutely no recollection of this period. From March to June she slept twenty to twenty-two hours a day, being awakened for attention to her bodily needs. The sleep was light, and when aroused the patient felt perfectly clear mentally, spoke readily with those about her and fed herself easily. As soon as she had been awake a short time she became very tired, and was overcome by an overpowering desire to sleep. From July, 1920, to April, 1921, the need for sleep diminished gradually, until she was able to lie awake in bed for as much as eight hours a day. She could sit up in a chair, but after an hour had to sleep again. On a few occasions she tried staying out of bed several hours, but after each effort she would sleep two or three days, except when she was aroused for food. The only symptom of which there was complaint during the fourteen months of sleep was a marked salivation at night. There never occurred diplopia, headaches or sweating. The sleep was always light but dreamless.

Two things were of importance during this period. The pre-existing constipation disappeared and menstruation was regular for the first time in the patient's life. Finally, there was a gain in weight of twenty pounds.

Status of patient. A rather pale, well-nourished young woman, weighing about 140 pounds, and 5 feet 6 inches tall. Her manner was reserved but pleasant, with perhaps a tendency to apathy. When

asleep, a light touch would arouse her and she would at once be in full contact with her environment. Immediately after the examination she turned on her side and dropped asleep, the respiration being shallow and regular. The skin was dry, clear, with some cyanosis in the hands and feet. The hair distribution was normal except for extension of the pubic hair nearly to the umbilicus. The pelvis and breasts were normal in contour. The pupils were oval and reacted to light with a hippus. There was tremor of the tongue; it was clean and the breath odorless. The palate showed a definite torus, the lateral incisors were quite small and decayed and there was maxillary prognathism. Heart, lungs and abdominal organs were all normal. Motor function, sensation and reflexes were normal. Blood pressure was 110 systolic and 70 diastolic. The pulse was from 70 to 80, respiration were 18 to the minute. The temperature (rectal) was never above 98 during the month in the hospital.

Laboratory findings. Blood count, W. B. C. 6,800, R. B. C. 4,964,000, Hb. 100 per cent (Sahli); Blood Wassermann, negative; Blood sugar, 66 mgms. per 100 c.c.; Urine, Normal; Spinal fluid, clear, pressure increased, 2 cells per cu. mm., globulin absent, Wassermann negative, colloidal gold curve 0011110000, quantitative sugar 40 mgms. per 100 c.c.; Sugar tolerance, could not be tested because the patient was unable to retain the glucose on her stomach. She never liked sweets. X-ray examination of the skull and hands showed no abnormalities.

Summarising the physical status, there were the following abnormalities: Male distribution of abdominal hair, small decayed upper lateral incisor teeth, maxillary prognathism, subnormal temperature, and low sugar content of the blood and spinal fluid. These all suggested dysfunction of the pituitary, the last two probably being entirely due to the illness. In the history of the illness, the cessation of the constipation and the change of menstrual function also suggested pituitary influence.

Treatment. This consisted of strychnine gr. 1/20 three times a day, thyroid extract gr. 5 each day and bicarbonate colon irrigations every three days. Treatment began on April 28. On May 3 the thyroid was stopped and pituitary whole gland extract in doses of 2 grains twice daily was substituted.

By April 29, one day after treatment began, the patient was more wakeful than she had been for months. Improvement was rapid and steady and by May 10 she was able to be up and about the ward all day without feeling fatigued. The bowels were moving twice a day, a thing entirely new to the patient. On May 20 the patient left the hospital feeling perfectly well, able to stay up all day and busy herself at occupational therapy tasks without becoming tired, and being quite satisfied with eight hours of sleep.

It is difficult to assert whether the strychnine or the endocrine substances helped the patient most. In view of the fact that neither of the latter were given throughout the treatment, it might be maintained that the strychnine was most effective. On the other hand, either thyroid or pituitary might have been effective, even accepting

the assumption that the endocrinological dysfunction in the patient was largely, if not entirely pituitary in origin.

III. Summary:

1. Acute onset of a severe infection of the nervous system.
2. Morbid sleep for 16 months, with great fatigability.
3. Subnormal temperature, gain in weight, alteration in menstrual function, low sugar content of the blood and spinal fluid.¹
4. Rapid recovery on strychnine in large doses and endocrine substances.
5. Maintenance of improvement for nine months.²

¹ Apropos of quantitative estimation of sugar in the spinal fluid, over 100 analyses made on a variety of clinical conditions proved to our satisfaction that the test is of no value whatever in the differential diagnosis of epidemic encephalitis.

² I wish to express my thanks to Dr. Foster Kennedy for consent to report this case, which was on his service at Bellevue Hospital.

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INVOLUTIONAL MELANCHOLIA

A STUDY OF 50 CASES AT THE WORCESTER STATE HOSPITAL *

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The term involutional melancholia has been limited by some writers to the depression or melancholia of later life, the period of involution or climacteria, while others classify it as a part of manic depressive insanity. In the preparation of this paper I gathered my data from the records of the 50 patients admitted to the Worcester State Hospital during the past five years and diagnosed as involutional melancholia with personal observation and study of most of them. In this paper I am treating involutional melancholia as a separate entity as it is essentially a disease of the period of involution, about forty to fifty years of age in women, later in men.

There is a mental alienation characterized by more or less profound depression with either no marked intellectual disturbance or the presence of more or less incoherence, hallucinations and delusions. The cerebral mechanism develops a condition of supersensitiveness, all impressions being exaggerated and magnified, a state of abnormal self-consciousness existing.

Heredity is not an etiological factor as in some of the other psychoses. Many show the beginning of senile decay, the menopause being the important factor in women. The mental deviations and disturbances brought about by organic and glandular changes at this period or decade of life are many. Marked exciting causes, such as emotional shock or other conditions of mental stress are unusually frequent.

To begin with, I rule out all attacks of depression preceding menopause or the climacteric period such as melancholia following child birth, that associated with dementia precox, manic depressive insanity, etc. There is a marked difference in the depression; it is more intensified, the fear or apprehension that goes with it is more marked; the mental anguish, attempts at self destruction; the attempts at suicide are more frequent than in depression of the manic depressive. The conditions pertaining to melancholic states,

* Read at the quarterly meeting of Assistant Physicians of the State Hospitals of Massachusetts at Worcester, Mass., December 7, 1921.

at all periods of life, are gloom and despondency, associated with paralyzed energies, indecision and volitional inactivity; yet the peculiar character of the involuntional psychotic patient is the frequency of religious despondency and delusions respecting the moral well-being of the subject.

The symptoms grow in severity, suicidal feelings become prevalent and the delusions that the soul is lost, her body must be burned in the flames or cut into a thousand pieces often creates fits of mental agony or despair.

In the early stages painful mental states invariably prevail, the disease always has a prodromal period of several months. During this period the patient suffers from vertigo, anorexis, insomnia, irritability, is forgetful, exacting and quite often has an organic disease affording a foundation for the delusions. The most common symptoms which this type of patient complains of are pressure pains in the head, a fullness with a feeling that the head is going to burst open, marked loss of weight, failing health, gastrointestinal disorders causing the patient to suffer great mental anguish and misery. The patient begins to neglect his or her duties to family and self, worries over something which she cannot explain, the world and everything is dark and wrong.

The more frequent form is the subacute delusional melancholia. Maniacal states are rare as are outbursts of excitement. In the agitated states there is a continual agitation in which the fearful and distressful thoughts and imagination cause wringing of the hands, restless walking, swaying of the body, prayers beseeching help with tears, some dreadful calamity that is to affect them or their family; insomnia is constant. Memory and reasoning faculties are usually intact, but the intellectual and ideational sphere suffer. The preservation of the intellect may apply to any one of the things outside the subject or may be entirely restricted to the body and organic sensation. This condition becomes progressively worse.

The morbid background is not infrequently delusions of sin, even petty things may be looked upon as a terrible sin or magnified into the unpardonable sin. Going about repeating over and over again certain phrases as "It is awful . . . there is no help . . . I must die . . . Oh, my God, what are you doing to me? . . . will I be here to-morrow . . . won't you stay with me?" etc. These patients, even the considerably depressed, are capable of seeing a joke and at times lapse into moments of light talk and smile, from a background of profound depression, quite characteristic in the involuntional melancholia.

Great changes take place in the general physical condition, as lowered blood pressure, sluggish nervous energy, marked loss of weight with emaciation. The loss of weight is brought about by the patient's refusal to take food; if left alone the patient rarely takes sufficient food in the belief that she is depriving others who are more worthy.

Prognosis: The question of time during which the alienation has existed, the age of the patient, the hereditary predisposition to insanity and the acquired predisposition must be considered. The prognosis is fairly good in uncomplicated cases, not only as regards the duration of the psychosis but favorable as regards the stability of the reinstated, and an early and rapid recovery is, as in some cases, favored by early treatment; the chances of complete and speedy recovery are much strengthened, if the subject comes under appropriate treatment within a few weeks of the onset of their symptoms.

Referring to W. Bevan Lewis, in 83 cases of involuntional melancholia he found that 27.7 per cent had a family predisposition to insanity, and that 38 per cent of the total cases had suffered from a previous attack of mental derangement, yet after confirmed recovery from this form of mental disease a relapse occurred in but four instances out of the 83, and in three of these a predisposition to insanity was indicated by a previous attack earlier in life with strong hereditary taint. Some of the older writers give the percentage of recovery in uncomplicated cases as 59, 48, and 47, and I believe to-day, with our broader knowledge of mental diseases, the nervous system and internal secretions, the newer forms of treatment and increasing knowledge of what occupational therapy can do, especially for this class of patient, the percentage of recoveries can be increased and has been increased.

In the treatment of this disease there are many things to consider but chiefly one branch which I am interested in at the present time, is the part the endocrines play in this disease.

In my observation and study of the involuntional melancholias and the action of the ductless glands of this period of life, the relationship of these glands, the function of the internal secretions, of the ovaries, the prostate and testicles, the thyroid and adrenals, also the pituitary, and certainly at this period of life, I am led to believe that their disturbance is a very important factor in this disease, there is brought about a great change and without doubt an unbalanced ratio in the relationship of these glands and their secretions, as evidenced by the many physical signs, namely, lowered blood pressure, anorexia, loss of weight, irritability, nervousness, constipation, head-

	NUTRITION	APPETITE	CONSTIPATION	PALOR	COLD EXTREMITIES	PULSE		RESPIRA- TION		TEMPERATURE	BLOOD PRESSURE	QUANTITY, 24 HRS.	SP.-GR.	ALBUMIN	CASTS	PHENOL- PHTHALEIN EXCRETED
						Character, Rate	Rate	Character, Rate	Rate							
E. K.	fair	poor	no	yes	yes	weak 90	shallow 18 irregular	97.2	108/70	860	1015	+	+	2 hrs., 10 min. 30% 40%		
M. A. S.	poor	fair	yes	yes	yes	weak 90	shallow irregular 20	97.4	146/94	720	1020	+	+	35%		
M. J. S.	poor	fair	yes	yes	yes	weak 66	shallow irregular 16	97.8	94/76	1015	1014	+	+	60%		
H. B.	good	varies	no	no	yes	weak 66	deep 10	98	160/120	700	1018	+	+	40% 35%		
E. W.	poor	fair	no	yes	no	weak 120	shallow 28	96.7	160/70	790	1022	-	-	25%		
I. B.	fair	good	no	yes	no	weak 78	shallow 24	99	132/100		1020	+	+	60%		
M. D.	fair	fair	yes	yes	yes	weak 72	shallow 20	98.6	95/70	1200	1015	+	+	50%		
F. W.	fair	fair	yes	yes	no	weak 78	shallow	98.4	118/78	1350	1012	-	-	60%		
A. G.	fair	poor	yes	yes	no	weak 94	shallow 20	100-2	120/90	1275	1018	+	+	50%		
H. B.	good	good	yes	no	yes	weak 72	shallow 18	98.8	150/110	1400	1022	+	+	30%		

	NUTRITION	APPETITE	CONSTIPATION	PALOR	COLD EXTREMITIES	PULSE Character, Rate	RESPIRA- TION		TEMPERATURE	BLOOD PRESSURE	QUANTITY, 24 HRS.	SP.-GR.	ALBUMIN	CASTS	PHENOL PHTHALEIN EXCRETED
							Character, Rate	Rate							
C. K.	fair	good	yes	no	yes	good 86	shallow 24	100	124/84	1600	1016	+	+	50%	
K. C.	good	good	yes	yes	yes	good 78	shallow 24	98.6	120/80	1100	1016	-	-	60%	
A. A.	fair	good	no	no	no	good 80	good 20	100	120/85	1005	1018	-	-	50%	
E. K.	fair	poor	no	no	yes	weak 84	shallow 20	99	110/80	1075	1020	+	-	40%	
M. M.	good	good	yes	yes	yes	weak 86	shallow 20	99.8	110/90	1250	1014	-	-	50%	
M. S.	fair	fair	yes	no	no	weak 84	shallow 20	99.2	105/75	1390	1010	+	-	50%	
G. S.	good	good	no	yes	no	weak 72	shallow 20	98.8	140/100	1225	1015	-	-	50%	
M. B.	fair	good	no	yes	no	good 84	good 20	99	120/90	1140	1024	+	+	30%	
N. G.	good	good	no	yes	no	weak 88	weak 22	99.4	135/105	1090	1010	+	-	60%	
E. J.	good	good	no	yes	yes	weak 108	shallow 20	98.8	140/100	1075	1016	-	-	50%	

aches, etc. As stated above, a great factor is the variation and disturbance of the endocrines.

The thyroid appears to play an important part of the ductless glands, it favors oxidation and controls growth, both physical and mental, and is responsible for the establishment and maintenance of many of the metabolic activities of the body and is very closely related to practically all the other glands of internal secretion.

I have already seen very good results in the glandular treatment by a rapid gain in weight, increased blood pressure, increased activity, the interest of the patient gained, suicidal ideas diminished and a new interest in life in some cases shown, but longer observation and treatment is necessary. These changes have not wholly been brought about by glandular treatment, for we have at our command many other forms of treatment, and these cases require constant supervision or we lose ground.

Among the other forms of treatment are open air exercise, calisthenics, daily walks, heliotherapy, electrotherapy, galvanic and faradic treatment, hydrotherapy, continuous baths, massage and douches, transduodenal lavage, reading, games, musicales, dancing, moving pictures, and community singing. There is a great difficulty in getting this type of patient to attend these functions, as they require constant supervision but by constant persuasion they do attend, gradually taking an active part with other patients.

In summarizing these 50 cases I find the following percentages interesting: 90 per cent were first admissions; 10 per cent had previous attacks; 12 per cent died; 48 per cent have been discharged and not returned; 16 per cent had a family predisposition to insanity.

Of the 20 cases remaining in the institution 35 per cent had a strong predisposition to insanity; 20 per cent had previous attacks, or acquired predisposition, which rule out this psychosis; 10 per cent were determined manic depressive insanity and dementia precox-paranoid; 40 per cent have been here less than one year.

I have endeavored to check up the above findings in twenty of the cases studied, with the following results: Most of the patients showed a poor or fair body nutritive condition, appetite was good in some cases but poor or fair in most of them. Fifty per cent suffered from chronic constipation, the others found it necessary to resort to laxatives occasionally; pallor was present in most cases; about 60 per cent suffered from cold extremities due to disturbance in the circulation, character of the pulse in practically every case was weak and poor, but the rate in most cases was increased. Respirations were shallow in most every case, though the rate was about normal.

Temperatures were all rectal except the first five. The blood pressures were somewhat contrary to my former finding though these were taken by an assistant. Twenty-four hour specimens of urine were taken and the quantity was rather low, specific gravity was about normal, albumin was present, generally a trace in nearly every case. Those examined were all female patients and not catheterized. Phenolphthalein excreted in two hours and ten minutes shows about normal excretion, though I did expect a diminished amount.

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SOCIETY PROCEEDINGS

NEW YORK NEUROLOGICAL SOCIETY

THE FOUR HUNDRED AND SECOND REGULAR MEETING, FEBRUARY 6,
1923. DR. FOSTER KENNEDY PRESIDED

I. ADDRESS OF THE RETIRING PRESIDENT, DR. FOSTER KENNEDY

The speeches of those about to die are often preserved by revered tradition, but the words of departing presidents of the Society are apparently never embalmed in the literature of our profession. I have, therefore, been without a guide or stay for my last remarks from this chair and am thrown piteously on my own resources. It would seem that a retiring president should justify his title and his obsolescent condition by a becoming brevity of speech; the more so, in that the discourse of my successor has a more vital concern for us all.

When you did me the honor of allowing me to lead this Society for the space of two years, I told you that I believed we should bring into our body men with knowledge cognate and supplementary to ours, that by listening to the converse of biologists, anatomists, and physiologists we should enlarge our mental swing and add greatly to the value of our meetings and the growth of our understanding. With this end in view we have extended invitations to address us to many men not of our vocation, and in one recent instance, to demonstrate the catholic quality of our taste, not even of our profession.

I shall not go over, here, the variety of our deliberations; some may be mentioned: Geyelin came to us to keep us in touch with his work on the fasting epileptic, and Stewart Paton plead with us to mend the world sadly out of joint by an intensive study of human behavior. The difficulties connected with the neuropsychiatric activities of the Ellis Island Immigration Station were reviewed; and Salmon read a paper provocative of concern on suicide and the possibilities of arresting the rising tide of numbers of these unhappy ones by mental hygiene and sympathetic understanding of individual difficulties. A corrective to wild and whirling words on glandular dyscrasias was supplied to us by Walter Cannon, who kindly came to us from Boston for that good purpose. An effort to have us comprehend the basic activities of our work was made by Newton Harvey of Princeton who gave us a lecture of memorable quality and clearness on the nature of the nerve impulse; and the development of the nervous system was put before us in a new light and with

audacious synthetic imagination by my colleague at the Cornell Medical College, Charles Stockard. The surgery of the nervous system has been admirably contributed to in our sessions by Alfred Taylor and Elsberg; while Byron Stookey, one of our recent members, has added illuminatingly to our knowledge of the surgery of the peripheral nerves. The institute on Ward's Island has added a psyche to the polished materialism of our soma; and I should like to add a word of respectful thanks to my honored chief, Dr. Charles L. Dana, for his contributions to our program, notably one of the therapeutics of myasthenia gravis and one on the condition of our neurological hospital service in New York,—an investigation which he is pursuing with Davis with his splendid zest and energy, so that a lasting betterment will take place in our facilities for caring for our palsied brethren, and the education of our students.

In the past two years we lost by death a former President of this Society, Dr. Pearce Bailey, whose name I know will long be honored among us. He gave of his best to his country and to us. May he rest in peace! And now I take my farewell as your Chairman, happy that I suffer no physical translation from your company. I thank you for all your great kindness shown personally to me and for the corporate consciousness and strength you have shown as a society of learning. To have been President of this honorable body will always be accounted by me as my happiest adventure. Like Charles II, I apologize for taking such an unconscionable time in dying, and take my leave and give my place to my friend, Edwin Zabriskie.

II. ADDRESS OF THE INCOMING PRESIDENT

(On account of illness of Dr. Zabriskie this was postponed.)

III. ADDRESS: "SOME REFLECTIONS ON THE MODERN SCHOOL OF DUTCH NEUROPSYCHIATRY. ILLUSTRATED." DR. SMITH ELY JELLIFFE.

(Abstract) In introducing his topic, Dr. Jelliffe mentioned the coincidence of the new incoming President, Dr. E. G. Zabriskie, who is a lineal descendant of the early Dutch families of New Amsterdam and Breukelin, thus enhancing the appropriateness of his subject on this occasion.

He stated that the modern Dutch School of Neuropsychiatry probably embraced the greatest number of eminent workers in this field at the present time. Mention was first made of the life and work of Dr. J. K. A. Wertheim Salomonson, Rector of the University of Amsterdam, who lately succumbed to heart disease, a severe loss to science in Holland. The work of Salomonson embraced a very wide field, covering a knowledge of medicine, physics, neurology and roentgenology; in the latter branch he was esteemed the chief leader in Holland. He had a lifelong interest in neurology, and turned more and more to this subject in later years. His chief researches dealt with the electric degeneration of the peripheral nervous system.

Much of his research work was directed toward clinical application, and of this may be mentioned studies on clonus and tetanus, psychogalvanic reflexes, shortening reflexes and measurement of chronaxia. He was also interested in the string galvanometer and applied it to neurological findings.

While essentially the man of science, Dr. Salomonson had many sided interests: art, music, sportsmanship. He merited the high opinion of his scholars who looked up to him as one of the foremost neurological exponents; while in social, as well as in mental standards, he held the position of an aristocrat.

Dr. Jelliffe spoke of the death of Professor Pikelharing and of his researches on the chemistry of muscle.

Dr. Jelliffe also mentioned in detail Professor C. Winkler, the present Dean of Dutch Neuropsychiatry and Director of the University Clinic at Utrecht. He is head of a modern psychopathic hospital and author of a number of works which form a mine of neurological learning. Winkler early devoted himself to neurology and psychiatry and for many years strove toward educating the University toward the provision of special chairs in these subjects. For a long time lack of funds hampered this project, and political machinations prevented its fruition, but he lived to see his idea realized. His life was devoted to the advancement of the cause of neuropsychiatry. He became particularly interested in brain function, at one time making a success as a brain surgeon, in the course of this special work. During his career he taught many students. He founded the neuropsychiatric society in Amsterdam and became a member of the Royal Academy of Sciences. He founded a Central Institute for Brain Research. Ariëns Kappers was made its Director. At this time also a Central Brain Commission was founded. His work embraced surgical experience, and anatomical and experimental knowledge, but this was always subordinated to the ideal of therapeutic results which were never lost sight of. His thought was deep, far-reaching, and his research patient; his therapeutic results were striking. During the early days of the war, the University of Utrecht had reached the point after many delays of founding a professorship of neuropsychiatry, a goal which Winkler had for 30 years striven to accomplish. He was finally persuaded to leave Amsterdam and assume charge of this department. His inaugural address was on the "Relationship of Psychology to the Physiology of the Nervous System." In his work Winkler shows remarkable catholicity of thought, and originality of conception. He is bound by no "school" and is preoccupied by the exploration of that difficult subject, the relation of the "soul" to the body. He is an advocate of the theory that the human body is a capturer, transformer and deliverer of energy. "An effort at grouping in functional systems the pathways and centers of diverse localization, whereby diverse sensory impressions can be transformed into reflex activities." This is the subtitle to his monumental work on neurology.

In considering the enormous field of his research work, time only permits of the mention of one, perhaps the most interesting. This

is his work on the eighth nerve, which he regards as originally a cutaneous one belonging to the oldest group of proprioceptive systems, reaching back in time to the marine habitat, and its functions being first adapted to water shock and later to other forms of pressure. The basis for these studies was work on marine mollusks in which the statocyst organ, influencing the equilibrium of the animal, is the point of departure for a functional study of the labyrinth. Winkler concludes that the labyrinth is the most ancient of sensory organs. He traces the development of vestibular and cochlear nerve components, and the gradual acquisition of sound wave components to the stimuli of aquatic nature. Thus the hearing mechanism has evolved out of the primitive water shock mechanism of the statocyst to respond more and more to air shock reflex activities. A further development of cochlear responses is along the line of audition, rhythmic movement reflexes (dancing, singing) and finally speech activities. Thus hearing and speech conserve as a heritage of ancient function the power of reproducing by reflex pathways the phenomena which have given place to the stimulus.

Dr. Jelliffe next passed to a consideration of the work by the Dutch School on muscle tonus, mentioning in connection with this research the names of deBoer, Boeke, Dusser de Barenne, van Rijnberg, Winkler, Jelgersma, Magnus and Kleijn, and Brouwer.

There is considerable research, and also difference of opinion, among Dutch workers, regarding the so-called double innervation of striped muscle tissue. Boeke established the existence of small neurofibrillar end rings, and end nets, at the end of fine nonmedullated nerve fibers, differing entirely from ordinary end plates. While the morphology is fairly well established, the physiology of these plates is under active discussion. Plastic mechanical factors, as opposed to the view of chemical nutritive factors, are the main contentions. Pekelharing has mainly studied the latter viewpoint, while deBoer has been one of the most active in claiming the existence of plastic tonus function. DeBoer, experimenting along the lines of pharmacodynamics, concludes that skeletal muscle tonus has a definite peripheral autonomic reflex arc component. Dr. Jelliffe pointed out that numerous correlates would be the outgrowth of such a conception, embracing many experimental and clinical possibilities.

Passing on to the work of van Rijnberg on muscle tonus, it was mentioned that the theory of this worker, that there was a vegetative supply to striped muscle, and this was utilized to account for Vulpian's lingual paradox. This theory may help to explain the muscular tonic phenomena following facial palsies, and explain the "foot phenomena" of Sherrington.

