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Original Articles

PHENOMENA OF NEUROBIOTAXIS AS DEMONSTRATED BY THE POSITION OF THE MOTOR NUCLEI OF THE OBLONGATA[1]

By C. U. Ariëns Kappers

What laws govern the arrangement of the elements of the nervous system is a question which has frequently puzzled the minds of neurologists. So long as the embryology and the phylogeny of the nervous system were still very insufficiently known, only suppositions could be made concerning such laws. From comparative embryology has come the first impetus to a systematic study of this question.

It is, however, only the determination of the growth of axis cylinders and dendrites that has been taken into consideration by embryologists. The determination of the position occupied by the ganglion cells is a problem which is scarcely mentioned by them.

Among the first whose researches led him to give considerable attention to the outgrowth of axis cylinders was His, senior. This author, generally prone to consider the purely mechanical factors as the most important in the evolution of the nervous system, was also inclined to see a mechanical problem in the determination of the growth and arrangement of these nervous elements.[2]

He tried to solve this problem, assuming that the direction of

[1] From the Central Institute for Brain-research of Holland. Amsterdam. Emended and expanded study, first appearing in Seventeenth International Congress of Medicine.

[2] His, sen., Die Entwicklung der ersten Nervenbahnen beim menschlichen Embryo, Archiv f. Anatomie und Physiologie, Anatomische Abteilung, 1887. See also: Die Entwicklung des menschlichen Gehirnes, 1904.

growth of nervous elongations was determined by the places of minor resistance, which would lead them to form those connections which they finally have.

Ramon y Cajal (see below), who has written a critique on this theory, justly remarks that this assumption does not explain the question, but only displaces its solution.

Accepting that only a general tendency of growth is present in the ganglion cell, and that the direction in which this growth shall be effected only depends on preëxisting spaces and paths in the surrounding tissues, the question remains: what has determined such a typical arrangement of this tissue, so that delicate fiber-tracts are directed in the right way?

It seems also possible that the peculiar arrangement of tissue is originally formed, or at least influenced, by the same forces by which nerves of central fibers are directed, and that afterwards this "path" is inherited and so well preformed that even foreign nerves or foreign central fibers (not present in this path under normal conditions) shall follow its course if they are transplanted in their neighborhood.

Concerning nutrition theory of His, jun.,[3] I refer to the original.

The observations of Held[4] are of more importance. After a full exposé of the history concerning the development of nerve cells and fibers, Held mentions that the cells of the nervous system are already—before the formation of fibrils—in mutual connection by intra-cellular bridges: plasmodesms (cf. also Braus[5]).

In such plasmodesms the fibrils, *i. e.*, the nervous path, are formed. In this process vicinity of cells (p. 47) and axial differentiation (p. 68) act a part.

Held himself is, however, perfectly convinced that the presence of these plasmodesmic forepaths alone cannot explain the *selection* in the fibrillo-formation, since it appears that alone in special plasmodesmic forepaths the definition formation of the nerve takes place. He calls the unknown cause (loc. cit., p. 270) of this *selection* "das Prinzip der Wegstrecke" "principle of the way" and discusses (pp. 270–80) the different possibilities that may explain this selection. He does not believe in a mechanical cause, and Cajal's theory of chemotaxis does not appeal to him since he supposes that diffusion will speedily spread the chemical substances

[3] His, jun., Die Entwicklung des Herznervensystems bei den Wirbeltieren, Abhandlungen der Kön. Sächs. Akad. der Wissenschaften, Math.-Phys. Classe, Bd. xviii, 1893

[4] Held, Die Entwicklung des Nervengewebes bei den Wirbeltieren, Barth, Leipzig, 1909.

[5] Braus, Die Entstehung der Nervenbahnen, Vogel, Leipzig.

that should act as leading factors. He is inclined to believe—accepted that such chemical substances are produced—that a special absorbing character for these substances in certain paths should be the cause of the selection, but he does not say by which process this special absorption should be caused. More satisfactory to me is his more general expression that the fibrillo-formative substance of the cell must be "receptive for the manifold impulses . . . which work upon it from the structures about it" (p. 273). He thus leaves without discussion the chemical process that might or might not accompany these stimuli.

Very accurate work on this subject has been done by Cajal, who also limited his observations to the process of outgrowth of axis cylinders, collaterals, and dendrites, and hardly alluded to the determination of the localities occupied by the cell-bodies themselves.