Certain phases of the same problem have been extensively studied by Magnus and Kleijn, of the department of pharmacology of the University of Utrecht. They have concerned themselves with the study of decerebrate rigidity and find that the cerebellum plays no part in this syndrome. These workers have separated the labyrinthine from the neck reflexes, the former arising from stimulation of the otoliths, the latter from proprioceptive nerve endings of the cervical

muscles. Magnus and Kleijn describe four components in the postural reflex: (1) head labyrinthine reflex; (2) body wall reflexes influencing head positions; (3) neck muscle reflexes, and (4) trunk and limb muscle reflexes.

Prominent among the workers on cerebellar physiology and morphology are Bolk and van Rijnberg, both of whom are innovators and originators of a new conception. The comparative anatomy of lower species is studied, working from below upward in the scale of organisms, and the conclusion is arrived at that the several parts recognizable in the mammalian cerebellum have definite functional significance and represent areas of central control over definite motor performance in the body. Bolk has mapped out the various divisions and subdivisions of the cerebellum and finds striking variations between different organs. He believes there is a functional variation related to structural variation, since the form is dependent upon function. He traces the relationship of various parts of the cerebellar cortex to the body movements (bilateral synergic, or unilateral synergic) with which they are associated. The work of Bolk, preëminently anatomical, has been confirmed by other workers through animal experimentation.

The work of Jelgersma, professor of psychiatry in the University of Leyden, was next considered. His studies on paralysis agitans had shown the alterations of the striatal fiber systems. His work on the cerebellum has shown that only two feeling qualities are localizable in this organ, namely, deep sensibility of muscle and joint, and, secondly, tonus and equilibrium. Time will show whether these views are correct. Jelgersma has written a masterly textbook on psychiatry. While of the older men, like many of the younger Dutch neuropsychiatrists, he is greatly interested in psychoanalysis.

Ariën Kappers is the director of the Central Institute for Brain Research, and a pupil of Winkler. He has done considerable work on the comparative anatomy of the nervous system. His thought is along the line of conception of organizing synthetic function of the nervous system in response to cosmic stimuli, and he holds that a structural evolution is going on within the nervous system, which he terms neurobiotaxis. He believes function is primary, structure secondary and variable according to the needs of the organism.

Dr. Jelliffe then took up the work of several other members of the Dutch School, showing their photographs and illustrations from their work, particularly B. Brouwer, H. and G. C. Bolten, and I. and H. Boumann. Concerning the work of Brouwer, among other things Dr. Jelliffe pointed out his contributions to the study of the cerebellum and the olives and drew particular attention to his work on the oculomotor nuclei. Brouwer's utilization of the evolutionary history of neurological structures made his work particularly valuable. His study of multiple sclerosis from a phyletic viewpoint was mentioned and illustrated.

Dr. Jelliffe then called attention to the work on the sympathetic nervous system by the Boltens which lay close to his own interests,

and then gave a very short sketch of the psychiatric opportunities in Amsterdam with the two psychiatric clinics.

Discussion of Dr. Jelliffe's Presentation

Dr. Foster Kennedy: This admirable and delightful presentation of Dr. Jelliffe's is now open to discussion.

Dr. Walter M. Kraus said: Dr. Jelliffe, in his delightful review of the work of the Dutch School, has focused our attention on subjects with which we ordinarily would not have come in contact. He has reviewed a number of interesting neurological topics of great value and interest to us, even to the point of stimulating us to learn Dutch.

I suppose that research activities in neurology could be divided into three parts. In one, the subject is approached from the viewpoint of formal psychology and, with practically no organic basis, an attempt is made to unravel the most complicated reactions of the human brain. Another group devotes itself to the study of facts as they present themselves, without being much concerned as to the significance of these in terms of past or future evolution. The third group is interested in tracing the evolution of the human nervous system. As Dr. Jelliffe has emphasized, this last method is essential to the solution of most of our problems in neurology and his review of the work of the Dutch School has laid emphasis on this point.

While in Amsterdam I had a short interview with Dr. Kappers. It was very stimulating indeed, and I came away with the desire to return as soon as I could. His collection of comparative anatomical material is the finest in the world. The opportunities for research which this vast collection offers would keep a score of men busy for a long time. For those who will find it impossible to work with Dr. Kappers, his textbook on comparative neurology and his papers on this subject will constitute a source of much information and inspiration to work.

I may mention a few of the things which may be found in his book which should certainly arouse one's inquisitiveness in regard to the phylogenetic significance of certain parts of the nervous system. For example, the pyramidal tract, which we have dignified with so many functions, is present only in mammals. Bearing this in mind and also recalling that the pyramidal tract forces its way through the striatum, we derive some notion of the reason for the frequency of hemorrhages in the blood supply of the pyramidal system in the capsular region. Obviously, this blood supply must be comparatively recent from a phylogenetic point of view and, due to this would be expected to be more easily irritated by toxins and thus more easily diseased. In another place Kappers states that in the lower mammals the pyramidal tract appears in the posterior column. Other fibers in these latter columns convey sensation through several relays to the cortex. One wonders in the light of Kappers' theory of neurobiotaxis, why the pyramidal tract wandered from this position to its present position in the lateral columns.

The nucleus of the twelfth nerve in lower animals having no

tongue, lies on the ventral side of the medulla. After the tongue had appeared the nucleus assumed a dorsal position in contiguity with the sensory nuclei having to do with the various sensations received from the tongue. This is a beautiful example of neurobiotactic activity.

Dr. Jelliffe originally loaned me his copy of Kappers' book on comparative neurology and this led me to visit Dr. Kappers in Amsterdam. The stimulation which I received from this visit has been of the greatest assistance to me and has emphasized a former opinion of mine, namely, that in order to understand the functions of the nervous system as they appear in man, it is essential to study their phylogenetic history.

Dr. Smith Ely Jelliffe (closing) said: In commenting upon Dr. Kraus' remark, I might add that it is not necessary to learn Dutch in order to learn from the Dutch neuropsychiatrists. Everybody speaks English well and all the professors are excellent linguists and speak English except when working with certain patients, so that the problems which are presented are easily followed.

Dr. Foster Kennedy said: The thanks of the Society are certainly due to Dr. Jelliffe. I am sure that we are all stimulated and interested by what we have heard to-night.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY
ANNUAL MEETING, JANUARY 18, 1923, AT THE MEDICAL LIBRARY,
F. H. PACKARD, M.D., PRESIDENT

AN UNUSUAL CASE OF BRAIN TUMOR

Dr. G. A. Waterman presented a man of forty, who had been suffering from attacks of aphasia for fourteen years. The first year there were several epileptiform convulsions. During subsequent years there were attacks of aphasia, sometimes with nausea and sometimes with amnesia. He might go several days without these attacks; often they would occur many times during one day. There had been no headache or vomiting and no optic neuritis at any time in the course of the disease. The patient had suffered from attacks of ophthalmic migraine during his life in college, and had been subject to asthma while there; it had persisted every year since. When first seen by me he had been having Jacksonian attacks for seven or eight years. These consisted of numbness of the right foot, which extended up the body to the right cheek and ear, and then down the right arm into the fingers, and passed off, the whole lasting one-half to one minute. These attacks followed the migraine, which were associated with right-sided scotoma and right hemianopsia.

In 1921 and 1922 the patient had a series of misfortunes and unhappy events; his father died, his mother had pneumonia, his boy had an accident that proved almost fatal, and much extra business

responsibility was thrown upon him. Early in 1922, he began having more and more lassitude and the aphasia became almost constant so that through the summer he found it difficult to converse and very difficult to understand what was said. The attacks of dizziness increased to twenty or thirty a day. He was unable to read although he still could play the piano and read music at sight. He found it difficult to understand simple questions and directions, and could scarcely speak a sentence without using wrong words or stopping to think of a word which he could not remember. In trying to read he would get two or three words very slowly and then be unable to go further.

The physical examination in October showed practically a normal condition. Pupils equal and reacted normally to light; optic nerves absolutely normal in both eyes; retina normal; no nystagmus; no diminution in the field of vision; eye movements normal. Hearing normal. Tongue protruded straight without tremor. Grasp normal in both hands; wrist reflexes absent; no ataxia of either hand or arm. No asynergy, adiadokokinesis, or astereognosis. Heart normal; blood pressure 120. Knee-jerks normal and moderately active. No ankle clonus, Babinski, or Romberg. He could stand comfortably on one foot indefinitely. Through October and November the symptoms were better and worse at times. On December 18 he had an unconscious attack at the table which lasted a few minutes. He was put to bed and all through that day had increasing headache and almost constant vertigo, and seemed very sick. In the evening he vomited and fell into a deep sleep, and died shortly after midnight.

Postmortem examination showed an extremely soft tumor, pinkish in color, involving the whole temporal lobe from the tip to the posterior part below the angular gyrus. It occupied about one-third of the substance of the lobe.

The interesting feature of this case is that the attacks of aphasia dated back for fourteen years although the persistent aphasia had existed about six months. It was only by microscopic examination that the fact was revealed that the tumor had undoubtedly been of recent development and that the earlier aphasic attacks and convulsions had been due to a degenerative process of the temporal lobe. The tumor was made up of rapidly growing cells as shown by the presence of occasional mitotic figures; it was very vascular and contained many small hemorrhages. Scattered through the tumor were numerous calcified masses of corpora amylacea, but these bodies existed also in the uninvolved brain tissue and indicated a previous degenerative change in the temporal lobe which had subsequently been invaded by the tumor. It seems probable, therefore, that the earlier attacks of aphasia were due to a degenerative lesion of the temporal lobe, and that the later intensified symptoms were due to a glioma which developed in this region, perhaps due in some way indirectly to the intense mental strain to which the patient had been subject.

Discussion. Dr. G. L. Walton: The duration of efficiency in spite of the gradual growth of a tumor of this variety gives the case

a special interest. There can be no question that the tumor was the cause of the symptoms present when I saw him in 1909, though I have no recollection of the process of reasoning by which I reached the diagnosis. Indeed, until reminded of it by Dr. Waterman (and by Dr. Clap, to whom I sent him for ocular examination) I did not remember that I had done so. My notes, however, would indicate that epilepsy was made improbable by the prominence of gastric symptoms, hemianopsia, and aphasia at the time of the attacks, as well as by the persistence of aphasia after consciousness was recovered; that migraine was thrown out by the loss of consciousness and lapses of memory, as well as by the aphasia, which would have been only fleeting, and as a premonitory symptom, in the unusual event that it were a symptom of this disorder. As in this case, the question whether long standing migranous attacks were connected with the new growth or merely coincidental, came up in the case many of us remember of Dr. D., who died from a pituitary tumor at the age of twenty-eight, but had been subject to attacks of migraine, preceded by hemianopsia, for a number of years. In that case, however, the hemianopsia became permanent during the last year of his life, which seemed to show that the "sick headaches" were other than a coincidence.

Dr. W. J. Mixer: I feel that this case has a real lesson, namely, that when new growth is suspected operation is indicated even in the absence of choked disc or other evidence of general pressure. Focal epilepsy is frequently an indication of a local process involving the cortex and as such requires exploration. We are all of us too prone to wait the onset of general pressure symptoms before advising operation. The neurologist should remember that the difficulties and dangers of exploratory craniotomy are remarkably increased by increased intracranial pressure. I am perhaps a radical, but I am strongly of the opinion that cases of focal epilepsy should always be explored. Operation in Dr. Waterman's case would have been palliative only, but to my mind would have been indicated, especially as I thought from the history that the lesion was probably an arachnoid fibroma or a localized collection of fluid beneath the archnoid rather than a glioma. An osteoplastic craniotomy such as would be performed in a case of this kind should expose the motor cortex from the lower edge of the leg area down, and also most of the temporal lobe and part of the frontal.

VERONAL INTOXICATION

Dr. A. Warren Stearns presented this paper. During the past five years the following cases have come to my attention. What seems to be a unique feature of these cases is that a single large dose of veronal causes a state of intoxication, either pleasurable or a relief from unpleasant symptoms, lasting from twenty-four hours to several days. The evidence does not warrant an opinion as to whether or not this is a peculiar reaction of certain people to veronal.

Case N. A man in the sixties who had been a periodical drinker for many years and had used veronal extensively during the sobering-up period, was found one day in a state of profound intoxication. Movements of hands were clumsy, speech thick, eyelids heavy, reflexes essentially negative. He was mentally clear but thought processes, though accurate, were very slow. He was also somewhat jocose. This state lasted for two days. The patient was seen in several subsequent attacks, in at least one of which there was assurance that the intoxication was due to some substance taken before the attack, the effect of which lasted for at least twenty-four hours. It was later learned that this man had taken large doses of veronal; the exact amount was not determined.

Case G. A trained nurse in the thirties, who had necrosis in the jaw with a great deal of neuralgic pain and insomnia, was found one day in a state of intoxication which at that time was believed to be alcoholic. Subsequent investigation satisfactorily ruled out alcohol. I first saw her in the evening; she had returned home late in the afternoon in an intoxicated condition: very unsteady, speech thick, eyelids heavy. Reflexes were unaltered. It was supposed that she had taken some drug, so her clothes were taken away and she was closely observed. She slept a little but for the most part remained in this condition for two days. I saw her in several subsequent attacks without knowing the cause of the condition until finally her brother saw her take the whole contents of a tube of veronal tablets containing 100 grains. The intoxication from this lasted about 48 hours.

Case S. A man in the forties, a chronic alcoholic, was found in a condition very similar to the above but with no alcoholic odor on his breath. He admitted that for the past year he had been taking veronal in doses of from 60 to 75 grains which produced intoxication lasting from 24 to 48 hours.

Case M. A man in the late forties, who had had repeated operations for gastric ulcer and had complained of great pain, was found unconscious one day and was supposed to have attempted suicide. After 24 hours he woke comparatively clear. He has since been observed in several attacks like those described above, and has admitted taking from 20 to 40 grains of veronal for the purpose of producing this state.

Case A. A man in the forties complaining of gastric distress and insomnia had taken veronal in an attempt to get relief. While on the train with his brother, he took the contents of a tube of veronal tablets; the exact number is not known. When seen six hours later, he was clumsy, unsteady, lids drooping so as to obscure vision, kneejerks were absent. The next morning I saw him in the same condition except that the reflexes were all active. The following morning he still showed symptoms but they were less marked. He admitted taking large doses of veronal in order to get relief from his symptoms.

Discussion. Dr. F. J. Farnell: In several cases of veronal as well as luminal poisoning seen by me during the last few years, all have presented absent superficial reflexes.

Dr. F. H. Packard: While I have no definite memory of the details of the cases, I remember that many years ago Dr. Tuttle told me of the possibility of poisoning by veronal; he had seen a number of cases. In those cases, as I remember it, veronal was not taken for the purposes reported by Dr. Stearns; the poisoning was accidental. Veronal was a comparatively new drug at the time and was advertised as perfectly harmless, in contrast to some of the other drugs, so that the poisoning resulted from taking large doses when the small doses had not produced the desired results. Poisoning by bromide, which Dr. Walton has mentioned, used to be rather commonly seen at the McLean Hospital, many patients arriving in a state of delirium, much exhausted physically, with badly coated tongue and sordes on the teeth. There were frequently paraphasia and aphasia and a bromide eruption was usually to be noticed. These were very gratifying cases to care for, as with withdrawal of all drugs and proper catharsis and feeding they very speedily recovered. The usual history was that because of nervousness and sleeplessness the family physician had begun by giving small doses of bromide, which had been increased to large doses in an attempt to produce the desired effect, and had been continued regularly for some time. As a rule the history indicated that little food had been taken for some days. I have seen many such cases outside in consultation where a removal of the bromide and feeding soon resulted in the patient's recovery.

THE PSYCHIATRIC IMPORTANCE OF THE KUHLMANN TESTS

Dr. James S. Plant read this paper. A new age-level set of psychological tests which were standardized largely upon institutional cases is presented. The present study deals with results with unselected, varied material coming to the Judge Baker Foundation. These tests stress mental control. They have the following advantages over the Terman tests: (1) being new there is less likelihood of previous coaching; (2) the responses are far less open to interpretation; (3) they are largely performance tests; and (4) they involve language to a much smaller extent. They have the following disadvantages: (1) they require a little longer time and demand much more sustained attention, and (2) they are very hard to motivate.

Forty-five unselected cases have been used. Eight of these were mildly psychotic or "prepsychotic." Psychiatric diagnoses were made by other physicians without knowledge of the test results. All cases were also given a wide range of other tests.

Normal cases showed a correlation between Kuhlmann and Terman tests of .95 with a P. E. of $\pm .01$. With one exception the "psychotic" cases showed much lower Kuhlmann I.Q.s than Terman

I.Q.s. The least difference between Terman I.Q. and Kahlmann I.Q. for psychotic cases was as large as the largest difference for any normal case. In one psychotic case the Kuhlmann I.Q. was 26 points lower than the corresponding Terman.

"Mental control" is largely dependent upon the affective life. Psychological tests have almost entirely busied themselves with intellectual functions. It is a matter of great psychiatric importance that a set of *standardized* tests have touched, however roughly, the emotional field.

Discussion. Dr. F. L. Welles: It is not clear to me just how Dr. Plant regards mental control and emotion, but it seems that he looks upon them as very close together, in that great fluctuations of a test dependent on mental control indicate instability of emotional life. The balance of probability is on this side, but it is doubtful if the Kuhlmann tests differ in this respect from a considerable number of standardized performance tests, such as those worked out by Pintner and Patterson. In this respect the Kuhlmann tests do what is done by any test involving continuous effort, of which there are many. Lesser correlation in psychotic as compared with normal material probably exists between any two tests. The Stanford scale correlates with itself, so to speak, least in psychotic material. It has been found most regular with normals, less so with feebleminded, still less with psychotics in general, and least regular of all in organic or toxic conditions. In general, new scales nowadays add little in the way of more accurate methods of measuring intelligence though some, like the Myers Mental Measure, make advances in convenience and practical serviceability. New test series are advantageous to have, however, as alternates to old tests with which the patient has become familiar. The Kuhlmann tests are a welcome addition to psychometric resources, but special distinction claimed for them is perhaps open to question.

CURRENT LITERATURE

I. VEGETATIVE NEUROLOGY.

2. ENDOCRINOPATHIES

Hoskins, E. R., and Hoskins, M. M. THE INTERRELATION OF THE THYROID AND HYPHYSIS IN THE GROWTH AND DEVELOPMENT OF FROG LARVÆ. [Endocrinology, 1920, IV, 1.]

Jarisch, A. ON THE ACTION OF THE THYROID ON TADPOLES. [Arch. f. d. ges. Physiol., 1920, CLXXIX, 159.]

These papers deal with observations on the phenomenon first observed by Gudernatsch in 1912 on tadpoles, that thyroid feeding inhibits the growth of the tadpoles but hastens their metamorphosis. The first paper deals with the effect of feeding on dried anterior lobe of the pituitary gland on normal and on thyroidless tadpoles. Given to normal tadpoles it brings about a precocious metamorphosis. Thyroidless tadpoles, if not treated in any way, remain in the larval form more or less indefinitely. If anterior lobe of pituitary is given a beginning of metamorphosis occurs within twenty-four hours, which progresses somewhat more slowly than in normal pituitary-fed tadpoles.

The experiments confirm the view arrived at by experiments on the higher animals, that the thyroid and pituitary are closely related endocrine organs, and can to some extent, function vicariously.

An extensive bibliography is appended to the paper and the results obtained by various workers with amphibian larvæ are summarized as follows:

1. Removal of the thyroid hastens growth, causes hyperplasia of the hypophysis and prevents metamorphosis.

2. Removal of the hypophysis retards growth, retards development of the thyroid, prevents metamorphosis, and retards development of cutaneous pigment.

3. Feeding thyroid or hypophysis (or iodine) to normal larvæ hastens metamorphosis.

4. Feeding these same substances to thyroidectomized larvæ brings about metamorphosis.

5. Feeding hypophysis to hypophysectomized larvæ stimulates growth, but does not cause metamorphosis.

6. Feeding iodine to larvæ with both the thyroid and hypophysis removed, causes metamorphosis.

The paper by Jarisch deals with the mechanism by which this effect

of thyroid feeding is produced. The changes are due to the thyroid stimulus. A rapid regression in larval organs takes place, hence the impression of a more rapid metamorphosis. [Med. Sci.]

Udsondo. SOMNOLENCY FROM THYROID INSUFFICIENCY. [Rev. d. I. Asoc. Méd. Argentina, July-September, 1920, XXXIII, Nos. 189-191.]

This clinical paper reports two cases of prolonged sleepiness in a woman of 29 and in a man of 33 years of age. He assumes that it was due to an insufficiency of the thyroid because of other hypothyroid signs and the good therapeutic results. The literature, of which a generous review is made, shows the frequency to excitement with excessive functioning of the thyroid, in contrast to the hebetude and slowness of individuals with dysfunction of the thyroid.

Cameron, A. T., and Carmichael, J. BIOCHEMISTRY OF IODINE. III. THE COMPARATIVE EFFECTS OF THYROID AND IODIDE FEEDING ON GROWTH IN WHITE RATS AND IN RABBITS. [Journ. Biol. Chem., 1920, XLV, 69.]

The effect of feeding continued small doses of desiccated thyroid gland to young white rats was threefold. There was a definite decrease in the growth-rate, a hypertrophy of the heart, liver, kidneys, and adrenals, and a disappearance of fat. The latter two results confirm those of Hoskins and Herring. The decrease in rate of growth is proportional to the amount, and also to the iodine content, of the thyroid tissue fed. The hypertrophy, varying with the dose and length of duration of the feeding, is proportional to the iodine content. The feeding of sodium iodide does not reproduce these effects, nor does the extract of other glandular tissues. [Med. Sci.]

Hug. THYROIDECTOMY IN CATTLE. [C. R. Soc. Biologie, November 17, 1921.]

This author has observed for a long period the development of three calves on two of which a thyroidectomy was performed at the age of 2 months and on the remaining one at the age of 3 months. The total period of observation extended through nineteen months. A series of nonoperated control animals—number not stated—were reared under comparable conditions. The weight of the animals, the calcium content of the blood, and the percentage quantities of plasma and red cells in the blood, were measured. Apart from a slight retardation in the growth of the thyroidectomized animals, development appeared to proceed in a normal manner. No general symptoms were noted. The secondary sexual characteristics showed no delay in appearance. The hematological pictures agreed well with those of the controls.

Schmidt. MORBUS BASEDOW. [Mitt. Grenzgeb., Vol. XXXIII, No. 4.]

Schmidt concludes from his penetrating—especially his serologic—researches that Basedow's disease rests upon a pathologic alteration of the

thyroid secretion. This has a very marked ability for dispersion and perhaps through its ability to permeate gives occasion for injury of the follicles and for regenerative epithelial proliferation. The separation of Basedow from the so-called thyroidisms is a correct one. The microscopic findings are decisive. Demonstrable differences exist between the thyroidisms and goitrous conditions with accompanying nervous symptoms. It is necessary to refer to the original work for all details of the methods of research employed for the differential diagnosis.

Kendall, E. C. CHEMICAL INFLUENCES OF DUCTLESS GLAND CONSTITUENTS. [Surgery, Gynec. and Obstetrics, March, 1921, J. A. M. A.]

In the study of the ductless glands, Kendall says, clinician is guided by the end results of physiologic processes. He is compelled to study these processes indirectly. However, these physiologic processes are carried on by definite chemical substances, and when the chemist deals with these compounds he is working in an exact science. The slightest deviation from the necessary chemical structure destroys the value of the substance. It is a case in which "something just as good" will not do. In the coöperation between the chemist and the clinician what will be the greatest aid to the clinician is the isolation of each of the active constituents of all the ductless glands with the determination of their exact chemical influence on the animal organism.

Feldman, W. M. THE PLANTAR REFLEX IN EARLY LIFE AND THE CAUSES OF ITS VARIATIONS. [Am. J. Dis. Children, 1922, XXIII, pp. 1-40.]

In view of the wide divergences in the findings of the nature of the plantar reflex in early life, Feldman investigated 500 children from birth (including premature births) up to the age of eight years with the following objects: (1) To test the truth of the generally accepted statements (*a*) that dorsiflexion of the toe is the prevailing phenomenon during infancy; (*b*) regarding the dependence of the nature of the plantar reflex on the state of the development of the pyramidal tracts as found postmortem. (2) The conformation of postmortem findings with theoretical expectations. (3) To find the correlation (if any) between the response and various developmental and environmental states. (4) Localization of the reflexogenetic zone in infants.

He obtained the following results: (1) That contrary to what is generally believed the prevailing plantar response in early life is plantar flexion of the big toe. Thus the proportion between plantar flexion and dorsiflexion is approximately 4:1 during the first year; 3:1 during the second year and 4:1 during the third year. During the fourth year the proportion was 14:1. After the fourth year there was only one case (out of twelve) in which there was dorsiflexion on one side. In the remaining eleven cases the response was invariably plantar flexor in type on both sides. Feldman, however, agrees that dorsiflexion, when it does

occur, has not the same significance as a similar response in the adult. (2) At full term, the pyramidal tracts are sufficiently developed at birth to give a normal adult type of response, and the degree of myelination of these tracts (as found postmortem) is not sufficient to explain the nature of the plantar reflex in early life. The variation in the nature of the response, Dr. Feldman believes—and he produces evidence in support of his belief—to be due to the easily aroused circulatory disturbances in early life. When the consequent changes in the circulation in the region of the cord are sufficient to compress the incompletely myelinated pyramidal tracts to evoke a Babinski phenomenon either unilateral or bilateral. (3) In premature infants the response is nearly always dorsiflexor in type up to five or six weeks postnatal life because of the almost total absence of myelination of the pyramidal tracts. (4) Malnutrition, as judged by defective weight and length is contrary to what is generally believed, *not* in itself sufficient to give a Babinski sign, but inasmuch as prematurity and defective weight and length go hand in hand up to about five or six weeks, the Babinski phenomenon seen in badly developed infants up to that age is due to the prematurity rather than to the malnutrition. Thus the author finds that although dividing his cases into "three-monthly" periods there is at every period a greater percentage of Babinski phenomena in underdeveloped than in well developed infants—apparently leading to the conclusion that malnutrition is a factor which operates in favor of the production of a Babinski phenomenon, yet if one subtracts from the undeveloped cases those whose malnutrition is due to prematurity, there results an equal percentage of Babinski phenomena in the well and underdeveloped groups of cases. (5) There is a slightly greater proportion of Babinski phenomena in girls than in boys. (6) Breast feeding during the first few weeks of life probably tends to diminish the incidence of a bilateral Babinski phenomenon; this may be so owing to the greater percentage of lecithin and lactose in human milk which helps the more rapid myelination of the pyramidal tracts. After the first month or so breast feeding has no advantage in this respect over bottle feeding. (7) Toxic influences, either from the blood or from other causes, do not affect the conductivity of impulses along the fibers of the pyramidal tracts. (8) Bilateral dorsiflexion of the toes is more common in cases with a subnormal temperature because probably in such cases there is a greater congestion of the spinal cord as the result of (a) the pallor of the skin whereby a relatively much larger quantity of blood goes to the internal organs (including the spinal cord) than in adults—since the relative surface area of the skin is so much greater in infants. (9) Dolichocephaly favors the production of a Babinski phenomenon on account of weaker inhibitory control in such infants, as compared with brachycephalic infants. (10) Rickets does not favor the occurrence of a Babinski phenomenon. (11) The age at which the Babinski sign vanishes has no relation to the age at which the child begins to walk. (12) As the peripheral nerves are imperfectly

myelinated at birth, a possible explanation of a Babinski phenomenon in certain infants is more imperfect development of the lower motor neuron supplying the flexors of the toes, but better development of the neuron supplying the extensors. In such cases, of course, extension is the only possible movement. (13) The inconstant nature of the response in certain infants in whom at the same examination one may obtain on one stimulation a plantar flexion and on another stimulation of either the same or a different cutaneous area a dorsiflexion may be due to the easy fatigability, as well as easy recovery from fatigue of muscle in early life, so that after a certain response has been obtained the muscles producing that response can no longer contract as easily as the opposing groups of muscles and the response is, therefore, produced by the less fatigued group of muscles. (14) The reflexogenous zone is very diffuse in early infancy, and sometimes one is able to elicit a plantar reflex (either flexor or extensor) by stimulating a cutaneous area other than the sole, when stimulation of the sole fails to evoke a response. [Author's abstract.]

Hörmann. A CASE OF ARSENICAL POLYNEURITIS. [Zentralbl. f. d. ges. Neurol. u. Psychiat., 1922, Vol. XXVII, No. 242. Med. Sc.]

A female patient (age not stated) took 4 gm. of a powder containing 88.4 per cent arsenious acid in mistake for a sleeping medicine. After four hours, vomiting began and recurred each time the patient took a drink. There was no diarrhea. Paresthesiæ were complained of in the hands on the third day, and on the fifth day she began to have delusions, seeing various animals, human figures, and colored fabrics in her room. She was restless and sleepless. Her mouth "burned" and her tongue felt as though covered with splintered glass. The skin of the face and arms was dark colored and tense, the eyes injected, with edema of the lids. Headache first developed on the tenth day. Numbness and weakness of the legs began on the twelfth day and spread up to the hands. There was no pain, nor muscular cramp. She was examined at the end of four weeks and was found to have a well-developed polyneuritis with absent tendon jerks and reaction of degeneration in the thenar muscles. There was astereognosis in the hands, and some cutaneous anesthesia of the palms. The muscles were tender to pressure. The cerebrospinal fluid contained numerous lymphocytes and an increased globulin content. Mentally, the patient was irritable and showed suicidal tendencies. Arsenic was found in the urine and in the hair.

Klinger. PROPHYLAXIS OF ENDEMIC GOITER. [Schweiz. med. Woch., January 6, 1921, LI, No. 1.]

A report on the use of small doses of iodine in goitrous districts. The author introduced on a large scale treatment with tablets of sodium iodide. There were no signs of intolerance, among over 1000 children taking the tablets for long periods, some up to sixteen months. The results are

said to have been conclusive, demonstrating that school children can be kept free from or cured of goiter by this simple means, taking three, four or five mg. of iodine in the week for part of the year.

Schulte, J. E. PRESENT STATUS OF EXOPHTHALMIC GOITER. [Neder. Tijds. v. Geneeskunde, March, 1921, I, No. 10.]

This conservative and scholarly review of the literature of the last few years and the author's own studies show that the thyroid itself can no longer be regarded as exclusively responsible for this disease. It is a most important link in the chain, but other ductless glands are involved. The latter, however, usually return to normal functioning when the influence of the thyroid is removed. Operative reduction of the thyroid has gained ground in recent years. The improvement realized is prompt and more permanent than with internal measures, while the mortality does not seem any greater than with the latter. X-ray therapy he thinks renders operative measures more difficult if they have to be applied ultimately, and that fatalities have been reported, as also the transformation of an exophthalmic goiter into myxedema. He ascribes the success with operative measures in America to the fact that the American people are more accustomed to operations in early stages of disease. The diagnostic import of the blood count is still disputed. The danger of tetany from ligation of all the four arteries of the thyroid has rendered surgeons wary with this as it interferes with parathyroid functioning.

Liek. ETIOLOGY AND TREATMENT OF GRAVES' DISEASE. [Deut. Zeit. f. Chir., September, 1921.]

In this careful clinical study the author, after first maintaining that Graves' disease should not be regarded as a disease of the thyroid alone, but of the whole endocrine system, the central nervous system included, gives some general conclusions. The system first affected he thinks is probably the central nervous system, including the brain, and a "degenerative constitution" is a predisposing factor. This factor is hereditary, and the variability of the clinical picture and of the results obtained by different methods of treatment can best be understood by the inclusion of the brain among the glands of internal secretion. Spontaneous recovery may occur, and slight cases may be cured by a number of procedures. But advanced cases, particularly when they are of a rapidly progressive form, require operative treatment, the best form of which is extensive resection of the thyroid. This treatment in his opinion is preferable to X-ray treatment, and as shock is the greatest danger of operative treatment, this should be carried out under general anesthesia, preferably ether, supplemented by local anesthesia. Marked nervous symptoms, notably irrepressible hysteria, are contraindications to operative treatment. Thymectomy, either by itself or in conjunction with partial thyroidectomy, involves dangers which are not compensated for by the results achieved. Only when operative treatment has failed should the X-rays be employed.

Gundrum, F. F. SKIN RASHES IN EXOPHTHALMIC GOITER. [Cal. St. Journ. of Med., August, 1921, XIX, No. 8, J. A. M. A.]

Gundrum reports two cases which presented what is apparently an uncommon skin complication, and reviews briefly the available literature on skin rashes in exophthalmic goiter. One patient had a discrete rash scattered over arms, body, and legs, most profusely over the legs, as high as the knees. This consisted of deep pink, almost red macules, barely perceptibly raised, varying from the size of a pea to that of a quarter. They disappeared on pressure. There was no scaling, no weeping, and no edema. The second patient had very slightly elevated macules, deep pink in color, in size varying from a pea to a dime. They itched "quite a lot." The distribution was symmetrical, and about ten were present on each forearm, and twenty on each leg. In both cases the rash disappeared after operation and did not recur.

II. SENSORI-MOTOR NEUROLOGY.

2. CRANIAL NERVES.

Jeandelize. PARALYSIS OF ACCOMMODATION. [Revue Medicale de l'Est., February 1, 1922.]

Three common factors causing eye palsies are diphtheria, encephalitis lethargica, and syphilis, and in the presence of symptoms of ciliary paralysis one should think of one or other of these diseases. In the first two the paralysis is mostly bilateral, in the third unilateral. The prognosis in diphtheritic paralysis is usually good. Bilateral paralysis may occur in syphilis, but is uncommon, and there are usually other signs of syphilis which will help to clear up the diagnosis.

Roy, Dunbar. PARALYSIS OF THE EXTERNAL RECTUS IN THE RIGHT EYE FOLLOWING MASTOIDITIS IN THE LEFT EAR. [Ann. Otol. Rhin. Laryn., March, 1921.]

Quite a number of authentic cases have been reported in the last few years of paralysis of external recti of the eye following a mastoiditis on the same side. In the present case the paralysis was on the opposite to the mastoid involvement. This condition is known as Gradenigos syndrome. Ophthalmologists recognize the fact that paralysis of the external recti are the most frequent muscles involved when paralysis occurs in the extraocular muscles. Isolated cases of abducens paralysis bear a strong resemblance to isolated cases of facial nerve paralysis. Syphilis, rheumatic diathesis, catching cold are supposedly the etiologic factors in both cases.

Patient: white, male, age ten and one-half years. Seen February 17, 1915. One month previously the patient had earache and discharge. This apparently healed on February 4, when suddenly the mastoid began to

swell. When seen by the writer there was a typical mastoid abscess. Immediate operation and healing in two weeks. Day after operation it was noticed that there was partial paralysis of the external rectus on opposite side. This disappeared three months after the operation. A review of the literature shows twelve additional cases of this kind which had been reported by American and foreign observers. [Author's abstract.]

Freeman. PARALYSIS OF ASSOCIATED LATERAL MOVEMENTS OF EYES. [Am. Arch. Neur. and Psych., April, 1922, Vol. VII, No. 4. J. A. M. A.]

The feature of prime importance in Freeman's case was the paralysis of associated movement for it rendered the thought of operation untenable. The symptom was striking. Barring nystagmus, the eyes could be moved normally to the right, upward and downward, but movements to the left of the midline were impossible. Yet the patient could converge to the physiologic limit, that is to say, the internal rectus of the right eye was paralyzed for associated movement to the left, but not for the same movement in convergence. At rest both eyes were in the primary position.

3. SPINAL CORD.

Jørgensen, Carl. THE EXCRETION OF URANIN IN THE CEREBROSPINAL FLUID. [Communicated to the Neurological Society, Copenhagen, January, 1921.]

Uranin or sodium-fluorescein, which has the characteristic that it is still visible as a greenish fluorescence in very dilute solutions, has been extensively used in ophthalmology since P. Ehrlich introduced it in 1882, as its appearance in the aqueous humor is pathognomonic of intraocular inflammation. (See for example Arnold Burk in *Monatsblätter f. Augenheilkunde*, 1910, p. 445.) The ophthalmologist at Frederiksberg Hospital, Dr. K. K. K. Lundsgaard, who directed my attention to this phenomenon, has urged me to investigate its relation to the cerebrospinal fluid. First of all I considered whether uranin could be looked upon as absolutely harmless to the meninges, or if it exerted an irritating action. I therefore examined the cerebrospinal fluid of six different patients before and after the administration of 6 gm. uranin by the mouth, and in no case did I find a difference between the two samples. An irritating effect thus seems to be excluded. I then investigated twelve patients suffering from various diseases of the central nervous system. Six of these showed a scarcely visible trace of uranin in the spinal fluid, a trace which presumably may be taken to be physiological. The diagnoses in these patients were: encephalitis (two cases), disseminated sclerosis, imbecility, dementia presenilis, and prison psychosis with hallucinations (one case of each). The spinal fluid of the remaining six patients, on the other hand, showed a distinct green fluorescence. Four of these

were suffering from dementia paralytica and exhibited the usual changes in the spinal fluid, associated with this disease (pleocytosis, and excess of albumin). The fifth patient had dementia caused by arteriosclerosis; there was no pleocytosis of the spinal fluid and only a moderate amount of albumin present. At the autopsy extensive and extremely marked arteriosclerotic changes of the meninges were found. The sixth patient was suffering from diabetes mellitus and arteriosclerosis, with extensive calcification of the palpable arteries; in mental aspect he was suffering from hallucinations. In the spinal fluid there was neither pleocytosis nor excess of albumin, so that the presence of uranin was the sole pathological symptom in this case. (He is still alive.) The last two cases are of peculiar interest because they demonstrate that it is not only inflammatory changes—as suggested by the ophthalmologists—but also other lesions, which can make the tissues permeable to uranin. The technique followed consists in grinding up the 6 gm. of uranin in a cup of coffee which is then drunk. Lumbar puncture is made four hours later. (A yellow coloration of the skin which appears in about twenty minutes and which may become very intense, disappears as a rule in eight to ten hours without leaving a trace. If it remains longer it points to kidney disease [Strauss]). The spinal fluid can be examined immediately by holding it up against a dark background, and comparing it with a standard solution of uranin, 1:2,000,000, which can be taken as the boundary between physiological and pathological fluorescence. Day-light is preferable. The author claims that this *test as to whether the meninges are uranin-tight* will be a help to diagnosis. He emphasizes its absolute harmlessness, and the ease and speed with which it can be carried out, and recommends further experiments on the subject. [Author's abstract.]

Kummer, Robert H., and Minkhoff, G. THE CALCIUM CONTENT OF THE CEREBROSPINAL FLUID. [Compt. Rend. Soc. de Biol., November 12, 1921, LXXXV, 864.]

In an examination of the cerebrospinal fluid of four normal subjects by Kramer and Tisdall's method the writers found that the amount of calcium present was 0.05 per 100 (in one 0.052). They point out the great difference in this respect between the cerebrospinal fluid and the blood; in the latter the quantity of calcium normally varies between 0.08 and 0.12 per 100. [Leonard J. Kidd, London, England.]

Kasahara and Hattori. REDUCING SUBSTANCE IN CEREBROSPINAL FLUID. [Am. Journ. of Dis. of Children, August, 1921, XXII, No. 2, J. A. M. A.]

The procedure of the methylene blue method devised by Kasahara and Hattori for the quantitative determination of the glucose in the spinal fluid is as follows: Two-tenths c.c. of cerebrospinal fluid is drawn up with a graduated pipet into the test tube. One c.c. of 0.004 per cent

methylene blue solution (Methylenblau f. Bac. Gruebler) is added to the fluid, and then three drops of 10 per cent potassium hydroxid solution are poured into it. This mixture is heated and boiled for a few seconds. If it contains 0.05 per cent glucose, the depth of the color varies, strictly depending on the quantity of this substance present. The quantitative determination of the glucose in the spinal fluid by means of the methylene blue solution is best performed in the following way: To 1 c.c. of 0.004 per cent methylene blue solution are added three drops of 10 per cent potassium hydroxid solution. Adding the spinal fluid to be tested from a buret, the minimal volume of it, with which this mixture becomes perfectly colorless by boiling is determined. When the minimal volume (c.c.) is determined, the amount of the glucose present is calculated.

Keidel, A., and Moore, J. E. COLLOIDAL MASTIC AND COLLOIDAL GOLD TESTS. [*Arch. of Neur. and Psych.*, August, 1921, VI, No. 2.]

In this laboratory method comparison the results obtained show a close parallelism between the colloidal mastic and the colloidal gold tests. If the results are not alike the mastic test seems to detect abnormalities more frequently than does the gold. Moore and Keidel therefore conclude that the mastic test should be part of the route of examination of the spinal fluid.

Weigeldt, W. CEREBROSPINAL FLUID AT DIFFERENT LEVELS. [*Münc. med. Woch.*, July, 1921, LXVIII, No. 27.]

This study points to the experience that the cerebrospinal fluid shows differences in its composition at different levels of the subarachnoidal space. The cell content for first and last amounts of fluid should be estimated separately. In 382 pathological and 124 healthy individuals, with above 1,500 lumbar punctures as a foundation of his conclusions, he maintains that at times very important diagnostic facts may be elicited.

Weed, Lewis H., and Hughson, Walter. SYSTEMIC EFFECTS OF THE INTRAVENOUS INJECTION OF SOLUTIONS OF VARIOUS CONCENTRATIONS WITH ESPECIAL REFERENCE TO THE CEREBROSPINAL FLUID. THE CEREBROSPINAL FLUID IN RELATION TO THE BONY ENCASEMENT OF THE CENTRAL NERVOUS SYSTEM AS A RIGID CONTAINER. INTRACRANIAL VENOUS PRESSURE AND CEREBROSPINAL FLUID PRESSURE AS AFFECTED BY THE INTRAVENOUS INJECTION OF SOLUTIONS OF VARIOUS CONCENTRATIONS. [*Am. Journ. of Physiol.*, 1921, Vol. LVIII, pp. 53, 85, 101.]

The papers represent an extension of the observations of Weed and McKibben who showed that the intravenous injection of strongly hypertonic solutions markedly lowered the pressure of the cerebrospinal fluid while hypotonic solutions elevated it. With isotonic solutions, a short enduring rise followed quickly by a return to normal, was found. The present series of papers present abundant confirmation of these findings.

In the first paper, the systemic effects of the intravenous injection of solutions of various concentrations are recorded, but there is little of strict neurological interest. The essential truth of the Monro-Kellie doctrine of a fixed capacity of the cranial contents is established by the data presented in the second paper. That negative pressures had been produced in the cranium by the intravenous injection of strongly hypertonic solutions of NaCl argued strongly for the essential truth of this hypothesis. Further evidence was adduced by opening the cranium and preserving an intact dura. Thus pressure from without was exerted on a loose membrane while pressure from within was exerted against the nonelastic dura. Under these conditions repeated injections of hypertonic NaCl failed to reduce the cerebrospinal fluid pressure below zero; furthermore the persisting positive pressure represented the height of the brain above the recording needle. However, when the cranial defect was closed temporarily and the pressure reduced below zero, removal of the sealing device promptly brought about a rise in pressure to the positive level, represented by this height of the brain above the needle.

With these data available, attention was directed to the relation existing between the cerebrospinal fluid pressure and the intracranial venous pressure. Previous observers had determined this latter pressure by applying a recording device to a trephine opening through the occipital bone into the torcular herophili. The widely divergent results reported show this method to be technically unreliable. The method used in this series of experiments consisted of the insertion of a recording needle into the superior sagittal sinus of dogs. Under proper experimental conditions the cerebrospinal fluid pressure was normally found to be higher, usually from 10 to 50 mm. Ringer's solution, than the intracranial pressure. Alterations in the normal relations could readily be brought about by the intravenous injection of hypertonic and hypotonic solutions. Under the influence of these changes in the concentration of the blood, it was shown that alterations in the cerebrospinal fluid pressure may be effected without change in the pressure of the cerebral arterial and venous circulation, though the fluid pressure is dependent upon both. Due to the closed box character of the skull the cerebrospinal fluid pressure is changed, in the same direction but never to the same extent, when the intracranial venous and arterial pressures are raised. By intravenous injection of hypertonic solutions, the cerebrospinal fluid pressure has been reduced to minus 135 mm. of Ringer's solution, while the intracranial venous pressure remained positive. Sudden changes in cerebrospinal fluid pressure have but little if any effect on intracranial venous pressure, though prolonged changes, particularly those affected by intravenous injection of strongly hypertonic solutions do exert some influence. Following the readjustment of the pressure subsequent to the operative procedures intracranial and brachial venous pressures tend to correspond. [Author's abstract: Hughson.]

Ferraro. THE COLLOID BENZOIN REACTION IN THE CEREBROSPINAL FLUID. [Il Policlinico, Sez. Prat., January 16, 1922.]

The colloid benzoïn reaction is here tested out in 16 healthy individuals and in 50 patients suffering from various nervous disorders with the following results: 1. The reaction was negative in the normal cerebrospinal fluid. 2. In all cases of general paralysis the reaction was markedly positive. 3. In some definitely syphilitic diseases of the nervous system the reaction was negative. 4. In five cases in which the syphilitic origin of the affection could be excluded on clinical and serological grounds the reaction was positive.

Kahler. SUGAR CONTENT OF SPINAL FLUID IN DISEASE. [Wien. klin. Woch., January 5, 1922, XXXV, No. 1, J. A. M. A.]

Kahler discusses the possible causes of the increase of sugar in the cerebrospinal fluid in most inflammations or overstimulated conditions of the brain. It may be due either to an abnormal permeability of the choroid plexus for sugar or an abnormally copious secretion of glucose by the plexus cells. Both conceptions are possible in view of Blumenthal's finding that the cerebrospinal fluid is formed by transudation and by secretion. The fact that Yoshimura demonstrated the presence of glycogen in the plexus cells, which he regarded as the forerunner of the sugar in the spinal fluid, lends weight to the secretion hypothesis. On the other hand, we cannot be sure but that abnormal metabolic processes in the brain substance itself may lead to an increase in the sugar content of the spinal fluid.

Riddell and Stewart. COMPARATIVE STUDY OF THREE COLLOIDAL REACTIONS IN CEREBROSPINAL FLUID. [Journ. of Neur. and Psychopath., February, 1922, II, No. 8.]

This is a comparative study of spinal fluids in thirty cases of paresis using the colloidal gold and the colloidal benzoïn tests respectively. They find that the gum mastic reaction was more inconstant. Both the gold sol and mastic tests gave paretic curves in fluids of nonparetic patients, whereas the benzoïn test gave paretic curves only in paretic fluids. So-called typical syphilitic curves were obtained by all three tests in cases that were diagnosed examples of clinical neurosyphilis.

Duhot and Crampon. COLLOIDAL BENZOIN REACTION IN THE CEREBROSPINAL FLUID. [Bull. et Mém. Soc. Méd. Hôp. de Paris, March 10, 1921.]

These authors have examined colloidal benzoïn reactions in the C. S. F., as introduced by Guillain, Laroche, and Léchelle, in 100 cases; 52 of these were healthy individuals or suffering from nonsyphilitic affections, and all gave a negative reaction; 37 cases with clinically undoubted syphilitic affections together with a strongly positive Wassermann reaction in the cerebrospinal fluid all gave a positive benzoïn re-

action. On the other hand, 8 cases in which the clinical symptoms indicated syphilis gave a negative benzoin reaction, and in 3 doubtful cases the Wassermann reaction in the cerebrospinal fluid was positive and the benzoin reaction negative. 1. The colloidal benzoin test is negative in nonsyphilitic affections, and practically constant in general paralysis and nervous syphilis in general. 2. Though less sensitive than the Wassermann reaction, except in the case of general paralysis, the benzoin reaction is simple, rapid, and practical. These are the general conclusions.

Bumke. UNPLEASANT SYMPTOMS FROM LUMBAR PUNCTURE. [Zentralbl. f. Chir., April 2, 1921, B. M. J.]

This author after alluding to Küttner's remarks on the increase of accidents after lumbar anesthesia, states that unpleasant symptoms following simple lumbar puncture have become much more frequent during the last few years than was formerly the case. Whereas formerly lumbar puncture could be performed without harm during a consultation and the patient sent home after half an hour's rest in the recumbent position, in 1915 and 1916 it was found necessary to perform lumbar puncture only in clinics. At first the recumbent position for 24 hours was sufficient to prevent any severe symptoms, but in 1918, 1919 and 1920, many patients had to be kept in bed two or three days until the headache, nausea and vomiting had subsided, and in not a few cases the symptoms did not appear till later. Before the war lumbar puncture was usually worst tolerated by those patients whose spinal fluid was normal. Now, however, multiple sclerosis, tabes, latent syphilis, and indeed any organic diseases, seemed to predispose to the occurrence of these symptoms. The cause of this change was obscure, but was probably to be found in some general factor such as defective nutrition.

Boveri, P. PERMANGANATE TEST FOR ALBUMIN IN SPINAL FLUID. [Policlinico, October, 1921, XXVIII, Med. Sect., No. 10, J. A. M. A.]

Boveri detects any increase in the albumin content of this fluid by the oxidation of potassium permanganate when there are protein substances present. When this occurs, the tint veers to canary yellow. Among those who have extolled the simplicity and dependability of this test are Rebizzi who found it useful in differentiating true from false tumors in the brain, and Bardisian who was able to exclude meningitis by the negative findings in four cases, corroborated by the course. To 1 c.c. of the cerebrospinal fluid is slowly added, pouring it along the wall of the test tube, 1 c.c. of a 1 : 10,000 solution of potassium permanganate. The tube is then held vertical, and there is no change in tint if the fluid is normal. If not, the zone of contact turns yellow. By jarring the tube a little the entire fluid turns yellow. The reaction is pronounced when the tint changes in less than two minutes; moderate, in three or four, and weak if the tint does not veer to yellow until after

five to seven minutes. In several hundred applications of this test he has found it a constant index of abnormal protein content, sometimes preceding lymphocytosis although in children the latter usually appears first.