In his standard work on the retina, then in his text-book on brain anatomy, in his treaties on regeneration, and finally in his exposé of the neurotropic hypothesis, Cajal has carefully tested the rich material of his personal observations.[6]

A great amount of observations and experiments gave him the conviction that, apart from some mechanical influences (as the central periventricular arrangement of the germinal cells, the presence of a membrana limitans externa), the direction of growth is determined by *chemotactic substances* in the central nervous system, and the sensibility for these substances in the outgrowth of cells.

As far as concerns the secretion of chemotactic substances Cajal supposes that this does not take place in all cells at the same time, but that different cells of the central nervous system pass this stage of secretion at different times of their embryological development. The first cells which come in this state of secretion, and consequently have a directing influence on the outgrowth of nerve-cells, would be spongioblasts, especially the external part of their cell-body, which exhibits in early stages a fringed condition. This outer division would cause the proliferating buds of the axis cylinder to grow in external directions. The myotomes and the epithelium of the skin would come next in a stage of chemotactic activity, while the cells of the central nervous system itself would come last in this condition.

[6] Cajal, La rétine des vertébrés, La Cellule, t. ix; Die Regeneration der Nervenfasern (originally in Spanish; Trabajos, &c., t. iv); Influencia de las condiciones mecanicas sobre la regeneracion de los nervios, Sociedad española de Biologia, Boletino, 1908; Algunas observaciones favorables á la teoria neurotropica, Trabajos, t. viii, p. 63, 1908; Estudios sobre la degeneración y regeneración del sistema nervioso, t. i, Degeneración y regeneración de los nervios, Madrid, 1913.

Although it seems strange to ascribe to so many various elements in an early stage of development, spongioblasts, muscle-cells, epithelium, nerve-cells, this capacity of directing in certain stages of evolution the outgrowths of nervous elements, the fact that proliferating tissue, even non-nervous, is able to exercise such an influence on axis cylinders and collaterals is clearly demonstrated by the experiments published by Cajal himself (*Trabajos,* t. viii) and the observations made by Forssmann,[7] Lugaro,[8] the Rossis,[9] Marinesco and Minea,[10] Dustin,[11] and others.

The simplest example of this influence is given by the proliferating connective tissue of a posterior or anterior root after lesion of that root.

Some days after the operation the axis cylinders of the roots are found to send a great quantity of collaterals into this proliferating tissue, which obviously exercises a stimulating and at the same time a directing influence on the axis cylinders.

This stimulating and directing influence, according to Cajal, can be so great that even the axis cylinders of the lateral funiculi are stimulated to send collaterals into the roots or root-fibers to send recurrent collaterals into the spinal cord.

The stimulating and directing influences of proliferating tissue on the outgrowth of nerve-fibers may thus be considered as a matter of fact.[12]

Since, however, these experiments have not directly to do with the normal development of the nervous system, but are observed in transsections, extirpations, cicatrizations, or transplantations of nervous tissue, this short quotation may suffice. For fuller details I refer to the above-mentioned authors, especially to Cajal's article in vol. viii of the *Trabajos,* where also the literature on this subject is collected.

Concerning the development of the central nervous system, Cajal points out in his text-book that we are obliged to accept that each cell of the central nervous system must be considered as being both active and passive, *i. e.,* it attracts and is attracted..[13]

[7] Forssmann, Zur Kenntnis des Neurotropismus, Zieglers Beiträge, Bd. xxvii, 1900.

[8] Lugaro, Sul neurotropismo e sui trapianti dei nervi, Rivista di patologia nervosa e mentale, vol. xi, 1906.

[9] O. Rossi, Processi regenerative, &c., ibid., vol. xiii, 1908. U. Rossi, Per la regenerazione dei neuroni, Trabajos del labor. de Madrid, t. vi, 1908.

[10] Marinesco et Minea, Recherches experimentales et anatomo-pathologiques, &c., Folia Neurobiologica, i, 1908.

[11] Dustin, Le rôle des tropismes et de l'odogenèse dans la régénération du système nerveux, Archives de Biologie, t. xxv, 1910.

[12] It may be remembered that this influence is not only exercised on nerve-cells, as the study of regeneration teaches us that also other tissues may be stimulated and directed by localities of regeneration.