Sordelli and Renella. COLLOIDAL REACTIONS IN CEREBROSPINAL FLUID.
[Revista de la Asoc. Méd. Argentina, August, 1921, XXXV, No. 202.]

Seven parallel colloidal tests were tried out by these investigators in 140 different cerebrospinal fluids. Their experience confirms their diagnostic value, especially of the Lange technic, although they are unable to confirm any specificity in the tests.

Howe, Hubert S. EXTENSIVE SPINAL ARACHNOID FIBROBLASTOMA.
[Neurological Bulletin, 1921, III, 216-229.]

The case was presented because it illustrated a rather unusual type of spinal cord tumor. The patient, a young man aged twenty-eight, was injured while playing football. When he first entered the hospital, one year after the injury, he was unable to walk. Bilateral ankle clonus and bilateral Babinski were present. The cremasteric and abdominal reflexes were difficult to elicit. There was increased muscle tone in the legs but no atrophy. Sensory disturbances were noted particularly in pain and temperature sensibility. It was inferred that owing to the injury there was a subdural hemorrhage in the upper dorsal region of the cord, perhaps some lacerations of the meninges, possibly a fracture of one of the vertebræ although a radiograph of the spinal cord showed no abnormality. It seemed likely that at the time of injury there was not sufficient pressure on the spinal cord to cause cord symptoms, but that a lesion gradually developed which compressed the cord and increased the symptoms. On operation a tumor mass was found surrounding the cord from the seventh cervical to the third dorsal vertebræ. It was diagnosed as an endothelioma of the perithelial type. As much as possible was removed and the dura was then sutured over the cord. The patient left the hospital walking well without assistance. The sensory disturbances had disappeared. Slight ankle clonus and slight bilateral Babinski still existed. After remaining in good condition for five years during which he resumed his former athletic activities, he began to experience lumbar pain, gradually followed by weakness of the legs and sensory disturbance. A second operation was performed. A diffuse tumor was found and diagnosed as an endothelioma. Complete removal was impossible. A portion was removed and the dura left open to afford room for growth without pressure on the cord. The patient improved for a year after this operation, was able to walk fairly well and was free from pain. He still had considerable weakness and some dullness of sensation. The condition remained stationary for a while after which symptoms recommenced and grew continuously worse until three years after the second operation, he was again admitted to the hospital. At this

time the presence of choked disc was noted. A third laminectomy was performed disclosing a long, closely adherent growth reaching from about the sixth cervical to the twelfth dorsal segment. As it was impossible to take out the entire mass, only the largest accumulations were removed. The patient left the operating room in a state of collapse and died the following day. Howe brings out these unusual features in the case: 1. Almost complete recovery from compression myelitis on two occasions when the portion of the tumor causing pressure was removed, the symptoms of compression occurring for the second time about eight years after the first operation. 2. The unusual dimensions of the tumor, the relief of pressure allowing it to grow along the entire dorsal, lumbar and sacral portions of the cord. 3. The presence of choked disc. This is difficult to understand and must have had some explanation other than the mechanical theory usually accepted as explaining choked disc in cerebral neoplasms. A tumor of this nature would obstruct the free circulation of spinal fluid in the spinal subarachnoid space, but no more so than tumors which compress the cord more completely than did this one. There is no indication of increased intracranial pressure on lumbar puncture. Howe reviewed eighty-six cases of cord tumor and found choked disc reported in but one instance. This was described by Fischer in a three-year-old girl in whom autopsy revealed an enormous gliosarcoma involving different levels of the cord, the dura and vertebrae, but not involving the brain or skull. In Howe's case the brain and cranial cavity were searched for evidence of tumor or anything which might have caused increased intracranial pressure or internal hydrocephalus, but nothing was found that could possibly have explained the presence of choked disc. [Author's abstract.]

4. MEDULLA: MIDBRAIN: CEREBELLUM: STRIATUM.

Tilney, F. THE FUNCTIONAL SIGNIFICANCE AND PRINCIPAL SYNDROME OF THE CEREBELLUM. [Neurol. Bull., 1919, Vol. II, No. 289.]

Sherrington, C. S. (1). THE INTEGRATIVE ACTION OF THE NERVOUS SYSTEM. [Constable; London, 1906.]

Sherrington, C. S. (2). ON PLASTIC TONUS AND PROPRIOCEPTIVE REFLEXES. [Quart. J. Exper. Physiol., 1909, Vol. II, No. 109.]

Sherrington, C. S. (3). REFLEX INHIBITION AS A FACTOR IN THE COÖRDINATION OF MOVEMENTS AND POSTURES. [Quart. J. Exper. Physiol., 1913, Vol. VI, No. 251.]

Sherrington, C. S. (4). POSTURAL ACTIVITY OF MUSCLE AND NERVE. [Brain, 1915, Vol. XXXVIII, No. 191.]

Tilney's paper is divided into three parts: (1) A general view of the significance of the cerebellum, (2) its functions, and (3) the principal

cerebellar syndrome. In part one, the author briefly reviews the evolution and phylogenetic history of the organ as follows: It is a suprasegmental structure, developed upon, and not a part of, the segmental nervous system. Like the other suprasegmental parts of the nervous system, the cerebral hemispheres, and the tectum of the midbrain, its gray matter is superficial and its white matter central. It is an organ of great antiquity, being found in certain invertebrate forms. Its development throughout the animal kingdom is in direct relation to the range of motor capacity of the particular animal type in question. Therefore it is greatest in man, who, in addition to the primitive locomotor functions of the lower limbs, has developed a highly complex motor activity in the upper limbs. Throughout the animal kingdom its internal structure is strikingly uniform. Its morphology, as elucidated by Elliott Smith and by Bolk is briefly stated, and its fiber connections tabulated.

This chapter concludes with some highly speculative conclusions by the author. In part two, the history of physiological research on the cerebellum is somewhat sketchily reviewed, and the clinical evidence as to topographical representation of the different regions of the body musculature in the cerebellum is given somewhat more fully. Synthesizing all these observations, Tilney concludes that the cerebellum is essential to motor coördination, quoting Babinski to the following effect: "Every form of active muscular exertion necessitates the simultaneous coöperation of immense assemblies of synergic movements throughout the body to secure steadiness and maintain general equilibrium . . . the cerebellum is the center of these unconscious adjustments. . . ." Mills and Weisenberg, dissatisfied with Luciani's analysis (*Medical Science*, 1921, Vol. V, No. 136), have interpreted the cerebellar syndrome to indicate that synergia is the fundamental function of the cerebellum and asynergia its essential defect symptom. The other symptoms described are particular manifestations of this, while atonia is a secondary effect. Synergia is taken to mean the faculty of combination of the various components of a complex act. The various manifestations of asynergia are then described in detail.

From this point Tilney develops his own theory of cerebellar functions. As a result of cinematographic recording and subsequent analysis of the disorders of movement in cerebellar cases, Lambert and Tilney conclude that synergia is dependent upon two factors: first, the establishment and maintenance of "synergic units" throughout the body; and second, the establishment and maintenance of coördination between the synergic units in the performance of complex acts.

Throughout the body the muscles are supposed to be arranged in unit groups, each consisting of agonist and antagonist. But these do not act antagonistically, as is taught. They are antagonistic in the anatomical sense alone. Physiologically they are synergists, both contracting simultaneously, though not equally. The more powerfully acting muscle, the agonist, is called the "dominant element," and the other member of the

pair, which contracts less powerfully, the "check element." Normally, the activities of each is coördinated, but in asynergia, the proper coöperation of the two is lost. The check element is too feeble, the range of movement is excessive, and correction follows. This in turn is excessive, and so movement takes on a jerky oscillating character. In complex movements this process is repeated throughout the body musculature. "Simple synergia" is the normal coördination within the synergic unit. "Integrative synergia" is the perfect coördination of different synergic units. In every motor act there is a "kinetic" and an "akinetik" phase, by which the authors may be taken to mean movement and the maintenance of any position reached, and these two phases must also be perfectly coördinated in perfect integrative synergia. Therefore, when coördination within the simple synergic unit is lost, integrative synergia is in turn disordered and the characteristic asynergia of cerebellar lesions results. Tilney believes that there is a definite topographical representation of the different synergic units in the musculature in the cerebellar cortex. Part three consists in the detailed account of a case of cerebellar disease in the light of these conclusions.

The reader acquainted with recent physiological work on the nervous processes concerned in the coördination of movement will find Tilney's hypothesis of some interest. At the same time he cannot but remark how much farther the author might have gone but for the self-denying ordinance by which he has apparently declined to avail himself of the wealth of exact knowledge on the nervous mechanism of coördination provided by the researches of Sherrington. These have already carried us far beyond the simple conception formulated by Tilney. It must be remembered that in attempting to analyze disorders of movement into their ultimate components the clinical observer labors under great difficulties. He cannot see the various muscular contractions, postures, and relaxations which go to make up a movement. All that he can hope to see is the resulting movement, the algebraical sum of many synergic and antagonistic reactions, all of which are completely hidden from him. He is, therefore, commonly reduced to evolving his theories of coördination and his explanations of the different forms of incoördination largely from his inner consciousness, with what results the numerous and conflicting analyses of cerebellar ataxy and of the extrapyramidal symptom complex only too clearly show. However, the many experimental observations of Sherrington on the nervous processes underlying coördinated movement have placed in our hands a weapon of incalculable value in the interpretation of the disorders of movement observed in man under the conditions of disease. From this source we have learned that there are two components in movement, phasic and tonic or postural. Each has its central nervous mechanisms laid down in the segmental nervous system, and all these are at the service of the cerebral motor cortex for the production of the voluntary movements of the organism. In the control and elaboration of postural reactions there is reason to suppose that the highest

cerebral motor centers act upon the segmental nervous centers employed in tonic or postural reactions through the medium of the cerebellum. Muscle-tone is the basis of all postural reactions, and when this is lost all postural reactions are abolished. Now posture is as essential an element of coördinated movement as the actual movement of the limbs through space. Therefore, when tone is abolished, gross disorders of coördination must result. If we study the results of atonia as they are to be seen in the reflex reactions of the experimental animal, we find that *they include each and all of the defects of coördination which make up the cerebellar symptom-complex*. It is clear, then, that any attempt to determine the nature of cerebellar ataxy and that of normal coördination of movement demands as an essential preliminary a thorough acquaintance with the physiology of muscle-tone, its maintenance, regulation, and purpose. At the head of this review we have placed a list of references to the papers in which Sherrington has recorded his classic observations on these subjects. We cannot conceive how the neurologist can hope to formulate theories of coördination and incoördination without this fundamental information. [F. M. R. Walshe in *Med. Sc.*]

O'Connor, E. NERVOUS COMPLICATIONS OF GONORRHEA. [*Quart. Jl. Med.*, October, 1921.]

The reviewer bases his thesis on the fact that while certain infections are mainly local and others mainly generalized, occasionally the former take on the characteristics of the latter. Thus gonorrhoea may become a systemic disease; and the gonococcus has been found, according to the literature, not only in the blood but in almost every organ of the body. In view of its morphological kinship to the diplococcus catarrhalis and meningitidis, however, it would be too much to assert that the evidence on this point is conclusive. Emphasis is therefore laid upon the fact that all complications of all diseases are liable to have a complex etiology. In some cases the toxins and not the germs themselves may be responsible for the phenomena; and in others the intervention of a mixed infection. However, some at least of the nervous complications of gonorrhoea are metastases.

Of the psychic manifestations, in addition to the neurasthenia, hypochondriasis and mental depression, which are too common for discussion, cases are quoted for delirium and coma (d'Amaval), melancholia, acute mania (Casella, Wooten, Luys), toxic insanity (Venturi) possibly hysteria (Batut, Chavier and Février, Glyn). Often there has been found an antecedent instability in the patient and the gonorrhoeal poison has added the factor required for the final overthrow of the mental equilibrium.

Coming to the central nervous system, Moltchanoff's experimental inoculation of guinea pigs and rabbits with gonotoxin resulted in hyperemia of the cerebral membranes and some degeneration of the cerebral cortex and ganglia. This prepares us for a possible involvement

of the human central nervous system. Hemiplegia and aphasia (Glyn, Pitre), meningitis (Raymond), temporary diplopia (Fournier), Jacksonian epilepsy, optic neuritis (Panas, Gowers, Fromaget, Basile) facial neuritis, deafness, paralysis of the vocal cords (Kienboch, Batut) are the chief clinical features. At the autopsy in Pitre's case there was softening of the Sylvian area, part of the first frontal, ascending parietal, and first temporal convolutions, and the insula. Reference is made to a recent case of right gonorrhoeal hemiplegia at the Dean Street Hospital, London.

Gonorrhoeal cerebrospinal meningitis is rare but established on fairly conclusive evidence. The most striking case is that of Henderson and Richie, whose claim to have identified the gonococcus as the causal organism by bacteriological proof and animal experiment still holds the field. Rawls too asserts that the gonococcus has been found in the fourth ventricle of the brain. Wooten's patient had headache, vomiting, vertigo, rigors, perineal pain, trismus, retraction, deafness and coma, with fatal result. Kienboch throws doubt on Fürbringer's case, in which the meningococcus was found in the cerebrospinal fluid. That of de Jongh has given rise to difference of opinion; and Tixier's and Jullien's and Sibut's are rejected by Delamare; who, however, accepts Stiénon's (vomiting, headache, rachialgia, urinary incontinence, delirium) Reimer's Boinet's, Guntz', and Dunlos'.

The sum of evidence is almost overwhelming. In addition to those mentioned there are Pick, Blind and Ricord, and Rombach. The last describes the case of a youth of nineteen with acute cerebrospinal meningitis following gonorrhoea. More impressive still is the authority for a gonorrhoeal meningomyelitis.

Stanley, Raymond, Hayem and Parmentier, von Leyden, Moltschanoff (who demonstrated changes in the cells of the anterior roots of the cord due to the gonococcus, with degeneration of the posterior roots and pyramidal tracts), Home, Gull, Prochashka, Piss-avy and Stiénon (who conclude that while there may be cases in which the spinal phenomena are reflex from joint lesions, there are others free from arthritis which must be referred to meningomyelitis), Chavrier and Février, Gordon, Spillman and Haushalter, Raymond, Speranski, Wooten, Eulenburg, Delamare, Charcot, Kienboch, Gower, Luys all bear convincing testimony.

Peripheral neuritis, from the nature of the subject, is less definite. The chief witnesses are Kucharzewski, Kienboch (cases of Dercum, Levy, Poubak, Naunyn., Bloch, Treves), Raymond and Cestan, Ménébrier. The last named reports on a patient who, after several attacks of gonorrhoea, had complete paralysis of the legs, atrophy and tenderness of muscles, and incoördination, dying of intercurrent pneumonia. The p.m. showed changes in the anterior cornual cells and a high vascularity of the spinal pia-mater. The reviewer points out that peripheral neuritis cannot be restricted to the limits of clinical classification. Other neurites,

perineurites and neuralgias, *e. g.* sciatica, are established beyond serious question. Of some special interest are Kienboch's report of a musculocutaneous and Bernhardt's of an ulnar neuritis.

Whether the interesting keratoderma blenorrhagica is of nervous origin, as a trophoneurosis, is less certain. Landouzy's gonorrhoides, alluded to by Marshall, have been described as angioneurotic; and Balzer reports a trophoneurotic onychia complicating gonorrheal arthritis.

Out of 6304 records of venereal cases investigated at a London clinic, only 22 were found of nervous complications. Allowance must be made for some incompleteness in the reports of a very busy hospital; but even then the inference remains that nervous gonorrheal complications are very rare.

The general conclusions are as follows: Gonorrhea has in all cases a tendency to produce slight psychic manifestations which may occasionally develop into neurasthenia, hypochondriasis, hysteria, or melancholy; and very rarely, toxic delirium and acute mania. It has sometimes indirectly occasioned or hatched mental disturbance. Lesions of the central nervous system have occurred from the specific germ or its toxin or as a secondary effect of gonorrheal infection.

Gonorrheal cerebrospinal meningitis has been clinically established and the diagnosis confirmed by some *postmortem* and microscopical evidence; while meningomyelitis is as definitely proved as other rare clinical entities. The picture of a gonorrheal multiple neuritis is rather involved than definite and yet may be safely admitted. Minor cases of slight nervous involvement are fairly common. [Author's abstract.]

III. SYMBOLIC NEUROLOGY

2. PSYCHOSES.

Smith, J. C. HEREDITY OF DEMENTIA PRECOX. [Hospitalstidende, March, 1921, Vol. LXIV, No. 9.]

Mendelian laws are here discussed in relation to a family in which the father committed suicide in melancholia and the mother died twenty-eight years after internment for dementia precox. The two sons had dementia precox, and one daughter drowned herself at the age of thirteen. The second daughter had been under treatment on two occasions for manic-depressive psychosis, but later recovered, and has been self-supporting for fifteen years, apparently normal.

Gordon, Hugh. LEFT-HANDEDNESS AND MIRROR-WRITING AMONG DEFECTIVE CHILDREN. [Brain, Vol. XLIII, Part 4.]

The author has made a series of observations and experiments on left-handedness and mirror-writing in schools for mentally defective children in London and Middlesex. The percentage of left-handed children is

much higher in schools for the mentally defective than in ordinary elementary schools and left-handedness is more frequently associated with defects of speech than is right-handedness. In the case of twins, when one is left-handed and the other right-handed, the left-handed twin is often backward, less developed, highly nervous or may even be an inmate of a school for the mentally defective, whereas the right-handed twin is normal. Further, among twins consisting of a boy and a girl, commonly (in one-third of cases) one is left-handed and the other right-handed. Among normal children the left-handed are frequently the most efficient and capable, whereas among the mentally defective it is exactly the reverse. Spontaneous change from left-handedness to right-handedness in writing among the mentally defective is often found to be associated with progress in school work and in intelligence. As regards mirror-writing, the percentage of mirror-writers is much higher in schools for the mentally and physically defective than in ordinary elementary schools. The majority of mirror-writers are children who are reported to have written with the right as well as with the left hand; but this is not invariably the case, as many mirror-writers, although left-handed in a number of things, are said never to have written with the left hand. Other mirror-writers who have suffered from right hemiplegia from an early age have obviously never written with the right hand. Many left-handed children write mirror fashion with the left hand when they first begin to write and persist in doing so for some time. A few right-handed children also write mirror fashion with the right hand when they first begin to write. In no case does a left-handed writer write mirror fashion on changing from left to right. In the explanation of mirror-writing the old suggestion is repeated that in some cases it is due to the influence of a motor memory-image, in others to an optical memory-image of the letters, while in explanation of the frequency of left-handedness among mentally defective children it is suggested that something has occurred to interfere with the proper functioning of the dominant left hemisphere.

Bond, E. D. RESULTS IN 250 CASES FIVE YEARS AFTER ADMISSION TO A HOSPITAL FOR MENTAL DISEASES. [*Am. Archives of Neurology and Psychiatry*, October, 1921, Vol. VI, No. 4. J. A. M. A.]

Of the 251 patients studied by Bond 68 have gone back to the community fully recovered, 61 have gone back to the community on a self-supporting basis, 8 have shown marked improvement, in 51 the illness has progressed to death, and in 63 there has been essentially no improvement. The dementia precox patients stay; the only deaths occurred in three who were taken home. The senile arteriosclerotic patients die. The manic-depressive death rate is not inconsiderable; deaths during excitement were always partly due to another disease. The unclassified, a group kept large in order to keep other groups pure, had an even distribution of results; most of them were unproductive, resistive patients with no signs of organic brain disease.

Laignel-Lavastine and Maingot, G. PHRENOSCOPY IN PSYCHOPATHIES. [Bulletin de l'Académie de Médecine, November 22, 1921, Vol. LXXXVI, No. 38.]

Roentgenoscopy of the excursions of the diaphragm may reveal certain individual characteristics instructive in psychiatric examination. In 100 such cases, the findings usually coincided with the clinical course.

Marinesco. AMAUROTIC IDIOCY. [Encéphale, December, 1921, Vol. XVI, No. 10. J. A. M. A.]

Marinesco concludes this study of the pathologic histology and pathogenesis of amaurotic idiocy, with four plates which apparently sustain his assumption that pathologic changes in the intracellular ferments are responsible for the disease. The cell nucleus seems to be intact. The familial character is explained by the diastasic activity of the mitochondria.

Coulonjou, E. and Terrien, E. TROPHEDEMA IN CHRONIC MANIA. [Paris méd., March 13, 1920.]

Two cases of chronic mania in women aged forty-five, complicated by trophedema, which was neither familial nor hereditary. In one case the trophedema affected the left leg and began at sixteen, in the other the right leg, beginning at thirty-nine. The writers suggest that the trophedema and psychosis in each case were due to disturbance of the sympathetic nervous system and the glands of internal secretion.

Gesell, A. HEMIHYPERTROPHY AND MENTAL DEFECT. [Am. Archives of Neurology and Psychiatry, October, 1921, Vol. VI, No. 4. J. A. M. A.]

Gesell records a case of total unilateral hypertrophy and reviews forty cases hitherto recorded in the literature. In a discussion of the etiologic theories for hemihypertrophy, preference is given to the view that hemihypertrophy is not a hereditary character but a morphogenetic anomaly dating back to an early embryonic stage. Hemihypertrophy is interpreted as a form of asymmetry due to a possible deviation in the normal process of twinning. The complication of mental defect is attributed to an abnormality in the process of bilateral twinning which involves a disturbance of normal tissue development. Possible relations of certain cases of mental defect to cranial asymmetry and intrauterine meningitis are suggested.

Quercy, P. HALLUCINATORY DELIRIUM. [L'Encéphale, June 10, 1921, Vol. XV, p. 398.]

The author describes a case of hallucinatory delirium which he believes shows the importance of the motor element in auditory hallucinations. The patient had obscure and confused delirious ideas to which he sought to give the utmost exactness. He attributed his words, his verbal

impulses—all that he thought or said to “voices” which were at the same time outside of him and in his throat. The fact that the patient accepted without detecting any discrepancy the most confused and contradictory ideas permitted the author to infer that a great part of the phenomena described by patient as psychomotor or auditory hallucinations were nothing more than interpretations. Without entering into a historical or theoretical discussion of hallucinations the author draws the following conclusions from his case: In many instances where the patient asserts he hears a voice, it is the patient himself who speaks the word and then insists that it is the word spoken by someone outside. It is impossible here to estimate the importance of the motor factor, whether it is necessary or contingent, or to determine in a given case whether there is really an audito-motor hallucination or merely a delirious interpretation of a verbal impulse. The hallucinatory scene is a complex of auditory hallucination and psychomotor “hallucination” which is very difficult to analyze. The two are united in such a way as to form a symptomatic unity, as it were, the reverse and obverse of the same psychological phenomenon, of which the verbal impulse is the effect accessible to the observer. The psychomotor phenomena has the appearance of a hallucination only when the patient asserts that there is a voice hidden in his mouth, throat, or stomach and the observer hears nothing and sees no movement. When the patient uses his speech apparatus and pronounces the words which *are* those of the voice in his throat, this is no longer a hallucination, a perception without an object; it is a delirious idea concerning a real fact more or less clearly perceived. Very frequently the phenomena which are claimed to be hallucinatory exceed to a great degree the real element due to false sense perception and certain patients attribute to their “voices” not only those words and verbal images which surprise them and which belong to the automatism of Baillarger, but all their spoken words, their verbal images, even those which form the most integral parts of their consciousness. [J.]

Delmas and Beaudouin. CONFUSIONAL MENTAL STATES. [Bull. Méd., February 28, 1920. J. A. M. A.]

This entire issue of the Bulletin is devoted to this subject. The first article describes the toxic-infectious types. Headache is the capital symptom; insomnia, tremor, contractures, digestive and urinary disturbance and low blood pressure are also suggestive. Juquelier discusses posttraumatic mental confusion. Usually it entails gaps in the memory and grooves in the nails showing the nutritional upset. Marchand and Barbé discuss confusional states in relation to psychoses, neuroses and organic disease of the nervous system. Roubinovitch and Dupouy review the field of treatment with special regard to the heart and the general condition, and organotherapy as indicated. Experiments on cats have demonstrated the gravity of thyroid insufficiency in gravid animals, and this is confirmed by the benefit from thyroid treatment in pregnancy

disturbances. It may be useful also as preliminary to ovarian treatment at the menopause, at puberty and during lactation. Symptomatic measures alone are not enough; the cause of the confusional condition must be discovered, and during convalescence psychotherapy is indispensable to aid in restoring mental balance.