[13] Only the spongioblasts form an exception. In a stage of evolution they attract and direct the growth of axis cylinders, but their own growth is not chemotactically directed.

The stage of attraction should be a temporary one, and coincides with the evolution of the cell, of which also the above-mentioned experiments may be considered as proofs.

Since the evolution of the different cells takes place in different stages of development of the nervous system, the attractive or, as Cajal calls it, the *chemotactic* function of different cell-groups would also take place at different times. The sensibility for this attracting influence would be present as well in the cell-body as in the dendrites and axis cylinders.

This differentiation in two sorts of expansions, axones (with collaterals) and dendrites, depends, according to Cajal, on the sequence of formation of chemotactic sources.

The spongioblasts should cause the first outgrowth of axis cylinders, and their influence as such would be continued by developing muscles, epithelium, cells of skin, and sense organs and nerve-cells, while the end branches of the axones should cause the dendritic expansions to grow in certain directions (p. 558). His histological observations taught him that the latter are, as a rule, only formed if the axone has or has nearly reached its end point (p. 523).

In this interesting exposé—based on a great number of observations —it is necessary to notice that Cajal ascribes a considerable influence to the spongioblasts in the direction of the outgrowth, not only in such a sense that their presence may have a mechanical influence on the shape of the path but specially in a chemotactic sense.

Not only the central outgrowth of various roots but also the commissural fibers (one of the first intra-cerebral tracts) should be directed in their outgrowth by the epithelial cells of the anterior wall of the central canal. Even the first outgrowth of the anterior roots, as long as they have not yet left the cord, should be directed by the spongioblasts.

Apart however from the fact that *Cajal* considers the ependyma cells as the first source of neurotropic phenomena his assumption of "substances attractives"—(accepted even that such substances are secreted in the nervous system) does not explain the matter.

It only means a displacement of the question and its answers, since *Cajal* does not mention which factors determine the secretion of these substances. If such factors are of an engrammatic, hereditary origin—as may be supposed in embryological development (partly at least) than we have to ask—for a complete insight in the whole process—of which determinating moments they are an expression. As long as we are not acquainted with the factors that determine these secretions, we know little more, indeed, than we did before.

Cajal himself has felt this and says plainly in his excellent work on the retina (p. 240):

> This hypothesis presupposes the existence of certain preliminary chemical and morphological conditions which are wholly inexplicable; for example, the production in the different portions of the centers of the substances, attractive or repellent according to *preëstablished laws,* the suspension or the transformation of the chemotactic state of each element for certain limited periods, etc. One might say that this theory merely defers the difficulty without reaching a solution.

This is also my opinion.

Nevertheless, the facts found by our Spanish colleague keep their value.

Of more importance than Cajal's chemotactic theory, is his remark concerning the *displacement of the ganglion cells themselves* in the ontogenetic development of the nervous system.

This remark, not known to me when I started my own researches on this point, is in perfect harmony with my own observations. Cajal expresses himself like this (t. i, p. 560): "If after a condition of relative rest new axones proceed to some nervous territory, a neurone can approach these axones in two days; either by sending out new dendrites or by a shifting of the cell-body itself, which may be guided by a large dendrite in the direction of the newly arrived axones.

Cajal mentions as examples of this cell-shifting into the direction of a territory of new nervous organization the superficial granular layer of the cerebellum and the spinal ganglia.

It appeared to me in my comparative researches on the oblongata and mesencephalon that *this displacement of nerve-cells in the direction of the place of stimulation is a factor of utmost importance for the architecture of the nervous system,* and that it plays a greater part than even Cajal could suppose at that time. It is a great satisfaction for me to confirm this author's statement as far as regards the shifting of cells, the more since my first observations and deductions on this subject were made before I knew Cajal's short remark on this matter.

I have, however, avoided the word "chemotaxis" in my conception of this process (although the similarity also struck me) because I have not found sufficient evidence for such a name, and I have used the expression *"Neurobiotaxis"* on account of this being a process of taxis or tropism occurring under normal conditions of nervous action, that is, under the influence of reception and propagation of stimuli.