Muller, F. P. THE INSUFFICIENCY THEORY OF DEMENTIA PRECOX TESTED ON A CASE. [*Psychiatrische en Neurologische Bladen*, 1920, Nos. 5-6, p. 255.]

It is generally agreed(?) that dementia precox depends on some form of intoxication; we are induced to accept this because of its frequently unfavorable course, the occurrence of serious residual defects, various somatic phenomena during life, and anatomical changes found in fatal cases. We often find in it many signs that remind us of the germ-psychoses; and many cases show in their history symptoms that strikingly resemble those of some hysterical and psychasthenic subjects. We are also uncertain how the case stands with the dementia of these patients. The fact that anyone has for many years suffered from a pronounced form of the disease does not prevent him on opportunity for a shorter or longer time from doing things again as if he had no psychical disturbance. This can happen so suddenly that one cannot think of a recovery of damaged functions. We might well admit that in dementia precox there is in the first place an impediment of functions, in themselves intact, that can become suddenly removed, and that an actual damage of functions that still appears—whether as an immediate result of intoxication, or as a result of inactivity, or as a consequence of anatomical changes—has a merely secondary importance to the impediment. The question, then, is what functions become impeded, and what impedes them?

Berze formulated the theory that the fundamental disturbance of dementia precox, and of hypophrenic patients in general, is the primary insufficiency of the psychical activity. He tried to prove that nearly all the phenomena of dementia precox can be explained as being due to a deficiency of energy. Muller thinks that Berze's theory is in some points open to objection, especially that he keeps the psychological factors too much in the background. Abraham holds that dementia precox depends on an inhibition of the psychosexual development; and in this way he explains a large part of its clinical picture, so that even toxin hypotheses can be dispensed with; the patient returns to the autoerotic stage from which he has never been properly freed; dementia precox, therefore, is a loss of the actuating motive toward an organized activity. Muller points out that an important gap in Abraham's theory is that he does not explain how the inhibition of the psychosexual development arises and why such an inhibition leads to a return to the autoerotic stage.

The case on which Muller tests the insufficiency theory of Berze was a student who, at the age of twenty-one, had to enter an asylum. At his birth he lost much blood from a torn umbilical cord, and grew into a

delicate child, and was nervous and had a very greatly shut-in personality. Otherwise he was gentle, unassuming, and friendly; and, although he failed at the time of his last examination, he was a favorite pupil. During his student days he failed entirely, and took up various mysticisms, vegetarianism, Indian philosophy, and the Salvation Army. He became irritable, and finally pseudomaniacally excited so that internment was necessary. Muller recognizes two stages in this case: in the first there was a pure picture of an increasing insufficiency of his psychical activity; at this time there was not yet more than the first indication of his narcissism (which later became so prominent). At the end of this first stage we find the patient in a state of great dissatisfaction; his increasing insufficiency is hindering the realization of his ideals; in vain he seeks refuge in all kinds of mysticism; his sense of his insufficiency leads to a despairing mood so great that he goes all to pieces and seeks an outlet in repeated attempts at suicide. He does not realize that he is ill, but attributes his state to worrying about his family. Then he suddenly hears the voice of God, and immediately enters on a new stage of megalomania and euphoria. The second stage was marked by narcissism and artistic phantasies; he has now no more interest in the external world. Muller here asks: "How can an insufficiency give rise to a more or less sudden occurrence of a narcissic-autistic state?" Here the theory of sleep may help us: here we see a similar sudden condition occur; sleep we may conceive of as a narcissic state, the dream as an autistic. Now Trömmner explains that sleep represents not the effect of fatigue but the reaction of the organism to fatigue. So, in dementia precox, when the insufficiency has reached a certain degree, the organism reacts with narcissism, and such a reaction may occur more or less suddenly just as the organism reacts suddenly by sleep; in both cases there is abolition of interest in the external world. This abolition, however, is to a large extent incomplete. Muller has recently (1920) in a treatise explained how this abolition leads to autistic thinking as that form of mental activity that costs the least exertion. He adds that in connection with Berze's theory we can say that this autistic thinking is a means by which the dementia precox patient can satisfy his strivings by an activity that his insufficiency still permits. When the inaction of narcissism is replaced by a certain degree of activity—though it be merely an autistic one—and when some degree of interest in the external world develops, even a merely phantasied one, then we may regard this as the first step toward recovery of normal mental life. Thus in the writer's case we see that in the acute excited phase a stage of the illness was reached in which the insufficiency had reached such a degree that the organism reacted with narcissism. The increase of the insufficiency may be ascribed to an increase of the intoxication, and the motor excitement was perhaps the immediate expression thereof. The euphoric mood appears to have been dependent on the narcissic-autistic state rather than a direct sequel of the intoxication. [Leonard J. Kidd, London, England.]

Kraepelin. WAR IN RELATION TO MENTAL DISEASES. [Münch. med. Woch., October 22, 1920, Vol. LXVII, No. 43. J. A. M. A.]

Kraepelin reports that the number of cases of mental disease due mainly to alcoholism has been very materially reduced since the war. He says further that the American people, after a long and hard struggle extending over many years, has succeeded in freeing itself from the bondage of alcoholism and that Finland has followed in its footsteps, and then he raises the question whether his own people, once it recognizes what is at stake, will not have the fortitude to hold fast to the new conditions, the wholesome effect of which must be apparent to every one, though his vision be never so dim.

Moorhead, T. G. INFANTILISM. [Dublin Journ. Med. Science, January, 1920.]

T. G. Moorhead reports two cases of infantilism of pancreatic and intestinal origin. Zundel and Thomson classify infantilism into (1) idiopathic cases, in which no serious general or local disease is discoverable; (2) cases due to general diseases, such as tuberculosis, congenital syphilis, malaria, leprosy, etc.; (3) cases due to disease of glands, which have an internal secretion, *e.g.*, subthyroid infantilism, Frohlich's pituitary syndrome, and cases associated with disease of the thymus, suprarenal or testis; (4) cases due to poisoning or malnutrition, *e.g.*, chronic nicotine or lead poisoning, congenital heart disease, chronic diarrhea. The author's first patient was eighteen years of age and had suffered from diarrhea since the age of five. The motions numbered, on the average, five a day. They were bulky, yellowish-white and offensive. Trichocephalus ova were present in large numbers. The patient suffered from typical attacks of tetany. The case resembled the described pancreatic cases, but the diagnosis was not definitely proved. At the autopsy the thymus was found enlarged and extended over the pericardium as a typical bilobular organ. Microscopically it was found to have undergone involution and consisted mainly of fat. The apparently primary pathological change was catarrh of the colon and probably also of the small intestine. The other changes were probably secondary, including those in the pituitary gland. The case was one of intestinal infantilism. The other case was less pronounced, but the author believes it to be one of genuine mild pancreatic infantilism. The patient was seventeen, and had suffered from diarrhea from the age of thirteen. The intelligence was good. The motions were from four to five daily, almost white, bulky and offensive. As a rule, a regular deposit of creamy fat separated on the surface of the motion. The glutoid test was negative on two occasions and positive on one occasion, when pancreatic extracts were given, in addition to the capsule. Loewe's test was negative. Treatment consisted of giving liquor pancreaticus, holadin and bile salts capsules, small doses of arsenic for the anemia, diet as described and, at first, lavage of the colon. The diarrhea became reduced to two motions daily. The motions

improved very much in appearance, although a considerable amount of fat continued to be passed. No gain in height was recorded, but general nutrition improved. The skin became soft and pliable, the pubic hair began to grow and the sense of fatigue disappeared.

Piltz. HEREDITY IN PERIODICAL DEPRESSION. [Rev. Neur., August, 1920, Vol. XXVII, No. 8. J. A. M. A.]

Piltz has noted that the attacks of periodical depression develop in certain families at a certain age, regardless of provocative causes. In one family, six members had their first attack at the age of twenty. They belonged to three different generations. In another family, four members developed it at the age of thirty-five. He warns not to mistake the periodical depression of neurasthenics and hysterics for this serious manic-depressive psychosis. With the latter there is always a tendency to ascribe its first onset to some emotional shock, but he thinks knowledge of the laws of heredity renders this improbable.

Cotton, H. A. RELATION OF FOCAL INFECTION TO MENTAL DISEASE. [N. Y. Med. Jour., March, 1920, Vol. CXI, No. 18.]

As a result of their efforts to detect and remove foci of infection there has been a decrease of ninety-one in the hospital population during the past nine months not accounted for by death or other ascertainable reasons. They feel justified in concluding that in the removal of foci of infection they are doing more for patients suffering from mental disease than they have ever been able to accomplish before. The teeth harbored the focus of infection in by far the largest percentage of cases, while the tonsils ranked second, and the gastrointestinal tract third as the site of the responsible focus.

Aragon, E. O. DEMENTIA PRECOX. [Gac. Méd. de Mexico, January-September, 1921, Vol. LV, No. 1. J. A. M. A.]

Aragon takes a pessimistic view of dementia precox proper, but he says that the psychasthenia of puberty and hysteria from ovarian insufficiency may induce clinical pictures liable to be mistaken for dementia precox. In one case he describes, the hysteria of a girl who had failed to menstruate at the proper age, was diagnosed as dementia precox. She was placed in an asylum, with epileptics and insane, and was growing worse, when Aragon prevailed on the family to send her into an entirely new environment. After a year in a boarding school, during which menstruation became established, the girl is now apparently completely normal.

Hart, B. DEMENTIA PRECOX. [Brit. Med. Journ., July 10, 1920.]

"Dementia precox constitutes without doubt one of the most important problems in public health with which modern medicine is confronted." The nature and causation of the condition had still to be made known, and even the question as to whether or not it was a definite entity had not

been adequately solved. Until the mystery surrounding the etiology and character of the disorder was cleared up prophylaxis and curative treatment would be impossible. To Kraepelin we owed the first clear formulation of dementia precox as a definite disease. He noted that there was a group of adolescent patients suffering from mental disorder which tended to run a more or less clearly defined course, ending in mental enfeeblement. The clinical pictures presented in the earlier stages varied considerably, but nevertheless there were certain features common to all. These were a "weakening of the emotional activities" and "loss of inner unity of the activities of intellect, emotion, and volition." Kraepelin's conception had been much disputed, but it was now generally recognized that it was adequate, in so far as it marked off a group of cases with notable similarities in their symptomatology, course, and outcome, although the group could not be accurately delineated. As to the nature of the essential morbid process in dementia precox, three principal views were held at the present time: (1) Physiogenic theories, maintaining that the pathology was essentially physical; (2) psychogenic theories; and (3) theories attempting to combine both these viewpoints. Physical alterations occurred, especially in the advanced stages of the disorder, and were found chiefly in the reproductive glands (Mott) and the cells of the central nervous system. On the other hand, the researches of Freud and Jung showed that psychogenic factors were of the greatest importance. Freud regarded the symptoms as the result of psychological mechanisms similar in kind to those he had found to exist in hysteria, and the compulsion neuroses. Jung looked on dementia precox as due to a failure of adaptation to the actual environment, and a consequent depression of the psychic energy to more primitive modes of adaptation. In conclusion, Dr. Hart expressed his own belief that any adequate formulation of the problem must combine both physiogenic and psychogenic aspects, and this could best result from a consideration of the disorder of dementia precox from the point of view of biological reaction.

Noel. PAROLE OF INSANE. [Can. Journ. of Ment. Hygiene, October, 1920, Vol. II, No. 3.]

The two principal factors which contribute to the crowding of hospitals for the insane, Noel says, are heredity and congenital conditions; that the way to combat them is to prevent consanguineous marriages, especially between families with doubtful heredity, and that children should be begotten according to principles of sound hygiene. This is the surest way of decreasing the number of the insane in the generations to come. [J. A. M. A.]

Buzzard, E. Farquhar. MENTAL HYGIENE. [Proc. Roy. Soc. Med., Nov., 1920.]

The growth of mental hygiene should be promoted, in the first place, by no longer misnaming mental disorders as "nervous." It is time to

be courageous and to speak of hospitals or clinics as institutions for "minor mental disorders," in preference to "functional nervous disorders." It is also necessary to dispel the confusion between ethical and medical principles as they affect health. Elementary principles of psychopathology and psychotherapy should be taught to students, so that when they become general practitioners they may take a prominent part in maintaining the mental health of individuals. Since these subjects are more important than some that the student is called upon to know, they should be introduced into the syllabus for examinations and questions should be set upon them. Finally, general recognition must be obtained for the multiplicity of factors concerned in producing mental as well as other disorders, due prominence should be given to fatigue as a factor in psychopathology and to rest in psychotherapy and education in thinking should be encouraged as an important preventive measure.

Mundie. RÔLE OF PSYCHIATRIC CLINIC IN COMMUNITY. [Can. Journ. of Ment. Hygiene, Oct., 1920, II, No. 3, J. A. M. A.]

Mundie claims that the community, until recently, had laid too much stress on the physical side of disease. More attention should be paid to the mental side of people. In this regard the work of the psychiatric clinic is valuable. Its purpose is to prevent and preserve the mental health of persons, to diagnose and estimate the number of feeble-minded and mentally abnormal persons in the community, and, lastly, to try and solve the problem of those persons who, physically well, are not feeble-minded or insane, but are misfits in the community.

Clarke. JUVENILE DELINQUENCY AND MENTAL DEFECT. [Can. Journ. of Ment. Hygiene, October, 1920, Vol. II, No. 3. J. A. M. A.]

Clarke presents the results of an analysis of 4310 cases of different mental types which passed through the Toronto General Hospital psychiatric clinic.

Banus, J. Sanchus. PARAPHRENIA. [Archivos de Neurobiologia, Dec., 1920, I, No. 4.]

Sanchis Banus describes with minute detail a case of chronic mental derangement, commencing in the late thirties, of the expansion paraphrenia type, with no trace of schizophrenia.

Pitres and Landes. THE CRIMINOLOGICAL VALUE OF A FOURTH HORIZONTAL FRONTAL CONVOLUTION. [Journ. de Méd. de Bordeaux, April 10, 1920.]

Pitres and Landes state that though Benedikt and several other writers attributed criminological importance to duplication of the convolutions of the frontal lobe, this anomaly has been found in a relatively high proportion of persons who are not criminals. They describe the autopsy on a man aged twenty-six, who had been executed for the rape and murder of a girl aged six, the findings being as follows: Thoracic and abdominal

organs normal; a few slight stigmata of degeneration in the skull and face; weight of brain much below the normal (1.032 kg. as compared with the average 1.360 kg.), thickening and adhesions of the *dura mater*, and an incomplete duplication of the second frontal convolution on both sides. Examination of the brain was otherwise negative.

Vianna, U. PRIMARY DEMENTIA FROM ARTERIOSCLEROSIS. [Brazil Med., Dec. 4, 1920.]

In primary dementia from cerebral arteriosclerosis, the mental disturbances develop slowly, following the course of the anatomic process. But in secondary dementia, the lesions occur precipitately, and the dementia develops by comparatively sudden focal symptoms, paralysis, aphasia, etc. With the primary form there is gradual impairment of attention, memory and association of ideas.

Jones, B. L., and Raphael, T. PERNICIOUS ANEMIA WITH ASSOCIATED MENTAL DISORDERS. [Am. Arch. Neur. and Psych., July, 1920.]

Jones and Raphael suggest that probably more cases of pernicious anemia are mistaken for arteriosclerosis than are generally recognized. Therefore, they advise that patients with doubtful cases of arteriosclerosis, especially those with a history of remissions, should, as a routine procedure, have frequent blood counts made, and neurologic examinations for cord changes. Careful history taking may reveal the so-called "pre-pernicious" symptoms in cases that otherwise might be mistaken for arteriosclerosis. [J. A. M. A.]

Dollinger, A. THE ETIOLOGY OF MONGOLISM. [Zeitschft. für Kinderheilkunde. Bd. 27, 1921, p. 332.]

Stöltzner was able to observe the following in the mothers of 3 out of 10 mongoloid idiots during the pregnancies which led to the birth of these children: "Small appetite, constipation, together with the striking increases of fat in spite of the taking of little nourishment, anhidrosis, feeling of cold, great lassitude, exaggerated need for rest and sleep, mental apathy and diminished intellectual alertness. All in all," as he adds, "clearly the picture of hypothyroidism." The author sought light upon this question through an investigation of four cases observed by himself. Satisfactory information could be obtained from 19 mothers. The result showed, small appetite 3, constipation 1, striking increase in fat 1, falling out of hair 0, anhidrosis 0, feeling of cold 1, great lassitude 1, exaggerated need of rest and sleep 4, apathetic mental condition 1. Far more impressive than this enumeration are the individual statements which were made. The greater number of women reported an exactly opposite condition during the period under consideration. Most frequently there were repeated reports of excellent sleep and appetite or increased mental and physical alertness. This in no way causes surprise. In fact in pregnancy a slight degree at least of hyperthyroidism is not at all a rarity.

The author therefore believes that he must reject Stöltzner's assumption of a "causal connection between the hypothyroidism of the mother during pregnancy and the mongolism of the child," for although the one or the other symptom was proved at one time or another yet an actual hypothyroidism can be spoken of only there where the entire number of all the symptoms have presented themselves. Stöltzner withdrew the opinion he had expressed in the work mentioned in a personal communication made after he had observed a mongoloid child whose mother during pregnancy had suffered an acute attack of Basedow's disease. Other findings fitted to bring light into the still obscure etiology of mongolism could not be produced. So far only partial confirmation has been possible as to what is known, rather conjectured.

The average age of the parents at the time of procreation of 23 of the children mentioned was for the fathers 39.2, for the mothers 33.7 years and the ages stood thus:

	Fathers	Mothers
Of the age 20-30 years.....	2	8
Of the age 31-40 years.....	13	10
Of the age 41-50 years.....	6	5
Of the age 51 and over.....	2	..

It is worthy of notice that there were 5, that is 22 per cent, of the women older than their husbands. That there was a strikingly large number of late born children also could be confirmed. There were in fact 4 firstborn, 7 second, 5 third, 1 each fourth, fifth, sixth and seventh born, 2 ninth, 1 each fourteenth and fifteenth born. Thirteen of the children, 54 per cent, were prematurely born. It is plain however that premature birth cannot enter the question etiologically since the characteristic symptoms are brought into the world with the child more or less clearly stamped upon it and among these children it is especially the prematurely born that show the most typical pictures. But a connection exists in this that the mongolism is to be considered as a malformation so that, as is well known, very frequently there is a premature expulsion of the affected embryo.

The development of the mongol shows as much in the length as in the weight an evident lagging behind the norm already at birth. This is somewhat increased in the course of the first year, later, however, it becomes equalized more and more though never completely. Only a relatively small number remain markedly backward in development. As regards the "stature" (relation of the height to weight according to

H^3

Pirquet's formula, $p = \frac{\quad}{W}$ at the beginning of one has to do mostly

W

with children somewhat of underweight for their height. About the beginning of the fourth year the relation is changed, the children are mostly too short for their weight. The author, like Noeggerath in Frei-

burg and Kellner in Hamburg, also has seen recently a striking increase in the number of mongoloid idiots. [Author's abstract.]

Garcia, E. CATATONIA WITH STUPORS AND UREMIA FOLLOWING INFLUENZA. [Revista Méd. del Uruguay, Feb., 1920, XXIII, No. 2, J. A. M. A.]

Garcia knows of only two cases on record which dementia developed complete in two or four weeks, but in the case he describes the interval from the onset of symptoms was only one week in the previously healthy young man. Catatonia then followed at once, with progressive stupor and reduction of all the vital processes, the young man lying like a living statue until death the third month. When first examined, three weeks after the onset of the apparently mild influenza, the blood serum contained 0.82 gm. urea per liter and the urine 9.5 gm., and the cerebrospinal fluid a few days later contained 0.48 gm. per liter. At this time there had been a brief period of delirium but the stupor and catatonia which then developed persisted without intermission to the last. In another case of influenzal psychosis the blood serum contained 1.2 gm. urea and the puncture fluid 1 gm., but recovery was soon complete.

Bianchi, G. PSYCHOSES AFTER SPINAL ANESTHESIA. [Policlinico, October, 1921, Vol. XXVIII, No. 44.]

The young man was a hard drinker, and after spinal anesthesia for a herniotomy he developed an acute psychosis, with hallucinations, and recovery in two weeks.

Menninger, K. A. WHAT IS DEMENTIA PRECOX? [Kans. Med. Soc. Journ., December, 1921, Vol. XXI, No. 12.]

This article emphasizes the following: (1) Cases of the incipient dementia precox are constantly occurring unrecognized; (2) the practical thing to do in these cases is, the diagnosis once made, the patient should be committed; (3) more facilities and opportunities for and interest in the subjects of research in mental diseases, particularly in the matter of dementia precox.

Rehm, O. BODILY WEIGHT AND MENSTRUATION IN ACUTE AND CHRONIC PSYCHOSES. [Arch. f. Psych., Vol. LXI.]

In paresis the menses are absent in half of the cases. In epilepsy disturbances are rare and without connection with bodily weight. In dementia precox and manic-depressive psychosis in the acute stages with their strong wave-like variations of bodily weight the menses are frequently absent in the depression stage. They not infrequently are absent in the chronic states of these psychoses, more frequently and for briefer periods in dementia precox, more rarely but for longer periods in manic-melancholic psychosis. The absence of the menses plays no important part in hysteria. The disturbances of menstruation in the psychoses are to be referred to general somatic disturbances, apparently

such as those of the inner secretions. A prognostic significance does not attach itself to the condition of the menses except that their reappearance in acute conditions may be looked upon as a favorable symptom in the occasional relapse.

Damaye. ACUTE MENTAL CONFUSION IN PNEUMOCOCCUS INFECTION.

[Encéphale, September, 1920, Vol. XV, No. 9. J. A. M. A.]

Damaye reports four cases which demonstrate that certain cases of acute delirium with hallucinations are the result of a septicemia acting on an organism debilitated by alcoholism, exhaustion, extreme debility or sitophobia. Saprophytes may assume virulence on account of the depressed vitality or fatty or amyloid degeneration of viscera. Treated energetically and in time, this infectious delirium may be cured, but otherwise the heart breaks down under the strain. Necropsy then shows the lesions common with acute psychoses. In two of his four cases the women soon died. The course and the lesions were alike in both, and they were in the hospital the same week. The two other patients were men, both addicted to liquor, and both recovered. The pneumococcus was cultivated from the blood in all the cases.

Westheide, W. PSYCHOLOGY AND PSYCHOPATHOLOGY OF MENSTRUATION FROM THE MEDICO-LEGAL STANDPOINT. [Deutsch. Zeitschr. f. d. ges. gerichtliche Medizin, Vol. I, Nos. 3, 4.]

Westheide calls attention to the variety in form and degree of the psychic manifestations which accompany menstruation in mentally healthy as well as in psychopathological women and girls. Its onset in healthy girls shows psychic as well as physical response to the action of the hormones set free. Some alteration of feeling accompanies the function until the organism has gradually become accustomed to the hormone activity. In healthy girls there is a tendency to sentimentality, phantasy building, romancing, to yearning or hypochondria or to a certain melancholic brooding over life. Logical thinking receives a temporary inhibition. As only a small number of developed women, 15.8 per cent according to one writer, can be considered absolutely free from some evidence of psychic changes at the menstrual period it is difficult to draw a line between what is to be considered pathological and what is not. In fluctuation of affect and tendency to impulsive action the distinction is especially difficult. Psychic changes are to be looked for in marked form in the weak and imbecile and these make in such individuals causes for delinquency in action. The psychopathologic are more subject to impulsive and compulsive actions while the affect shows derangement and the conduct reveals irritability.

Still more serious in consequences are the symptoms in hysteria which accompany menstruation, clouding of consciousness, offense against the property of others, incendiarism, infringement upon the peace of homes, injury to the body. Menstruation may show a significant relation to

epilepsy and there is a menstrual type of dipsomania. Certain manifestations may be included under forms of mania or hypomania, the monomanias of older authors. Sometimes there is very severe hallucinatory confusion with smearing of feces and obscenities followed by severe prostration. There may be melancholic disease conditions with attacks of crying out, feeling of anxiety, impulsive actions, compulsion to suicide from weariness with life. Manic-depressive psychosis also may show a reaction to menstruation, temporarily at least, and sometimes dementia precox shows its relation in the form of attacks of excitement. More frequently, however, an amentia hallucinatoria with gross hallucinatory confusion is present.

All of these possibilities with the fluctuation of affect and the increase of affectivity are important in medico-legal decisions and in establishing the answer to the question of responsibility. In this respect, the author reminds us, no case can be judged on general grounds but only by considering medically and legally the individual features in each case. It must be determined whether the menstrual process has occasioned an affective alteration from the ordinary condition or not before it is admitted as an excusing or an ameliorating factor. [J.]

De Hartogh. PSYCHOSES AND THE INTERNAL SECRETIONS. [Ned. Tijds. v. Genees., December 4, 1920, Vol. II, No. 23. J. A. M. A.]

De Hartogh emphasizes the importance of the action of toxins in the causation of mental disturbances. These poisons may be of internal or external origin, and it is our task to discover and check the source of the toxins. In a certain proportion of cases they come from an upset of the balance of the endocrine glands. By tentative administration of thyroid or ovarian extract we may not only reveal the source of the toxins but be able to cure the psychosis by removing this source. He reports some instructive examples of psychoses. An emotional shock may be capable of modifying the secretions of one or more of the endocrine glands, just as we know that it is capable of inducing vasomotor, secretory and chemical changes. In an instructive case described the woman had a psychosis at two pregnancies both of which had terminated in a miscarriage and the disappointment was extreme. De Hartogh thinks that the corpus luteum was probably responsible for the recurring psychosis in this case. He gave thyroid treatment at first, but without benefit. A change to ovarian extract was followed by marked improvement and a complete cure, both at the first and at the second miscarriage.

Reinhold, Josef. PRESBYOPHRENIC SPEECH DISTURBANCES. (A CONTRIBUTION TO THE QUESTION OF THE DESTRUCTION OF THE FUNCTION OF SPEECH.) [Zeitschr. f. d. ges. Neur. und Psych., Vol. LXXVI, Nos. 1, 2.]

Reinhold in studying a case of Alzheimer's disease makes a close analysis of the destruction of the speech function. There is first the

appearance of amnesic disturbances and loss of the understanding of speech, while understanding of tonal accent is still present. This leads by way of agrammatism of the paraphasic type to meaningless rhythms with strong emphasis upon the musical element. The relation of this analysis to the ontogenetic and phylogenetic building up of speech is pointed out. [J.]

Lobstein, J. DEMENTIA PRECOX WITH ADIPOSE-GENITAL DYSTROPHY. [Nederlansch Tijdschr. voor Geneeskunde, 1922, Vol. LXVI, p. 738.]

A woman, now forty-eight, was suddenly mentally affected seventeen years ago; she fell out with the neighbors and her landlord, became strange, thought she was being followed, had grandiose ideas and delusions of persecution, and became aggressive toward her husband. She was noisy, confused, disoriented, and showed compulsion-speech and alteration of personality. She was seen by Lobstein early in 1921 when dementia precox was diagnosed. She was now far advanced in dementia; and was generally very irritable and inaccessible, and strongly resisted examination. She showed extreme adiposity, with great thirst and polyuria; the urine had a specific gravity of between 1000 and 1002; it was clear, almost colorless, acid, and contained no albumin or sugar. There was very scanty axillary and pubic hair. The sella turcica was fairly large and wide. Menstruation had been regular till early in 1921. In this case there was a psychosis developing as a dementia precox, followed (at an uncertain date) by polydipsia, polyuria, and an adiposo-genital syndrome without the true genital atrophy (probably owing to the relatively late age at which the syndrome appeared). Lobstein thinks that in this case a lesion of the floor of the third ventricle is less probable than a pituitary lesion. He also thinks that, as we are coming to the view that disturbances of internal secretions play an important part in the etiology of dementia precox, it is probable that in his case there is a relationship between the psychosis and the adiposo-genital dystrophy, though the exact nature of this relationship cannot be stated. [Leonard J. Kidd, London, England.]

Laignel-Lavastine, L., and Tinel, J. PRESENCE OF FATTY ACIDS IN CERTAIN CORTICAL PLAQUES IN SENILE DEMENTIA. [Compt. Rend. Soc. de Biol., November 12, 1921, Vol. LXXXV, 847.]

The writers draw attention to a hitherto undescribed form of plaques, which they have found in eight out of twelve cases of senile dementia, containing fatty acids. They are often the only plaques seen, but in three of the eight cases they have coexisted with other plaques of Alzheimer's type. They are irregular, stainable by silver impregnation, and show no apparent modification of the nervous tissue and especially no neurological reaction. They are thus very different from Alzheimer's senile plaques, and they form veritable dépôts or incrustations, superposed on the cortical tissue, and they are often very numerous. The mechanism

of their formation, and their pathological significance are unknown; probably there is here a process of disintegration of cerebral lipoids, added to an accumulation in the cortex of dépôts formed for the most part by fatty acids. [Leonard J. Kidd, London, England.]

Bentley, James. SOME ILLUSTRATIVE CASES OF DUCTLESS GLAND THERAPY IN THE INSANE. [Medical Journal of Australia, May 14, 1921.]

The following cases were published in order to stimulate others to investigate this line of treatment. Bentley's work was encouraged by that of Dercum and Ellis whose postmortem findings in eight cases of dementia precox were in keeping with the inference that anomalies exist in the ductless glands in dementia precox. Dr. Bentley did his chief work with the accelerator group which consists of thyroid, pituitary, adrenal and reproductive glands, but he intends, in the future, to try the retarding group (pancreas, parathyroid and possibly the thymus) in maniacal cases.

Case 1. B. L. A., aged twenty-eight, admitted May 31, 1919, lay listlessly in bed and paid no attention to his surroundings. He would not reply to questions, although he showed that he understood what was said to him by protruding his tongue when asked to do so. On June 15, 1919, he was in a cataleptic condition. He refused food at times. On September 9, 1919, he was put on hormotone, and ten days afterward he spoke a little for the first time since admission. On December 29, 1919, he was discharged as recovered and has worked on a farm since discharge.

Case 2. F. H., aged forty-four, on admission on December 2, 1919, depressed and would reply to questions only in monosyllables. He was very confused and slept badly. He heard a voice which talked to him continually, but he did not know to whom it belonged. He refused food at times. One week after admission he was in a state of catalepsy. December 20, 1919, he was put on hormotone and a week later the cataleptic condition had disappeared. He was discharged as recovered on May 26, 1920.

Case 3. E. S., aged thirty-five, admitted July 7, 1916. He remained in a negativistic state, rarely speaking, apparently not taking much interest in his surroundings. On May 25, 1920, he was put on hormotone and about four months later he seemed somewhat brighter. In January, 1921, he began to speak freely. He looks as if he would soon be fit for discharge.

Case 4. J. P., aged forty-five, admitted November 19, 1919. A case of acute melancholia. He had hallucinations of sight; he said he saw blacks and others chasing him and that he galloped his horse for two miles until the horse became exhausted. He was very depressed and miserable, and he slept badly. In May he was still worried and unhappy and had suicidal tendencies. He was put on hormotone on June 1, 1920, and was discharged as recovered November, 1920.

Case 5. Aged eleven, a sporadic cretin, at first put on thyroid, but did not make much headway. About two months later he was put on hormotone, and he began to improve mentally and physically. When hormotone was unobtainable he was again put on thyroid, whereupon he deteriorated mentally and physically; he became very dull and the collar of fat returned. When hormotone was again procurable he made considerable improvement. This case was a peculiar one, inasmuch as, according to the accepted knowledge, he should have improved on thyroid, whereas this was not the case. He improved only under treatment with hormotone.

Pineal gland is generally regarded as being depressant in grown up people. For this reason it was prescribed in cases of acute mania with some startling results, as, in place of acting as depressant, it had the very opposite effect. The cases became quite unmanageable and more restless than before. As his cases show that pineal gland substance excites the cerebrum Dr. Bentley intends trying this gland in cases of melancholia. [Author's abstract.]

McClellan. MONGOLIAN IDIOCY IN ONE OF TWINS. [Jour. Am. Med. Assn., January 7, 1922.]

This author reports an instance. He says that since the original description of Mongolian idiocy by Down and the more complete description by Kassowitz there has been but small addition to the knowledge of this condition. The etiology is unknown. Attempts have been made to assign syphilis as a cause, but reports of positive Wassermann reactions in certain Mongolian idiots have never misled the careful clinician. The extremes of age in either parents have also been considered, but Goddard in an analysis of more than 290 cases found that the ages of fathers of Mongolians varied from twenty to sixty-three years. He found that the number of Mongolians born of mothers of forty years was much higher than at any other age. In thirty cases reviewed by von Hofe the mother was less than thirty-five years of age in 47 per cent. Consequently any influence of the age of either parent seems to have no foundation of fact. Goddard inclines to the belief of many others that the condition of the mother during pregnancy has a strong influence upon the development of this condition. If this is true the same changes are to be expected in both twins. Such a result was seen in the cases of Hjorth. Seven other cases similar to this one have been found in the literature. Instances of more than one case of Mongolian idiocy in the same family have been reported, the most recent being that of Pardee, who suggests the endocrine disturbance as the probable cause. If there was an endocrine disturbance in the mother in the case here reported, which might manifest itself in a Mongolian offspring, it would naturally be expected that the other twin be similarly afflicted. The author suggests the following explanation: Two ova were fertilized by two spermatozoa; one of the ova was fertilized by a normal spermatozoön

and resulted in the normal child; the other ovum may have been abnormal and have been fertilized by a normal spermatozoön, or may have been normal and fertilized by an abnormal spermatozoön. This fertilization resulted in the Mongolian idiot.

Hansen. HEREDITY IN DEMENTIA PRECOX. [Hospitalstidende, January 4, 1922, Vol. LXV, No. 1. J. A. M. A.]

Hansen relates that the committee officially appointed for anthropologic research in Denmark is now busily compiling data throughout the country in regard to all the insane, the feeble-minded, the deaf-mutes, and other similarly abnormal persons, and their family history. In Sweden the government has recently appropriated a certain regular annual sum for research in this line, three times larger than the sum the Danish committee has to work with, but already an extensive material has been compiled.

Bedford. THE GOLDSOL TEST IN MENTAL DISEASE. [Journ. Mental Science, January, 1922.]

This author regards the goldsol test, from its greater reliability and simplicity of technique, as preferable to the Wassermann reaction in the diagnosis of neurosyphilis, since it merely consists in making ten saline dilutions of the spinal fluid, adding the goldsol reagent, and interpreting the results by the degree of gold precipitation. Typical well-marked reactions are obtained only in general paralysis, taboparesis, and juvenile paresis, the percentage therein of positive reactions being 95. Comparisons made in 250 cases showed the reaction to be as reliable as the Wassermann, and even more so in the detection of early disease; and it is helpful in the recognition of acute poliomyelitis, and may prove of more value in the diagnosis of congenital syphilis than any other test. Its simplicity as compared with the Wassermann test, and the facts that it only occupies a few minutes and that only a few drops of the spinal fluid are required, are important points in its favor. It is not applicable to blood serum as a means of diagnosing general paralysis, because a dilution corresponding to 0.08 per cent causes precipitation of gold in the same way as a strongly positive paretic fluid, but the presence of a small amount of blood in the spinal fluid does not render it unfit for testing. The chief drawback is the uncertainty of being able to prepare a good goldsol at every attempt.

Borchardt. INFANTILISM. [Deut. Arch. f. klin. Med., January 24, 1922, Vol. CXXXVIII, Nos. 3-4. J. A. M. A.]

Borchardt explains the various causes for the arrest of development which entails that certain physical and mental properties of the growing individual correspond to an age younger than the age actually attained. The cause may be inherited, or it may be some injury of the germinative tissue, or some upset in the endocrine system, or some external influence,

infectious, toxic or alimentary. Some of these injurious influences seem to exert their action by inducing a lack of lecithin, "that important and indispensable stimulus for growth." Reduction of the amount of total nourishment does not entail infantilism in animals, but depriving them of certain "body bricks"—the tryptophan and lysin of the protein molecule—arrests the growth. Only when the lacking lysin is restored to the food does growth proceed. Syphilis, tuberculosis, tetanus and diphtheria toxins all seem to have the property of binding lecithin, and the lecithin is thus withdrawn from its physiologic purposes. Leprosy, malaria, pellagra and echinococcosis probably have this same lecithin-depriving action, as also certain nutritional disturbances and intoxications. Alcohol is preëminently a toxin for lipoids. He saw a boy of five who had actual delirium tremens, his father letting the boy drink with him. The child did not look older than the age of three.

Nobécourt, P. PSYCHOSES IN PNEUMONIA. [Bull. Méd., March 12, 1921.]

Extreme mental confusion is not infrequently met with in severe infectious states. The two children here reported of seven and fifteen respectively show delirium and excitement; in the other girl preceded by coma. The symptoms pointed to meningitis. The cerebrospinal fluid was comparatively normal and the symptoms of pneumonia cleared up the diagnosis, and both recovered. These brain disturbances may take the form of convulsions, delirium or somnolency; the latter is most frequent and may accompany the rise in temperature. There is usually extreme hyperesthesia of the entire skin, and ocular disturbance is frequent, from ptosis to mydriasis and choked disk. The outlook is grave with suppuration in the meninges and somewhat serious even with serous meningitis. The latter may be followed by chronic hydrocephalus. Treatment must be prompt and vigorous. The main indication is to relieve the congestion of the nerve centers; hot baths are the best for this, given every four or six hours, or hot packs. Potassium bromid or chloral should be given to combat the cerebral agitation, with camphor in case of torpor. Lumbar puncture may relieve, but there is little use to repeat them in serous meningitis. If there is pus, the lumbar puncture should be repeated daily and antiserum injected, although the therapeutic action of this has not yet been decided.

Schaefer, Otto. NEUROPSYCHICAL DISTURBANCES IN MALARIA. [Archiv. f. Psychiat. u. Nervenheilk., Vol. LXI, p. 543.]

The author cites the authorities of various nations, who have studied the nervous and psychic symptoms in malaria. The pictures may present great dissimilarity, taking the form of general coma, delirium, epileptic seizures, tetanic contractions, or the symptoms may be restricted to circumscribed areas, as neuralgias, etc.; or there may be vasomotor disturbances, forms resembling multiple sclerosis, or the picture typical of

bulbar paralysis; or dementia acuta (Kraepelin), or psychoses of more prolonged nature, having in part the character of amentia, in part that of hallucinosis, and in part that of the Korsakow syndrome (Bonhoeffer). The question as to whether the fever or the toxin is responsible for the psychosis has been much discussed, but in the author's opinion, it may now be stated with certainty that the fever plays only a subordinate rôle in these disturbances and all the evidence is in favor of the view that they are due to the specific influence of the malaria parasites, especially corroborative of this view being the occurrence of initial delirium and of intermittent psychoses. In 1897 Dürk published his experiences with malaria as pathologist with the German army in the southeast, giving detailed descriptions of histological findings in various cases, among which, as very characteristic of the malarial infection, he mentions the cell knots and cell proliferations. These, produced in the tissue by the malarial poison, were probably never before observed, and are considered by Dürk to belong to the infectious granulomes. He gives them the name of malaria granulomes.

Lowrey, L. G. ONE HUNDRED ADMISSIONS. [Jl. Iowa State Med. Soc., December, 1921.]

The paper presents a summary of the law founding the Psychopathic Hospital and comments upon the functions of psychopathic hospitals in general and of this one in particular. This is the only mental hospital in the state which can accept voluntary patients. Patients may also be committed by the judge of the District Court, whereas patients coming to the State Hospital are committed by the commissioners of insanity of the county in which they reside.

Of the first one hundred cases, sixty-six were voluntary admissions. There were no cases of alcoholism, six cases of neurosyphilis (three paretic, one paranoid, one feeble-minded, and one epileptic). There were ten cases of feeble-mindedness and seven cases of epilepsy, twenty-two cases of dementia precox, seventeen cases of manic-depressive psychosis, and eleven psychoneurotic cases. Twenty-six cases were committed to other state hospitals, three died while in the service, nine were discharged recovered, nineteen as improved and sixty-nine as unimproved.

These figures refer to the "temporary service" in which it was not possible to keep patients under treatment for longer than a month. Some of the more interesting cases are briefly abstracted. A broad survey of the plan of operation is given. [Author's abstract.]

Rows, R. G. TREATMENT OF PSYCHOSES. [January 21, 1922. B. M. J.]

Dr. Rows said that there did not seem to be any basis for a scientific distinction between the psychoneuroses and the psychoses, although such a distinction might be useful from a clinical or descriptive standpoint. If it was intended to speak of an organic basis for psychoses, they must be considered from the earliest moment of their appearance and must

not depend upon examinations which had been made a number of years after the trouble began, for in later stages there might be very definite changes in the central nervous system. From the point of view of recoverability, there was no distinction between the two things at all; both were recoverable if treatment was applied in the early stages, and were difficult if treatment was long delayed. All mental illnesses existed for a long time before they were obvious to those associating with the victim. By mental illness Dr. Rows meant a condition in which there was a disturbance of the ordinary mental activities, such as proceeding, thinking, feeling, judging, giving attention, and assessing values. The patient himself was the first to recognize an abnormality. Sometimes there was definite disturbance during the night, but apparent normality in the daytime, until later the abnormality extended to relationships in the world.

Freud counseled that symptoms should be regarded merely as directing posts indicating lines of investigation, and this investigation would show the cause of the symptoms manifested. He himself found symptoms to be of extraordinarily little value in understanding a case. If the wildest deliriums were analyzed some experience would be found in the earlier life of the patient to account for the form which the disorder assumed. Once the mental illness was established, with a dominant emotional tendency, every incident of the past which had been accompanied by a similar emotional state added its weight to the disturbing influence. His contention was that the emotion in all such cases was a normal reaction to the stimuli which caused the mental disturbance. The sequence of stimulus, association, inhibition, and reaction, although worked out possibly in an exaggerated form, was the product of the old mechanisms; no new mechanism was introduced into the evolution of the psychosis. The ordinary symptoms relied upon for the diagnosis of the various types of mental disorder were as a rule secondary developments. Mental illness was present before the delusion or the hallucination arose. As time went on, the repetition of the stimulus or the recollection of the stimulus brought about a habit of thought from which it was exceedingly difficult for the patient to escape. The most trifling cause was sufficient to set in motion the memory mechanism, and the patient thereupon fell into a state of terror or whatever the emotional manifestation might be.

Dr. Rows went to say that it was impossible to understand mental illness by considering the psychic side alone. Every experience which crossed the threshold of consciousness had three results: an intellectual perception of the fact, an emotional reaction, and a physical reaction. The emotion of acute fear, for example, was associated with a disturbance of practically every organ of the body, quite as the normal result of the stimulus. Many of the symptoms of organic reactions in patients were simply physical changes connected with the expression of the emotions, and did not indicate any definite physical disease; they were natural consequences of the emotional state in which the patient found himself.

Mental illness was not merely the result of a change in the nervous system; if the mental processes were to be understood the organism must be taken as a whole, or, at least, if attention was concentrated on the nervous system, its normal reactions must be very carefully worked out.

Vallon, C. THE CRIMINAL INSANE. [Bull. de l'Académie d. Médecine, November 15, 1921, Vol. LXXXVI, No. 37. J. A. M. A.]

Vallon states that the French laws make no provision for the criminal insane. When the court accepts the plea of insanity as attenuating the responsibility for a crime, the accused is sent to an insane asylum. When in the judgment of the medical force of the asylum no further psychiatric treatment is needed, he is dismissed. He may thus escape both prison and internment.

Read, C. Stanford. THE PSYCHOPATHOLOGY OF ALCOHOLISM. [Jl. Ment. Sc., July, 1920.]

In this study the author points out that we have been far too superficial in our pathological inquiries into many of the so-called alcoholic psychoses and that alcoholism is only contributory and more a result of the mental illness than the cause (*Journ. of Mental Science*, July, 1920). Alcohol is taken to promote the social instincts and to alleviate and narcotize the many mental conflicts to which we must all to some extent be victims. It thus becomes a psychological necessity in modern civilization. In excess it tends to destroy sublimation and aid mental regression and in this way may precipitate a psychosis. The regression may be of various degrees and may bring into conflict with the personality different impulses and desires previously more or less successfully repressed. Of these, the homosexual impulse is found on analysis to be the most frequent, the resulting conflict being very liable to result in paranoiac states. A deeper study of the so-called alcoholic hallucinoses and paranoid psychoses reveals psychogenic factors which should be looked upon as the real pathological basis of the abnormalities. Dipsomania most assuredly has a psychogenic basis. It must be noted, too, that with the aid of alcohol the psyche defends itself against mental pain, pleasure is gained by the freedom from inhibitions and compensations occur, though often at the expense of sanity. If these views are in any way true, many of these psychoses should be differently classified.

Ring, A. H. FACTORS IN SUICIDE. [Boston Med. and Surg. Journ., December 1, 1921, Vol. CLXXXV, No. 22. J. A. M. A.]

While disease may be, perhaps usually is, the final determining factor in Ring's opinion in suicide, the underlying substrata of inherited tendencies is, however, most important. It has been said that normally human beings desire life above all things. Ring does not believe that this is true. Of course, no one desires to suffer, but there are many persons otherwise normal who would gladly "lay them down in their last sleep,"

if they could but learn of an easy way of thus evading "the slings and arrows of outrageous fortune." The type of person who has a fundamentally self-abusive temperament is much more likely, under stress of adverse environment or disease, to wish himself out of the world. If he has no belief in a future life with its punishments and rewards, this is still another reason for hastening that annihilation which will rid him of the conflict of life and bring everlasting sleep.

Höst. ACUTE BROMIDE PSYCHOSIS. [Norsk. Mag. for Lægevidenskaben, September, 1921.]

The author sounds a note of warning with regard to the possible provocation of mental disease by large doses of potassium bromide. The case with which he illustrates his point is that of a woman, aged fifty, with a record of recurrent attacks of rheumatic fever. There were signs of mitral and aortic insufficiency, as well as of stenosis of the aorta. She was rather restless and nervous on admission to hospital, and in addition to digitalis one gram of potassium bromide was given three times a day. During the first few days she gave a drowsy, tired impression, and on the fifth day she suddenly became very restless and delirious. She screamed and suffered from hallucinations. A day later the potassium bromide was discontinued. Veronal (0.5 gram every evening) was substituted, but for three days there was no improvement. After that she gradually recovered, the hallucinations disappearing first by day, and, still later, by night also. For about a week she was apathetic and forgetful, but after this her mental condition became perfectly normal. The author refers to a paper published in 1916 by Ulrich in *Kor. f. Schw. Aerzte* on chronic bromide poisoning followed by hallucinations and delirium.

Zeehandelaar, I. OCCULTISM. [Nederlandsch Tijdschrift v. Geneeskunde, July, 1921, Vol. II, No. 5. J. A. M. A.]

Zeehandelaar comments on the danger for the unbalanced from the prevailing cult of materialization of spirits, referring in particular to Kolb's report of a family of eleven persons who have all developed insanity recently, requiring internment. He adds that no one can expect to enlighten the public unless he knows something about the subject in hand, but we can be certain that in the near future much of these "occult phenomena" will be "decocted."

Repond, A. TREATMENT OF SCHIZOPHRENIA. [Schweiz. Arch. f. Neurol. u. Psychiatrie, 1921, VIII, No. 2, J. A. M. A.]

Repond refers to institutional treatment, saying that the results of treatment are more direct and effectual in this than in any other mental disease. In the majority of cases, appropriate treatment will restore the patient to ordinary life. He adds that for this the physician must not shrink from combating certain prejudices and shouldering certain responsibilities which his skill will enable him to attenuate in large measure.

This includes restoring the patient to his family. He has done this several times even against the wishes of the parents, but the success in a number of such cases has justified his action. An actual resurrection followed in some cases, the patient becoming capable of self-support, in part at least, under a little supervision and attention.

Watkins-Pitchford, W. SILICOSIS AND SUICIDE. [Med. Journ. S. A., Nov., 1920, J. A. M. A.]

Watkins-Pitchford says that the view appears to be gaining ground among people generally that suicide is of unduly frequent occurrence among the sufferers from silicosis. The conclusion which the available evidence appears to warrant is that silicosis does not specifically predispose to suicide, either directly by any particular mental effect of the disease, or indirectly by the production of insanity culminating in an act of self-destruction.

Donkin, B. MENTAL DEFECT AND CRIMINAL CONDUCT. [Lancet, Nov. 13, 1920, J. A. M. A.]

Donkin is of the opinion that criminal conduct is dependent on the innate capacities of each individual as developed and actuated by the innumerable influences which act on these capacities; and that the actual mental characters or qualities observed are the resultant of these factors. In his opinion the proper and fruitful understanding and treatment of criminals depends mainly on the careful study of the individual offender. This consideration should influence far more than it does at present the sentences awarded in courts of law, which are to an undue extent based on the class of crime committed, irrespectively of the history of the accused person, and of the circumstances in which the offense took place. No judge should pronounce any sentence of imprisonment unless he is personally acquainted by visiting prisons with the actual nature of the terms of imprisonment entailed by his sentences.

Mesdag, S. van. HUNGER STRIKES IN PRISONS. [Nederlandsch Tijdschrift v. Geneeskunde, May, 1921, I, No. 20.]

The author here outlines a simple means by which a hunger strike in a prison was controlled. He allows no food except milk, and does not allow any water in the cell except water for washing, and this is all made soapy before it is brought in. The hunger striker intends to refuse food, but does not count on having nothing to drink. This soon overcomes his resistance. He has had no experience with it in treatment of the insane who refuse food, and has never applied it other than to healthy prisoners.