I will emphasize here that *this process cannot be explained by the presence of plasmodesmic "forepaths."*

Since cell-migration in a certain direction is generally preceded by the outgrowth of a large dendrite in the direction in which the shifting of the cell shall take place, we may accept for a moment that the dendritic outgrowth follows a preformed plasmodesmic path, and that consequently the cell, if it follows that outgrowth, does the same. In so far plasmodesms could accompany or even precede the process, but what can never be explained by the presence of such a plasmodesmic forepath is why in one case only the dendrite follows this plasmodesmic way, while in the other case also the cell itself migrates along this path. Or, in other words, the principal question, *the shifting of the cell,* cannot be explained by it, and my studies, now covering all the cranial motor nuclei in all classes of vertebrates, have taught me with certainty that for this phenomenon *only the process of taxis or tropism exercised by the centres from which the majority of stimuli proceed to the cell and its dendrites can be considered as responsible.* It would take too much space if I gave even a short exposé of the phenomena of cell-shifting, or discussed in detail the different stimulating or afferent fiber-systems which in each case have to be considered responsible for the location of the cells. For those details I refer to my former publications on this subject.[14]

It is only mentioned here that comparative researches show that the motor nuclei of the oculomotorius, trochlearis, trigeminus, abducens, facialis, glossopharyngeus, vagus, accessorius, and hypoglossus occupy very different places in the brain-stem of the different classes of vertebrates as is shown by the colored plates accompanying this article.

The *oculomotor nucleus* may be located as well dorsally under the mid-brain ventricle (in most cases), as partly dorsally, partly ventrally (Petromyzon and Teleostei).

[14] Specially to: The migrations of the Motor cells of the bulbar Trigeminus, Abducens, and Facialis in the series of Vertebrates and the differences in the course of their root-fiber, Verhandelingen der Kon. Akad. v. Wetenschappen, Amsterdam, Tweede Sectie, Deel 16, Nr. 4, 1910.

Weitere Mitteilungen über Neurobiotaxis, VI. The migrations of the motor root-cells of the vagus-group and the phylogenetic differentiation of the hypoglossus nucleus from the Spino-occipital system, Psychiatrische en Neurologische Bladen, 1911.

Weitere Mitteilungen über Neurobiotaxis, VII. Die phylogenetische Entwicklung der motorischen Wurzelkerne in Oblongata und Mittelhirn, Folia Neurobiologica, Bd. vi, Sommerergänzungsheft, 1912.

See also: The arrangement of the motor nuclei in the brain of Chimaera monstrosa, compared with other fishes, Verhandelingen der Kon. Akad. van Wetenschappen, Amsterdam, 1912.

The structure of the autonomic nervous system, compared with its functional activity, Journal of Physiology (Cambridge), vol. xxxvii, 1908.

The *trochlear nucleus* may lie dorsally in the velum cerebelli (Petromyzon) as under the floor of the fourth ventricle (most vertebrates). In Petromyzon it is found far behind the III nucleus, near the level of the Vth; in most vertebrates, however, it is shifted in a frontal direction, lying either very close to the oculomotor nucleus or being continuous with it.

The *trigeminus nucleus* is always situated near the level of its root-entrance, but in some animals (Petromyzon, Amphibia) is found directly under the floor of the fourth ventricle, in others (Teleostei and Reptilia), partly, and again in other animals (mammals) entirely in the middle of the oblongata.

The *facial nucleus* is sometimes found in a dorsal position (Rana and Petromyzon). In others (Selachii, Ganoids and Urodele Amphibia) it has still a dorsal position, but is shifted a long distance behind the entrance of its roots, being continuous with the nucleus of the IX and X columns. In Teleosts a part of the nucleus (sometimes connected with some IX cells) has descended a short distance ventrally along Herrick's anterior gustatory tract.

As a rule the descent of the facial nucleus takes place behind the level of the root-entrance (Reptilia and mammals, with the exception of Monotremes); in birds, however, this descent takes place in front of the root-entrance.

In those animals in which the VIIth cells descend behind the level of the root, the nucleus is either found to lie medially to the superior olive (Alligator), behind it (most mammals), or partly behind, partly laterally to it (Homo).

Only one or two small groups of cells keep a dorsal position.

Similar displacements are found in the *abducens nucleus*. Originally[15] in lower vertebrata it is located behind the VII entrance (Teleostei, Selachii, Amphibia), sometimes lying nearer the VIIth root (Teleostei), sometimes nearer the IXth (several Amphibia). In the Selachii and Amphibia it has a dorsal position next the fascic. longitudinalis posterior in Teleosts, however, it is located very ventrally, mostly divided into two parts, and dorsal cells are scarcely found.

In Reptilia it exhibits a frontal displacement. In water-living Reptilia it extends from the IXth root to the entrance of the VIIth. This frontal elongation is followed by a caudal retraction in land-living Reptilia, so that the greater part of it is found in or near the level of the VIIth. This position is kept in most birds and Mam-

[15] For Petromyzon see: Tretjakoff, Archiv f. mikroskopische Anatomie, Bd. lxxiv, 1909 (Das Gehirn von Ammocoetes).

malia, but in most of the latter the nucleus has acquired a more dorso-lateral position, not under, but next to the horizontal root of the VIIth.

Also the nuclei of the IX, X, and XI suffer considerable displacements.

The motor *glossopharyngeus nucleus* has a dorsal position in Cyclostomes and Selachii, being continuous with the (dorsal) vagus nucleus. In Teleostei it may be separated from the Xth nucleus and more or less shifted ventrally together with the frontal part of the facial nucleus.[16] Lying dorsally in Amphibia and in most birds, it has a more or less ventral position in Reptilia, where it is united with the facial nucleus. Its position is still more ventral in mammals, where it forms the frontal part of the nucleus ambiguus, being connected with the ventral Xth nucleus.

Only some of the cells, those that innervate the salivatory system of the parotis, keep a more dorsal position, together with some dorsal VII cells (Hayama and Yagita), innervating the submaxillary gland.[17]

The entire *vagus nucleus* has a dorsal position in all animals with the exception of birds and mammals. In birds the posterior part of the ventral vagus nucleus is formed (posterior part of the ambiguus), and besides this a number of the dorsal cells are shifted in the direction of the XII nucleus of these animals and constitute, with a part of the XII cells, a special phonation nucleus. In mammals only those cells of the vagus column have kept their dorsal position which innervate the esophagus, the stomach, and the lungs. The motor root-cells of the larynx and the heart (Kosaka) have acquired the same ventral position as the glossopharyngeus cells, and constitute the caudal division of the nucleus ambiguus. Apart from the elongation which the posterior part of the dorsal X nucleus: the *accessorius nucleus* exhibits (having only one root in fishes, three in some Reptilia, and up to seven in mammals), it also acquires a ventro-lateral position in the latter, instead of the dorso-medial position present in lower vertebrates.

The most striking phenomena of displacement is however shown by the *anterior spino-occipital nerves,* during their transformation in *hypoglossus roots.*

[16] For Menidia, see Herrick's paper, Journ. of Comp. Neurol., vol. ix, 1899.

[17] Ueber das Speichelsecretionscentrum Neur. Centralblatt, 1908, No. 15; and Weitere Untersuchungen über das Speichelsecretionscentrum, An. Anzeiger, Bd. xxxv.

Originally, in animals without a muscular tongue, the corresponding center of this nerve is simply an elongation of the anterior horns of the cervical gray matter, remaining with its frontal limit far behind the frontal limit of the IX–X nuclei. In animals with a muscular tongue it loses successively its continuity with the cervical horns, and shows a dorso-frontal displacement, so that at last (in mammals) its frontal extremity reaches about as far frontally as that of the IX–X systems.

At the same time the position of the cells has become so dorsal that they lie for a considerable part dorsally to the fasciculus longitudinalis dorsalis.

A careful study of these displacements and a comparison with the other phylogenetic changes in oblongata and mid-brain have given me the conviction that these shiftings are caused by the differences in stimulation, viz., the difference of development of their corresponding posterior roots, and the differences in the sensory, optic, vestibular, acoustic, and other reflexes that influence their function. At the same time changes in the muscular system which they innervate complicate these factors.

The nuclei appear to shift in the direction of the places whence the majority of stimuli proceed to them.

For the *eye-muscle nuclei* the optic and vestibular reflex tracts appear to be the most important factors for the determination of their location, and the changes in position which they exhibit appear to run parallel to changes in the optic, vestibular and coördinative reflex tracts.