Neff, H. I. THE DRUG ADDICT. [Mich. State Med. Soc. Journ., Grand Rapids, March, 1921.]

In this paper the author says that while the present federal narcotic law is in force, it is recommended that the dispensing of all narcotics be

controlled and authorized by a central bureau, preferably the state board of health, and that such administrative agency cooperate in every particular with the medical profession and the federal government. The problem is a public health question of great importance and pending the enactment of an international law regulating the production and disposition of opium and its derivatives, the question of individual application of any narcotic law should be relegated to the physician who must necessarily conform to any existing law regulating the dispensing of narcotics. The medical profession, when assuming such responsibilities must recognize the importance of the task and try to secure legislation which will not handicap the physician in performing his duty to his patient and to the public in general.

Courtois-Suffit and Giroux, R. TRAFFIC IN COCAIN. [Bulletin de l'Académie de Médecine, June, 1921, LXXXV, No. 24, J. A. M. A.]

Courtois-Suffit and Giroux present data demonstrating the enormous spread of the traffic in cocain since the war, as the Germans are selling it in profusion for 600 francs per kilogram and it can be resold for 10,000 or 15,000 francs in France. The soldiers of the armies of occupation take advantage of this to trade in it, and the aeroplanes favor the smuggling of the drug into France. There were 151 arrests in France in 1920 of those trading in cocain, but the penalties were never more than three months' imprisonment and fines of from 100 to 1,000 francs. One of these cocain traders had a handsome establishment for dancing parties. When arrested he had 200 vials of cocain with the Merck label. Another had 14 kg. of the drug when arrested, and he claimed to have bought it from an American sergeant. In their investigation two years ago, they found Paris the main center for the trade, but now it seems to be scattered all through the provinces.

Koll, G. OCCULTISM AND FAMILIAL INSANITY. [Münch. med. Woch., June, 1921, LXVIII, No. 25, J. A. M. A.]

Kolb refers to a family of eleven members, all of whom had to be committed to the hospital for the insane. After the analogy of similar cases, he thinks it may be assumed that primarily only one member of the family may have been actually insane and that the other members became infected psychically, so to speak, by the one member (either directly or through the mediation of certain other members). He regards it as possible that the revival of spiritualism and occultism since the war may have played a part in the result.

Thursfield, H. MONGOLISM. [British Jour. of Child. Diseases, January-March, 1921. J. A. M. A.]

Forty-two Mongol children examined by Thursfield failed to corroborate the statement that the Mongol is apt to be the last born child of a long family. Of the forty-two cases five were first, and eleven were

second children, three were third, and seven were fourth, so that two-thirds of the whole number were certainly not members of an unduly long family. Of the remaining fourteen one was a fifth child, three were sixth, three seventh, three eighth, three ninth, and one was the tenth. Nor, again, are they by any means the last children. In seven instances children have been born since the advent of the Mongol: respectively a third, a fourth, two fifths, an eighth, a ninth, and a tenth, all quite healthy children. A current statement on this point is that the mother of the Mongol is near the end of the childbearing period. Of the mothers in this series the average age was thirty-six years, but if the mothers of more than four children are excluded the average age sinks to between thirty-three and thirty-four years—an age which is certainly within the childbearing period. Among the mothers of Mongols were apparently healthy young women of twenty-three, twenty-five and twenty-seven years. Among these forty-two mothers were nineteen who had miscarried at some time in their pregnancies, many of them more than once. On the other hand there were seventeen with more than one pregnancy who had not had a miscarriage. There is no evidence to connect the advent of the Mongol with any obvious defect of health during the months of pregnancy. Nor does there appear to be any evidence of the influence of syphilis or tuberculosis. In no instance in this series was there any obvious taint of either of these diseases; and in the few cases where a Wassermann reaction was used for a test the result was negative. An obvious cardiac defect was noted in seven of the forty-two, six were not noted, and of the remaining twenty-nine it is definitely stated that there was no physical sign of a cardiac lesion, but in two of these attacks of "blueness" were stated to occur. Nystagmus was noted in four cases, double congenital cataract in one, an accessory auricle in front of the ear in one, and in one webbed toes, the second and third toes on either foot being joined together. The well known incurving of the last phalanx of the little fingers was noted as present in thirteen patients, absent in sixteen, and not noted in thirteen.

Cheney, Clarence O. THE SIGNIFICANCE OF THE REPORTED NERVE CELL ALTERATIONS IN DEMENTIA PRECOX. [N. Y. Neurol. Soc., May 4, 1921.]

The speaker called attention to the nerve cell and other cortical changes in cases of dementia precox, as described by various observers, particularly Mott, who has maintained that the nerve cell alterations were responsible for the clinical symptoms of this mental disorder. With the desire to determine the validity of such claims, the speaker has undertaken histological cortex studies of a series of dementia precox cases, with another series of manic-depressive cases for control, using photomicrographs extensively. The comparative cortical appearances in the dementia precox and manic-depressive cases were demonstrated by lantern slides. Conclusions were reached to the effect that in cases of long

standing dementia precox a nerve cell loss was not evident as compared with cases of manic-depressive psychosis of similar age and cause of death; that frequently identical nerve cell changes were found in cases of manic-depressive and dementia precox; that a marked variability in the nerve cell appearances was present not only from case to case but in different microscopic fields of the same case; that there was no uniform or constant cortical or individual nerve cell picture in dementia precox which would enable one to distinguish such a case from one of manic-depressive psychosis. It was considered as unproven that the nerve cell changes found were essential to the clinical picture of dementia precox inasmuch as it could not be definitely stated how much.

Boven, William. NASAL GAVAGE IN THE CARE OF THE INSANE. [Archives Suisses de Neurologie et de Psychiatrie, Vol. V, Fasc. 1, pp. 99-106.]

On receiving a complaint from a former patient in an insane asylum denouncing the practice of nasal gavage as medieval and cruel, the author questioned a number of patients who had been subjected to forced nasal feeding during delirium for days, months, and even years. He even submitted to it himself. He draws the following conclusions:

1. It is painful even for a normal individual. It is painful from the moment the tube passes the inferior turbinate, the pain becoming accentuated with each forward or downward movement of the tube, and radiates from the upper molars to the temple, producing the feeling of insufflation of the temple. The rest of the procedure is not very painful.

2. On the whole, the patients react very differently to this measure. Some think nothing of it, while others recall having suffered, though not excessively; still others found it a very brutal procedure. All, however, agree that one becomes rapidly accustomed to it.

3. This difference of opinion may be due to either variations in the local condition (size and shape of the nose), or to the form of mental disease, for instance, those suffering from persecution mania react with more fear and violence than those suffering from autoaccusation.

Boven recommends that nasal gavage be resorted to only in cases of necessity, that great gentleness be exercised, especially until the patient has become accustomed to it, and that small tubes be used at first, not larger than 5-8 mm., gradually increasing the size up to 10-12 mm. He also recommends the use of 20 per cent cocaine in an atomizer, if the patient is particularly sensitive. These precautions are well worth while, as we have not at the present time any measure as effective as nasal gavage. [Author's abstract.]

Thursfield. MONGOLIAN IDIOT. [Arch. of Neur. and Psych., May, 1921.]

The author records his observations on forty-two Mongolian imbeciles seen at the Hospital for Sick Children, Great Ormond Street, between

the beginning of 1912 and 1916. After discussing possible etiological factors, such as the place of the Mongolian imbecile in the family, the age of the mother, her health during pregnancy, history of miscarriages, character of the labor, infective diseases, and prevention of conception, the author gives figures showing the frequency of cardiac and other defects among his cases. Of twenty-five patients whom he was able to trace fourteen were dead, the causes of death being chiefly bronchopneumonia and diarrhoea. The oldest survivor was aged fifteen years and the youngest six years. None of them showed the least tendency to become normal with increasing years, though the more obvious signs of mental defects were certainly lessened. Like certain French physicians who have been able to keep Mongols under observation for a long period in institutions, Thursfield is convinced that both physical and mental improvement can be derived from small doses of thyroid, though there is no prospect of obtaining the effects commensurate with those observed in the case of cretins.

Timme, W. MONGOLIAN IDIOT. [Arch. of Nour. and Psych., May, 1921, Vol. V, No. 5. J. A. M. A.]

In twenty-three out of twenty-four nonselected cases of Mongolian idiocy examined by Timme the roentgenogram of the skull showed a peculiar change from the normal in the anterior portion of the pituitary fossa. This change consisted in an excavation under the anterior clinoid processes and presumably under the olivary process and optic groove, and the excavation communicated directly with the anterior portion of the fossa itself. There were varying degrees of this excavation. From knowledge, more or less exact, of the influence of the anterior lobe of the pituitary on growth and genital development, Timme regards this roentgen-ray finding as of considerable interest. Especially is this true, when it is remembered that among the clinical signs of Mongolian idiots there is invariably a combination of subnormal and disproportionate body growth, coupled with lack of genital development. The intimate relationship which in early life exists between the anterior hypophysial lobe and the pharyngeal glandular elements is also strikingly coincidental with the extreme pharyngeal mucous secretion seen in Mongolian idiots. Furthermore, with such an excavation, involving at times the optic groove, eye symptoms should be and are of frequent occurrence. Theoretically, therefore, disturbance of the anterior portion of the pituitary might readily produce many of the symptoms shown clinically by Mongolian idiots. It is therefore suggested that every necropsy examination in cases of Mongolian idiocy should include a careful examination of the pituitary gland, notably in its anterior portion. Should such an examination eventuate in a corroboration of 'antemortem findings, perhaps a rational treatment might be forthcoming for these cases. On the theoretic basis of anterior lobe disturbance, Timme has inaugurated a therapy in several of his cases which has had some degree of success thus far. In

one Mongolian idiot the testicles have descended since treatment was begun, and there seems to be a measure of mental improvement likewise. This treatment includes the hypodermatic injections of anterior lobe extract (antuitrin), combined with whole gland feeding and thyroid administration in small doses.

Lhermitte, J., Sloboziano and Radovici. THE ANATOMY OF MONGOLIAN BACKWARDNESS. [Presse Médicale, July 9, 1921, 548.]

The writers describe their pathological findings in a case of Mongolism in a child of three and one-half months: necrotic lesions of brain and cord, of various ages, and brain malformations. There were also focal renal sclerosis, and irregular subcapsular and perisubcapsular hepatic cirrhosis; the liver parenchyma was also traversed at many points by aberrant myelinated nerve filaments. The thyroid gland showed islets of sclerosis, with numerical and volumetrical reduction of the colloid vesicles. The adrenals showed adenomatous hyperplasia of their cortex contrasting with a complete agenesis of their medulla which was replaced by an angeiomatous conjunctive tissue. The writers recognize two groups of lesions underlying Mongolian backwardness: on the one hand the arrests of development and the malformations, and on the other the changes of infectious nature. Up to a certain point these lesions progress independently of each other. As to the nature of the infectious agent, they regard syphilis as the cause of at any rate some of the Mongolian symptoms, for in their own case a syphilitic cutaneous eruption had been present. [Leonard J. Kidd, London, England.]

Ley. THE TREATMENT OF MENTAL PATIENTS. [Le Scalpel, July 9, 1921.]

The author pleads for the abolition of all mechanical restraint in the asylum treatment of persons of unsound mind. In most asylums restraint of a grossly mechanical order, such as chains, strait waistcoat, etc., is abolished, but the padded cell is still used. In the last fifteen years the author has discarded the padded cell, and says he does not regret it. He uses observation rooms, where troublesome patients can be watched and isolated, but they are like ordinary private wards and not like a prison. Instead of mechanical forms of restraint he trusts to the trained and continuous attendance of nurses, prolonged bath or wet pack, good nourishment, and sedative drugs. The worst cases he has had to deal with have been those who had come from other asylums where some form of mechanical restraint had been used, but even these were eventually controlled without restraint when they came under his care. Abstinence from alcohol is advisable, and asylums generally should be made to look less like prisons.

BOOK REVIEWS

Fielding, William J. THE CAVEMAN WITHIN US. HIS PECULIARITIES AND POWERS; HOW WE CAN ENLIST HIS AID FOR HEALTH AND EFFICIENCY. [New York: E. P. Dutton and Company, 1922.]

The author of this stimulating book captures his reader's attention by giving the unconscious a currently popular name and then before the reader is aware he is in the whirl of a sweeping review of all that the unconscious has done and all that it may do. This large hidden portion of the self, whether as it works in the individual or as one finds its effects in the workings of groups of humanity, is found to be capable of vast good or most intricately extended evil. The latter is often so subtle in form that it escapes the name of evil. It is lamented as illness, lack of success, or passes as the work of Providence. Or it assumes the guise of good called religious, patriotic, or many another high sounding name. The author runs all this down to the variety of action arising in disguise out of the Caveman within. He seems to have studied well the workings of the Caveman. He makes comprehensive reference to investigators in psychoanalysis and to other workers with the unconscious. He applies his knowledge to the estimation of movements great and small, to the actions and sufferings and the products of the ordinary man and the man of note. The book shows wide knowledge of humanity in its accomplishments, penetrating knowledge of it in its motives and their often strange modes of expression. The Caveman is neither all right nor all wrong; he needs understanding.

Landau, E. ANATOMIE DES GROSSHIRNS. FORMANALYTISCHE UNTERSUCHUNGEN. With 66 Figures in the Text. [Ernst Bircher Aktiengesellschaft, Bern, 1923.]

This book has much to commend it in its external form, its arrangement of material, its clearness of presentation. The spirit in which it is written is even more inspiring. The writer realizes the necessity of much comparative research. Problems of evolution must be investigated through facts which can be observed in their various stages. Causes lie in the uncertain realm of speculation. Yet he fearlessly weighs theories and utilizes them or rejects them. He studies the formation of the brain and of the cranium. He concludes that each has its independent development yet where they come into contact it is the nervous system that has controlled the formation of the skull. Study of the convolutions and fissures of the brain leads the writer not to lay weight upon variation in convolution as ground for determining races or talent. He believes the island

of Reil to have its origin through an indentation that has affected both the rhinencephalon and the pallium and that it later comes to be overgrown by adjacent portions of the brain mantle. For all these processes as well as for the development of the basal ganglia he gives an abundance of comparative material. His own work is compared fully with that of other investigators. Landau is led to important biological questions in the consideration of which he emphasizes the view that forms do not develop successively one out of another but parallel to one another, each following its own determined way out of a primitive general type. He accedes in part to the idea of a "formative psyche" behind brain development but prefers to leave the matter still an unanswered question.

Gennerich, Wilhelm. DIE SYPHILIS DES ZENTRALNERVENSYSTEMS. IHRE URSACHEN UND BEHANDLUNG. Second Revised and Enlarged Edition. With 7 Illustrations. [Berlin: Julius Springer, 1922.]

Gennerich has presented a very full and instructive discussion of syphilis of the central nervous system. A long period of occupation with a great number of cases, together with the advance made everywhere in the technic of research and of therapy in this field, has permitted a rich amplification of the subject. No form or locality in which the development of syphilis takes place has been overlooked. The therapeutic and prognostic facts in relation to each separate phase are fully considered. Particular attention is given to the first most important question in development, that is the connection through meningeal syphilis between primary lues and metalues of the central nervous system. The writer insists upon his own theory of treatment based upon this meningeal intermediate stage. His point of view may be subject to critical difference of opinion, yet in fact he makes his standpoint more of a useful warning against possible danger than the ground of an arbitrary unmodifiable method. He himself submits the matter to careful procedure in further investigation and in actual practice. His warning is directed to the danger of treatment not carefully enough considered which may interfere with the development of immunization against the invading agent. By merely weakening the virus and dulling the sensitivity of the organism one may encourage the meningeal infection and further development of the disease. His plea for a more perfect technic and more complete training for this therapy is well supported by the detailed presentation of the entire subject which is given here.

Donnelly, John J. SUBJECTIVE CONCEPTS OF HUMANS. SOURCE OF SPIRITISTIC MANIFESTATIONS. [The International Press, New York, 1922.]

This book represents a curiously constructed piece of animistic thinking. One need not greet the author's theory of subjective concepts with the sarcastic belief which he anticipates. No bit of thinking is so fantastic that it does not touch upon some truths. Furthermore, evidence like this of the power of human desire to father any

such form of thought is itself a fact worthy of study in the examination of the mental life. And what anyway is truth? The author's rejection of doctrines long accepted, his dogmatic setting up of his own theory together with the befogged gropings with which he tries to show the workings of the latter, may all be left to the pragmatic test. His theory is an elaboration of an idea "that the intelligence of every sentient being begets a subjective concept of each sentient being met" and that the mutual recognition and action of these beings constitutes the spirit world. His pleading that "clairaudients" shall not be considered merely as insane but shall be brought through better understanding of them to a rational point of view contains a worthy thought but the meaning he reads into the situation strikes one as wide of the mark.

Stern, Felix. DIE EPIDEMISCHE ENCEPHALITIS. [Julius Springer, Berlin.]

The Foerster-Wilmanns Monograph Series, the German homolog of the Nervous and Mental Disease Monograph Series, here presents as Vol. 30 a complete monograph of 228 pages, on epidemic encephalitis by F. Stern, senior physician of the Göttingen Neuropsychiatric Clinic.

In spite of the colossal mass of research upon this syndrome the author here shows a commendable grasp upon the many problems involved. It cannot be said that he has dealt with them all but study of this volume leads us to recommend it most highly. At the present time we believe it to be the best summary and critical analysis available, but do not feel that the last word has been spoken by any means. It is a masterly presentation, particularly of the neurological and psychiatric findings.

The reviewer is in partial sympathy with the general trend of the author concerning the very intricate problem of pathogenesis. He says (p. 175), "Pandemic influenza and epidemic encephalitis have an indirect relationship. The special virus of encephalitis is a filterable 'noxe' which is found in a harmless form in the mucous secretions of the mouth of many individuals. This harmless virus becomes activated by a number of other viruses: influenza (often), pneumococci, streptococci, and others. Then without other factors (influenza) the virus becomes harmful, pathogenic." Just what the relationship is the author does not completely elucidate.

Concerning the "sleep" factor, Stern, after reviewing the many suggestions, seems to put the vegetative (thalamic cut off) in the foreground. As yet the analyzed cases are too few to satisfy the many complicated situations, and the author wisely refrains from a superficial dogmatic explanation.

Therapeutically, he would emphasize the value of the use of convalescent serum. Whether this is "autistic" thinking, time and further experience alone can determine. At all events he is not pessimistic about the matter.

A bibliography of 372 titles (admittedly but a scratching of the surface) is appended to this more than meritorious monograph.

Hoffmann, Hermann. DIE INDIVIDUELLE ENTWICKELUNGSKURVE DES MENSCHEN. [Julius Springer, Berlin.]

The modern studies of heredity provoked through the Mendelian hypotheses have taken many directions; not the least important of these have been the applications to problems of psychiatry.

This small brochure has taken as its point of departure certain studies by Goldschmidt, R. (1920), upon hereditary factors as worked out in butterflies and has attempted to apply them to constitutional factors found in psychotic individuals already studied by Kretschmer in the Tübingen Clinic. This last author, it may be recalled, has called attention to the fact that certain bodily formations—his asthenic, athletic, and pyknic types show definite correlations with psychical constellations, which in present day psychiatry are grouped under fairly definite concepts of classification.

Goldschmidt has worked out certain intersexual combinations as a result of his butterfly crossings. Hoffmann would apply these principles to the endocrine metabolic factors as determining the constitutional body formations of Kretschmer's types, as well as affording insight into the problem of "constitution" in general. Physical constitution and psychical constitution thus become correlated and certain underlying factors are analyzed in an interesting and fascinating manner. The details must be consulted in the original, very stimulating suggestions.

Wilbrand, H. u. Saenger, A. DIE NEUROLOGIE DES AUGES: Neunter Band. DIE STÖRUNGEN DER AKKOMODATION UND DER PUPILLEN. [J. F. Bergmann, München und Wiesbaden.]

In May, 1921, Alfred Saenger, the neurological coworker with Wilbrand in this monumental classic, died of heart disease at the age of sixty-one. Since 1890 these two scientists had been associated in the Eye Clinic at St. Georg's Hospital in Hamburg and this, the ninth volume of their common efforts, marks the culmination of their activities in a masterly monograph on Disturbances of Accommodation and of the Pupillary Activities. In the entire world's literature this series of monographs stands out as preëminent and the present volume but enhances the value of this coöperative accomplishment.

Disturbances of Accommodation, in their physiological aspects are first discussed. Paralysis of Accommodation follows; then Accommodation Cramp as it occurs in various syndromes. The major portion of the work is devoted to pupillary disturbances. Anatomical considerations precede; then follow pupillary conditions under different life periods: The Light Reflex, Physiology of Pupillary Movements; Galvanic Reflexes; Pupillary contraction from accommodation and convergent activities; these are described in detail. Pupillary Dilating mechanisms are then discussed. The Ciliospinal Synaptic activities; The Influence of the Cervical Sympathetic, these make up another section. Reflex Immobility is taken up in great detail; the various hypotheses discussed and the types of syphilitic and nonsyphilitic Argyll-Robertson pupil very thoroughly dealt with.

Absolute pupillary fixation is then detailed; catatonic pupillary rigidity is included.

Abnormal dilation and contraction of the pupil under all possible conditions is dealt with in the final chapter in which one may find a complete exposé of the vast variety of problems that are met with not alone in neuropsychiatric conditions but in the various situations observed in internal medicine.

In lamenting the death of the junior author of this vast encyclopedic work we can but add our commendation of this, its last volume.

Quennell, Marjorie and C. H. B. EVERYDAY LIFE IN THE OLD STONE AGE. [G. P. Putnam's Sons, New York and London.]

Ever since Evolution, as a conception, replaced older and less valuable generalizations, the phyletic history of man has become of deep significance for the student of psychiatry.

As a series of easy lessons concerning the mode of life of man in the Old Stone Age this small volume can be most earnestly recommended. It makes an excellent introduction for the student who would attempt to get some insight into the vast history of present man's beginnings. It is not alone popular, but authentic and carefully done and the authors deserve much credit for their fascinating production.

Lematte, L. L'OPOTHÉRAPIE DU PRACTICIEN. [A. Maloine & Fils, Paris, 1923.]

This is a very useful little book as a guide to a more intelligent use of organotherapy. The subject is considered from the point of view of the substances used, their preparation, the forms in which they are most effectually used, dosage and the like. The various disorders of the endocrinous organs themselves or those indirectly related to these are then discussed in their relation to opotherapy. The work is based upon the theories and usage of those whose investigations and experience have made opotherapy practical.

Smith, M. Hamblin. THE PSYCHOLOGY OF THE CRIMINAL. [New York: Robert M. McBride and Company, 1923.]

A more sane and sound approach to the problems of criminology has not been made than is set forth in the pages of this book. It comes from the experience of one who is putting in practice the methods of the "newer psychology" and who can speak therefore with conviction of their effectiveness. He first discusses the offender—the "delinquent" as he prefers to call him rather than the criminal. The delinquent is one to be understood not merely explained by any theory that happens to suit preconceived theories of society. To be understood and handled with any real constructiveness he must be considered an object of individual scientific investigation. Acts of delinquency like any other acts of behavior are dependent upon unseen causes. The delinquent action is not a definite course of action chosen as a mode of life. Even if definitely related to some particular choice or influenced by some external event it is yet part of a longer

series of determining factors within the life. From such a point of view psychoanalysis is accepted by the writer as the most natural and efficacious means for reaching helpfully into the characters of delinquents for their understanding and their real correction. The book is exceedingly well written. It is a clear, cogent presentation of criminology and of the relation to it both of conscious and unconscious psychological methods.

Barrie, J. M. DEAR BRUTUS, A COMEDY IN THREE ACTS. The Plays of J. M. Barrie. [Charles Scribner's Sons. New York, 1922. Price \$1.00.]

Barrie is a psychologist because he knows where to find certain secrets of the inner life and the mechanisms by which they work, the mechanisms by which they may be made to work to better advantage. His psychology is intuitively arrived at. It is that of the artist with a peculiar grace which touches human life just where the secret elements meet between tears and laughter. "Dear Brutus" is characterized by the tenderness yet whimsicality in which through Lob's wisdom these human traits have been revealed.¹ One is fascinated and instructed by Barrie's delicately true use of the dream mechanism for discovering and affecting the secret elements of personal character. The elaborate stage directions which accompany the printed play run like a subtle accompaniment of interpretation to the words of the characters themselves. The edition appears in simple, tasteful form altogether in keeping with the nature of Barrie's artistically delicate presentation of serious material.

Forsyth, David. THE TECHNIQUE OF PSYCHOANALYSIS. [London: Kegan Paul, Trench, Trubner & Co., Ltd., Broadway House, 68-74 Carter Lane, E. C., 1922.]