The associative function of *oculomotor* and *trochlear* nucleus may be considered as the cause of the close relationship in most vertebrates, although the former is originally found nearer the basis of the mesencephalon, and the latter[18] above the fourth ventricle in the velum cerebelli, lying, moreover, a long way behind the former in the region of the trigeminus in Petromyzon. In higher vertebrates they are grouped round the fasciculus longitudinalis dorsalis, a highway of optic and vestibular associative reflexes, and the trochlear nucleus shifts in a frontal and ventral direction to reach the place of reflex action, where also the III nucleus is found (Tretjakoff).

Röthig found in Bufo and Rana a considerable elongation of the IV nucleus, which points out that in these animals the frontal shifting is not yet entirely completed. In Teleosts, in which this fasci-

[18] Tretjakoff, Das Gehirn von Ammocoetes, Archiv f. mikroskopische Anatomie, Bd. lxxvi, 1909.

= nucl. & rad. III = nucl. & rad. IV = nucl. & rad. V = nucl. VI

= nucl & rad. VII = nucl. IX = nucl. X[1] = nucl. occ.

= nucl. spinalis et XII = calamus scriptorius.

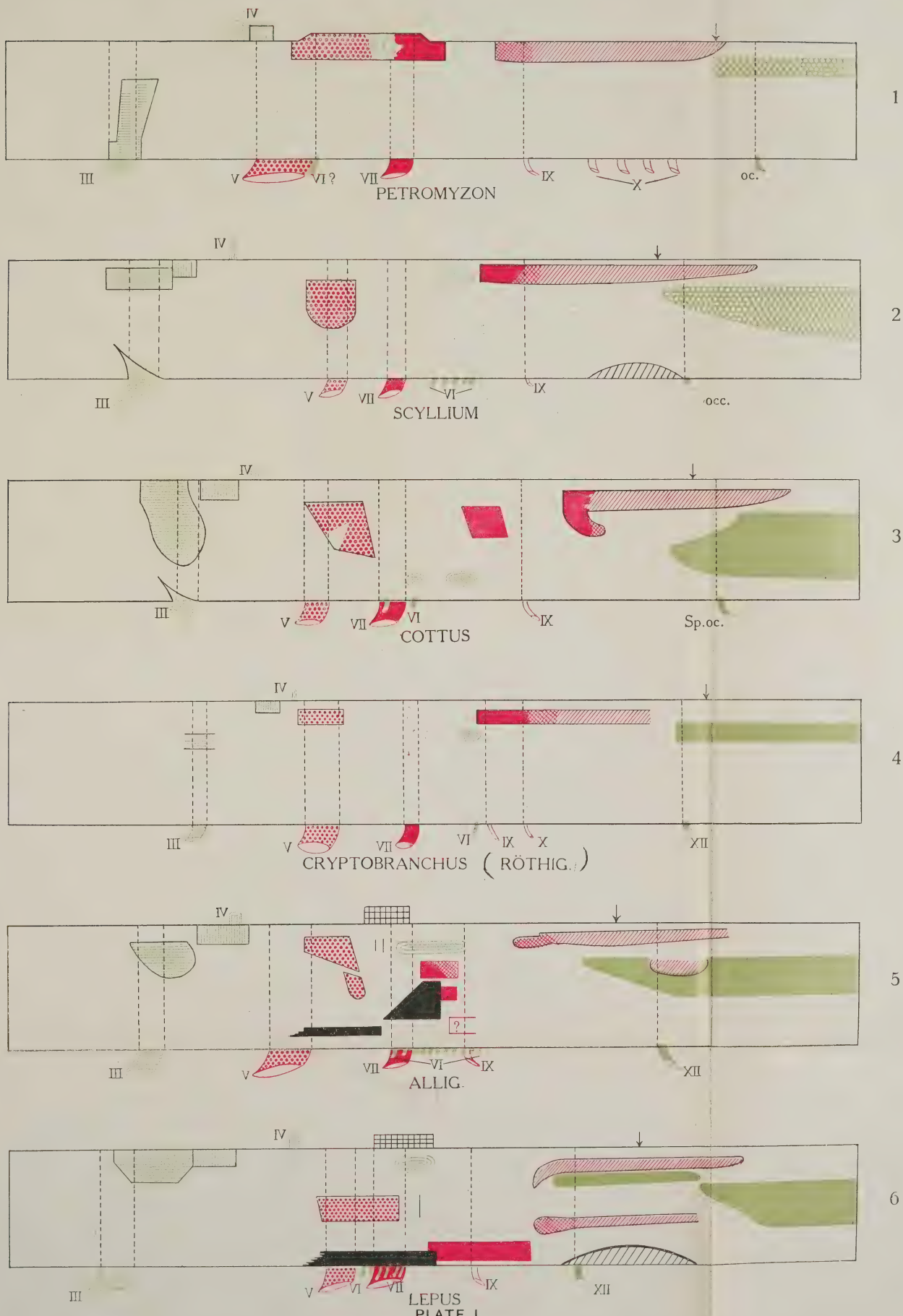


PLATE I.

Comparative Topography of the Motor Nuclei of the Cranial Nerves in a Lamprey (*Petromyzon*), a Shark (*Scyllium*), a Bony Fish (*Cottus*), an Amphibian (*Cryptobranchus*), a reptile (*Alligator*) and a mammal (*Lepus*).

culus is less developed, a large part of the oculomotor nucleus has a ventral position on the large ventral tecto-bulbar tract of these animals.

A neuro-biotactic phenomenon of great importance has been described recently by Brouwer[19] who traced the formation and frontal shifting of the central nucleus of Perlia which serves convergence and phylogenetically grows forward between the nuclei of Edinger-Westphal, which innervate the internal eye muscles and consequently serve the internal accommodation. Great differences are shown by the *abducens nucleus*.[20] In Selachii, in which the fasciculus longitudinalis *dorsalis* acquires the largest size known in the comparative anatomy of the bulb, its cells are located next, even partly between the fibers of this tract. In Teleosts, where the *ventral* tecto-bulbar tracts have such an enormous size, the nucleus has a ventral position, and lies close to these tracts. In the higher vertebrata the dorsal position of this nucleus is again found, but its cells shift in a frontal direction, so that instead of lying between the level of the VII and IX root, they are found on the level of the VII root, apparently shifted in a frontal direction.

This frontal displacement of the VI nucleus is introduced in Chelone and Alligator by a frontal elongation of the nucleus, similarly as Röthig could demonstrate it for the trochlear nucleus of some Amphibia. This shifting is apparently caused by the influence of the anterior part of Deiters's vestibular system and the nucleus triangularis vestibuli, which becomes still more obvious in most mammals, where the position next the fasciculus longitudinalis posterior is even left, and the cells shift in a dorso-lateral direction, approaching more the floor of the ventricle, and acquiring a much closer relation to the principal nucleus of the vestibular nerve and Deiters's nucleus, apparently attracted by these centers as well as by other reflex systems that proceed to them from a dorso-lateral direction, as I have specially demonstrated for Rodentia, Ungulates, and Man, in contradistinction to Carnivora.

For the displacement of the originally dorsal *trigeminus nucleus* to the mid-ventral part of the oblongata the position of its sensory nucleus may be considered to be responsible. Chiefly in those animals which chew their food (mammals), this typical position next to the sensory nucleus of the mouth, teeth, and jaws, is found.[21]

[19] *Brouwer*, Klinisch-Anatomische Untersuchungen über den Oculomotorinskern. Zeitschr. f. d. gesammte Psych. und Neur., 1917.

[20] According to Tretjakoff in Cyclostomes the VIth nucleus is found in the caudal part of the Vth nucleus.

[21] In some Teleosts, which do not chew their food but swallow it directly, the nucleus is found to run along a gustatory center and tract.

For the considerable caudal displacement exhibited by the *facial nucleus,* the centers of taste (located on the level of the glossopharyngeus entrance) are of great importance. This explains why in animals with a poor development of the sensory taste fibers of the VII (and IX) nerve (Cyclostomes and especially birds) this caudal displacement fails.

In birds this nucleus, which here chiefly innervates the posterior belly of the musc. biventer, even unites with the Vth nucleus that innervates the anterior belly.

The development of the facial muscle-system from a branchial system to a system of the face itself, and the considerable rôle which this musculature acquires for the organs of vision (eyelid movement), hearing (stapedius and ear-shells), smell (nostrils), with the fact that the musculature of the facialis is chiefly covered by a trigeminus skin, are to be regarded as the causes of the fact that the dorsal facial nucleus leaves its location near the VII–IX taste center, and descends, thus approaching the fibers of the descending Vth, the oliva superior and tecto-bulbar fibers of the visual reflex system, and the spino-bulbar reflex fibers that accompany *Gowers'* tract.[22]

From this standpoint it is very interesting to notice that only a small part of the facialis cells keep their dorsal place near the center of taste, and that the researches of Yagita and Hayama have proved that these cells constitute the *salivatory center of the submaxillary and sublingual glands.* It is similarly proved that the only cells of the *glossopharyngeus nucleus* that keep a dorsal place near the dorsal taste center, form the *salivatory nucleus* of the *parotis.* A more striking proof for the determination of the location of the motor-cells by their chief sensory center—that is, by neurobiotactic influences—can hardly be given.