This small book forms an exceedingly useful guide for the practice of psychoanalysis. It presupposes some knowledge of the latter. It attempts therefore neither to restate the theory completely nor to cover all the ground necessary for preparation for practice. By emphasis on those points of technique which are most indispensable it stimulates closer investigation of the subject while at the same time it gives encouragement and counsel directly to the beginner. The author speaks from his own experience in obtaining a working knowledge of the subject and applying this through years of careful work. The brevity, simplicity and saneness of presentation make the book a valuable addition to psychoanalytic literature.

Reys, Louis. L'ENCÉPHALITE ÉPIDÉMIQUE. [A. Maloine et Fils, Paris.]

This is a comparatively short (150 pages) clinical study of this syndrome by the Chief of the Neurological Clinic of the University of Strasbourg, based upon an epidemic in that city and other Alsatian towns. Beginning in February, 1919, it extended up into 1922, and

¹ See Psychoanalysis and the Drama, Monograph Series No. 28, for analysis of this play.

the survey here given embraces an analysis of approximately 150 cases.

Speaking of disposition the author notes that there has seemed to him that certain factors have been present which may be thought of as in some degree determining the infectibility of the patient. He speaks of neuropathies, surmenage, and difficult social situations as creating a particular "terrain."

Under the head of Symptomatology forms of onset, classical and otherwise, are first discussed. The period of actual involvement, with case histories of eye, vestibular, myoclonic, paralytic, sensory, Parkinsonian (and its varieties), cerebellar, choreic, vegetative, endocrinopathic forms is succinctly and clearly portrayed. Diagnosis is exhaustively discussed, and an excellent chapter on Treatment. This makes up the first portion of the monograph. A second deals with an "anatomical classification" of the different syndromes observed, and with the different evolutive types. Finally the sequelae are discussed.

On the whole a very useful and sound contribution.

Lévy-Bruhl, Lucien. LA MENTALITÉ PRIMITIVE. [Felix Alcan, Paris.]

"Mental functions in inferior societies" is a work of Lévy-Bruhl somewhat known by workers in psychiatry. This was published twelve years ago and is now in a third edition.

In it the author expounded ideas concerning the mentality of different ethnological groups in a manner quite at variance with current psychological conceptions.

He has continued his studies and here presents another volume on primitive mentality which is a companion piece to the former work. In the former volume the author spent much labor in developing the idea of a law of participation, considered in its relationships to the principle of identity, which is so compelling in all conscious primitive thinking. Contradiction or identity behind dissimilarity Lévy-Bruhl maintains is more or less foreign to primitive thinking. The present volume develops these ideas in their relationship to the primitive conceptions of causality and the results that flow from them. He does not by any means seek to give an exhaustive treatise. It should be thought of rather as a general introduction.

One of the most important situations developed by the author is the criticism of those ethnological thinkers who would carry back into the mind of the primitive the complicated conscious thought processes of the modern dialectic. In this trend he is sound, but at the same time it may be noted that the primitive may be wiser than many think him to be. Lévy-Bruhl is one who admits it because he emphasizes in his preface the impropriety of speaking of "primitive" man, and speaks of them as being so far and yet so near to us.

To all students of psychiatry, who approach their problems from the standpoint of an evolutionary psychology this is a work which will prove of much interest. It cannot be said that the author is au courant with the researches offered through the analytical psychology; in this respect there is a lack of appreciation of the sig-

nificance of unconscious activities and a definite failure to value many important functions of primitive thinking. In spite of glaring defects in this field the work is of supreme importance.

Mayo, Gertrude. *COUÉ FOR CHILDREN.* [Illustrated. New York: Dodd, Mead and Company, 1923.]

This volume might serve as a subject for psychological analysis in itself, of psychopathological analysis we had almost said. The sentimentality with which it is presented gives a note of the extreme activity of the "transference" phenomenon upon which Coué, and particularly this tender maternal follower of his who is pictured here, unconsciously base their work. That results are effected by such means is a psychological truism. Their permanency based upon so blind a use of emotional response is a matter of serious question. More serious still is the adulation and nurture of an attitude of mind which already is a blight upon human health and progress, that of unthinking submission to personally roused confidence. Pitiably enough that adults run enthusiastically to any new presentation of a method which aids them in dismissing the reality instead of facing it and dealing with it as it is. More lamentable still is it that the children are to be drawn further into the sway of a magic idealism. Some points of psychological truth undoubtedly are to be found in the statements of this book as in the method it portrays. The dangers which also are there are most menacing because of the subtle appeal they make to humanity's all too ready protective and self-indulgent tendencies.

Binswanger, Ludwig. *EINFÜHRUNG IN DIE PROBLEME DER ALLGEMEINEN PSYCHOLOGIE.* [Julius Springer, Berlin.]

It would hardly seem possible to write a new book of nearly 400 large octavo pages on problems of general psychology, yet here it is. Furthermore, it justifies itself, for here in no wordy discussion of academic psychology; there is none of the a priori desk psychologizing which still is found in many of our universities, though being fast elbowed out by behaviorism, vocationalism, or other really living brands of psychology. Here the entire mental field is not exposed on the basis of the old familiar, "I see a rose" type of subjectivism. This is a dynamic psychology that has come from living machines as they came limping into the mental garages which we call mental hospitals.

It is quite as much a departure from the usual psychology as is Kretschmer's short text or Bleuler's superb "Naturgeschichte der Seele."

Psychology is seen and described first as a branch of natural science. In his second chapter Binswanger gives a historical résumé of the "actual characteristics of the psychical." A third chapter deals with the psychical as a function, an act or as an experience. This is also largely historical and developmental. A fourth and final chapter takes up the scientific discussion of the personality. Here may be found a handling of the subjects of the "Pure I."

Consciousness in general, and the "Strange I," the field of the Unconscious. This is done in a singularly original manner.

In fact the book is distinctly original and intriguing and leads to many practical issues in psychiatry.

O'Shea, M. V. TOBACCO AND MENTAL EFFICIENCY. [New York: The Macmillan Company, 1923.]

One's interest is arrested first in this book by a revelation of the difference of many minds upon a subject which tends naturally to be viewed largely on the ground of the "pleasure-pain principle." All credit to the author that he has been able to steer a judicial course amid the varying mass of opinions he has collected. His attention has been particularly directed toward the effect of tobacco upon intellectual effort but he has not left out of account the presence of many factors which play around this narrower mental field. He reminds the reader of the influence of a traditional expectancy in subjective examination of the effects of tobacco and of the tendency to respond to a questionnaire in a manner assumed to be the expected one. Other factors add to the difficulty of obtaining trustworthy information by which the matter of the use of tobacco can be scientifically weighed. The writer himself might have emphasized more explicitly also other emotional determinants which would really alter the effect of tobacco for good or for ill. These for the most part lie deeper than consciousness but doubtless play the largest part. Even without due consideration of these the book has an important secondary value perhaps even above its primary purpose. For it reveals more of human psychology than it does of the nature of tobacco merely in relation to the physiological organism.

Stekel, William. SEX AND DREAMS. THE LANGUAGE OF DREAMS. Authorized translation by James S. Van Teslaar. [Boston: Richard G. Badger, The Gorham Press.]

Stekel has written much upon the interpretation of the unconscious through psychoanalysis. It is important that this one of his works should now appear in English. It contains much of value in the interpretation of the symbolism of the dreams, both the individual symbols used and the symbolic structures into which the dream is formed. The material has been gathered from Stekel's own extensive experience with individual analyses but he has introduced his study by valuable results from other investigators in symbolism and in the significance of dreams. He points out the significance attached to dreams in all ages. His interpretations offered from his own work seem often to be arbitrarily made but this is due to the fact that his full case histories could not be presented here. His object is rather to give a gradually deepening insight into the nature of the dream by giving varying examples of its use. The translator's service should be acknowledged in bringing this work to our hand.

NOTES AND NEWS

Annual International Neurological Reunion.—The Fourth Annual International Neurological Reunion of the Neurological Society of Paris will take place in Paris at the Ecoles des Infirmières at the Salpêtrière, Friday and Saturday, June 8, 9, 1923. The subject for discussion will be Spinal Compression. Drs. James Purves Stewart and George Riddoch of London will discuss the Pathological Anatomy and Pathogeny, Dr. Ch. Foix will take up the Pathological Physiology, Clinical Signs and Therapeutics.

The American Neurological Association meets at Boston, May 31, June 1, 2, 1923.

The American Psychopathological Society will meet at the Boston Medical Library No. 8 Fenway, Saturday, June 2, 1923.

The American Psychoanalytic Society meets at Boston at the Hotel Somerset, Sunday, June 3, at 10:30 A. M.

The American Psychiatric Association meeting takes place June 19-22, at Detroit. The Hotel Statler will be headquarters.

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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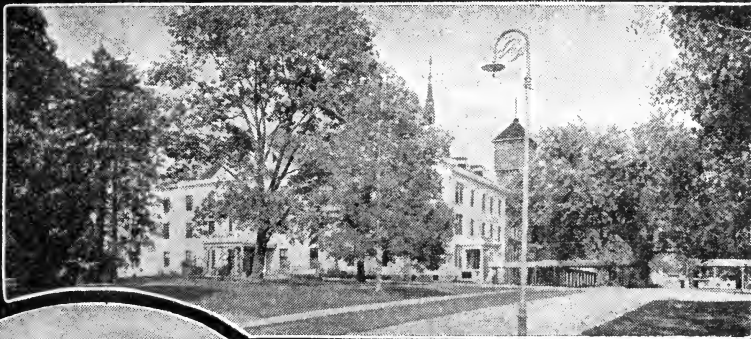
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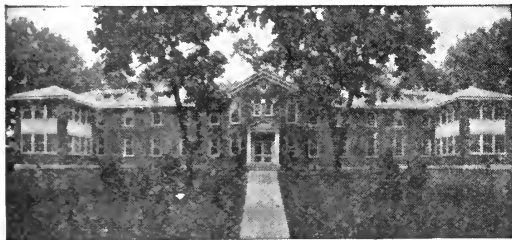
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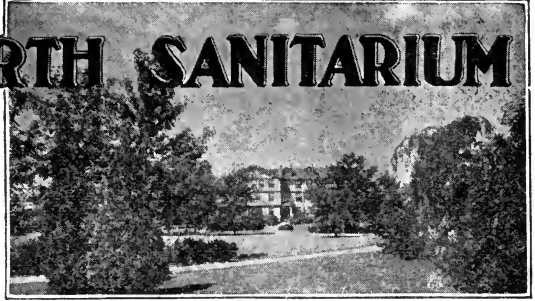
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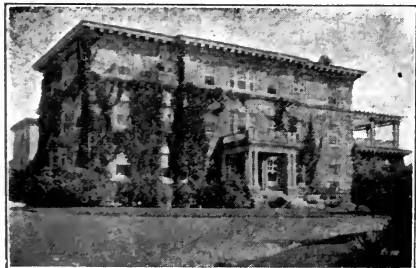
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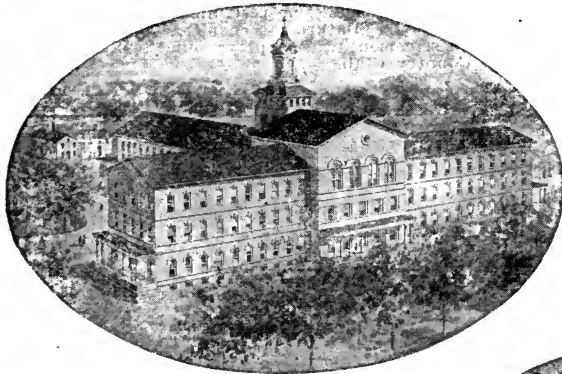
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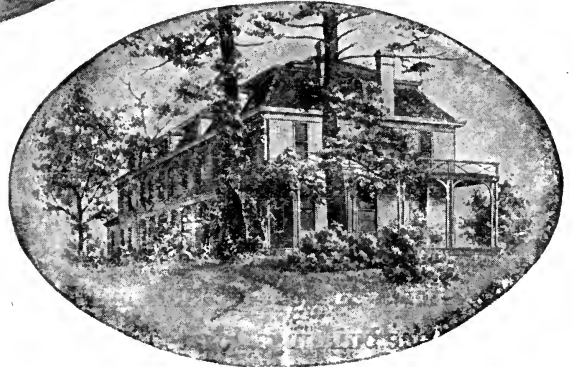
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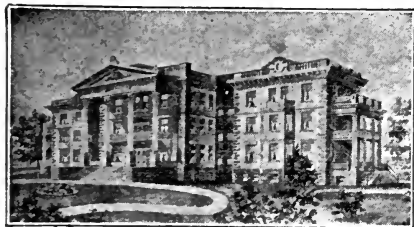
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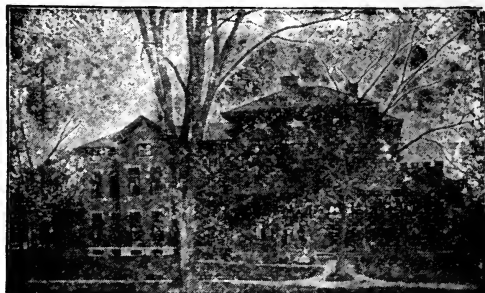
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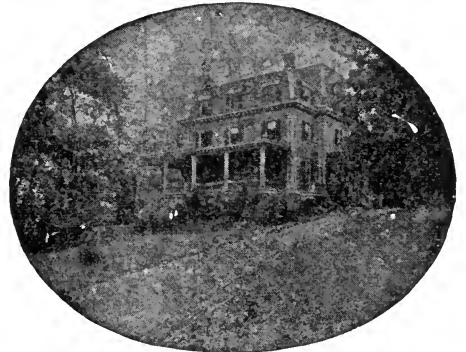
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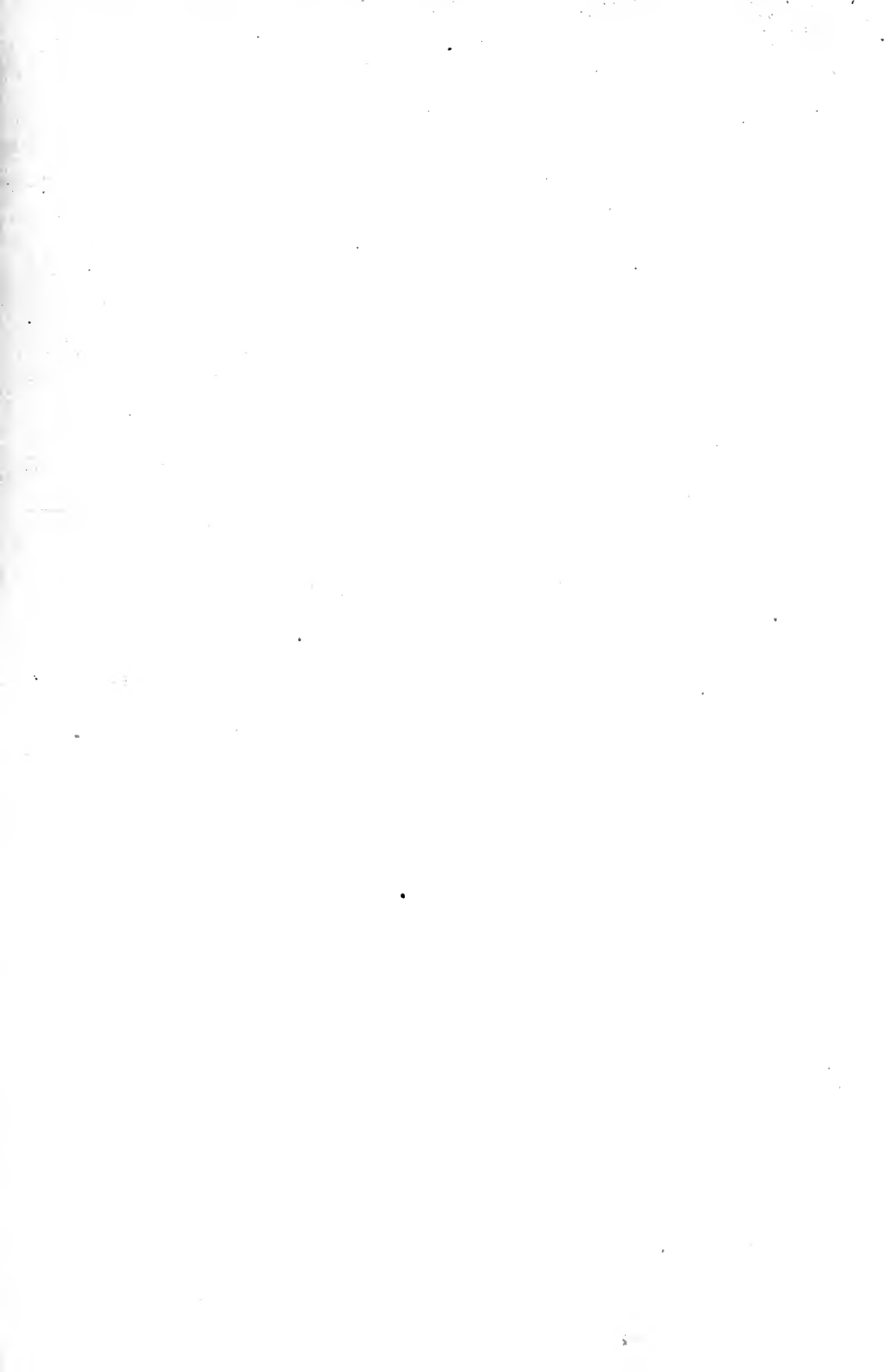
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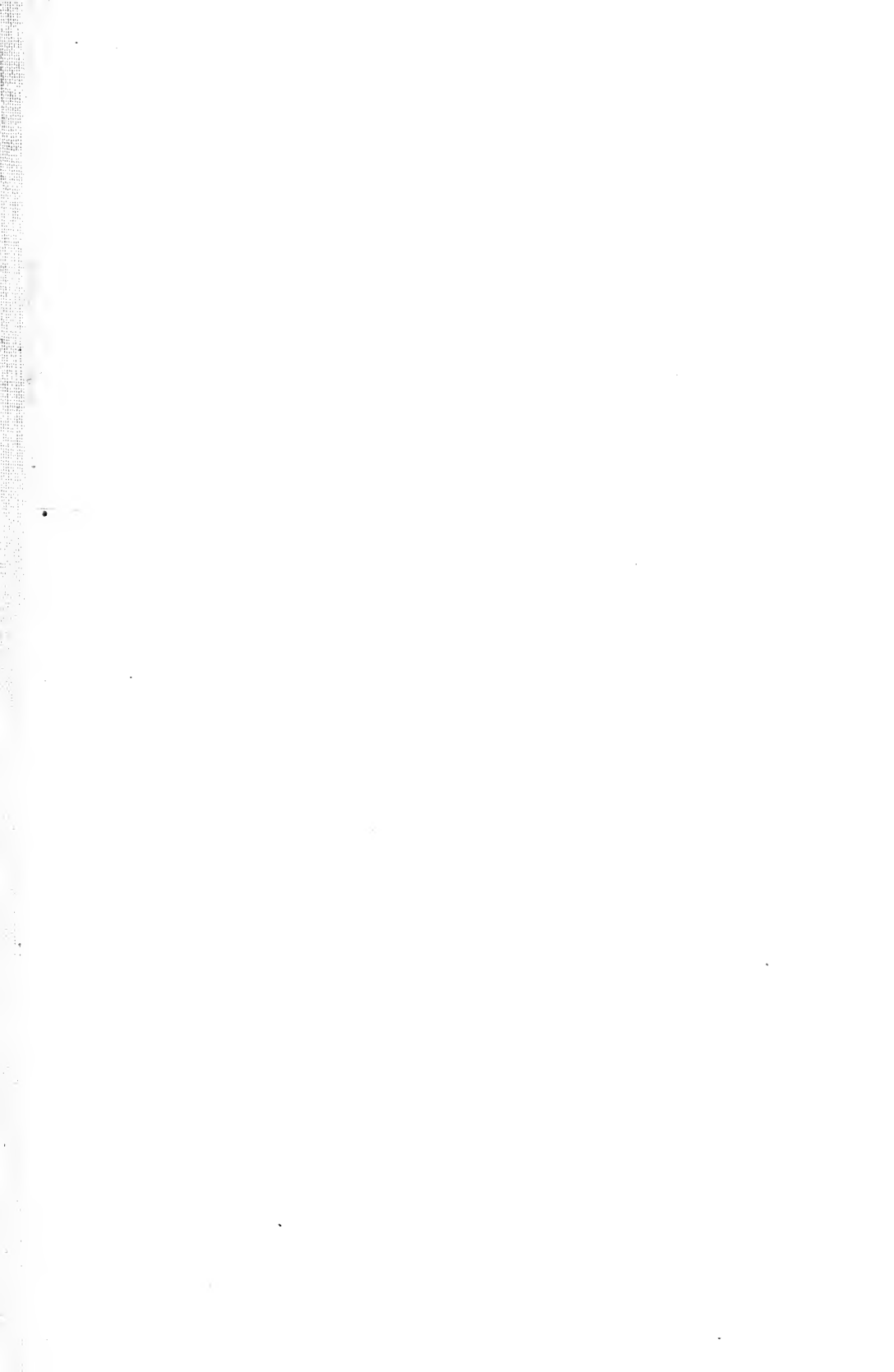
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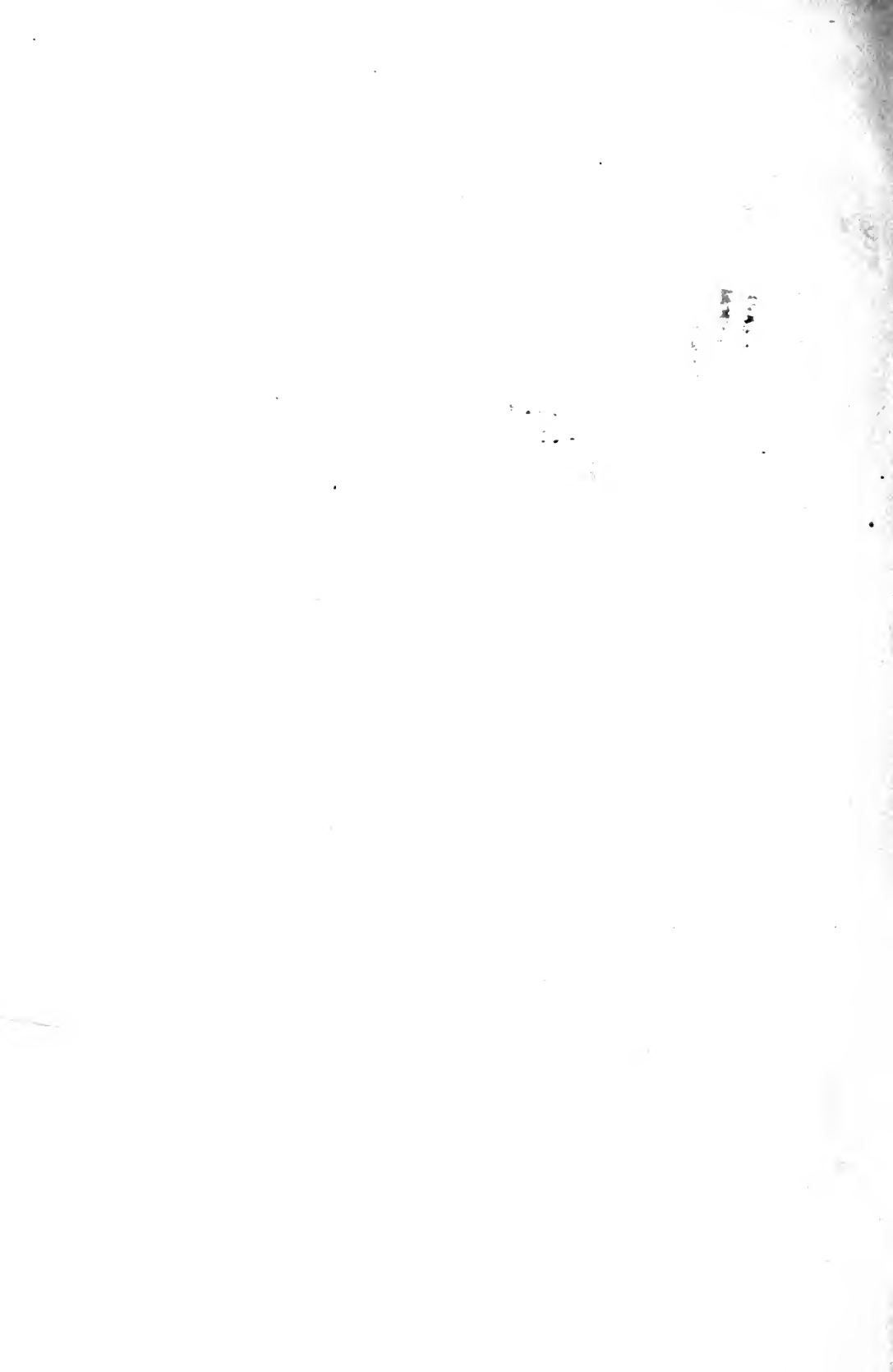
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