Concerning the *ventral nucleus of the glossopharyngeus,* the front part of the nucleus ambiguus, we may state that, contrary to the salivatory glossopharyngeus nucleus just mentioned, it innervates striated musculature and that it lies next to reflex paths of this musculature.

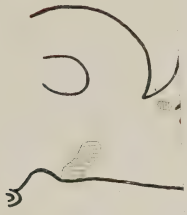
We know from the researches of Stuurman and those of Kosaka and Yagita that the *dorsal vagus nucleus* innervates the lower part of the esophagus, the stomach, and probably the lungs (in animals with a large stomach, birds, and cows, it is extremely large;[23] in

[22] For the VIth nucleus in Petromyzon, see the other plate.

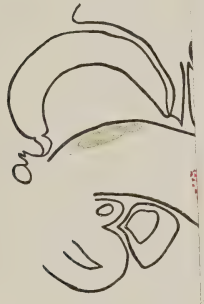
= NUCL.I

= NUCL.I

= NUCL.V



PETROMY
LAMPREY.



SCYLLIUM

= NUCL. III

= NUCL. IV

= NUCL. V

= NUCL. VI

= NUCL. VII

= OLIVA SUP.

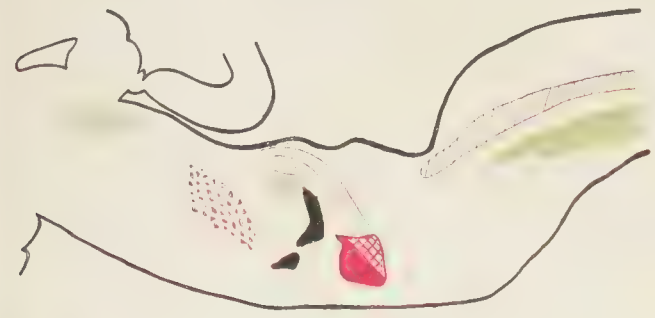
= NUCL. IX

= NUCL. X

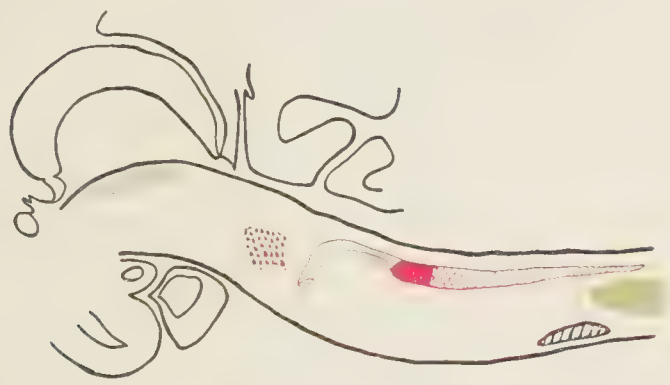
= NUCL. XII

= OLIVA INF.

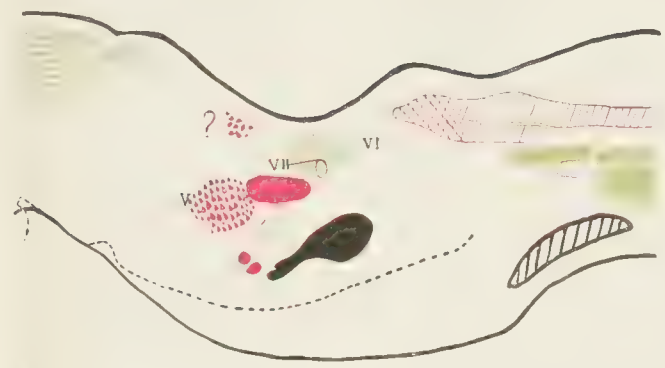
PETROMYZON.
LAMPREY.



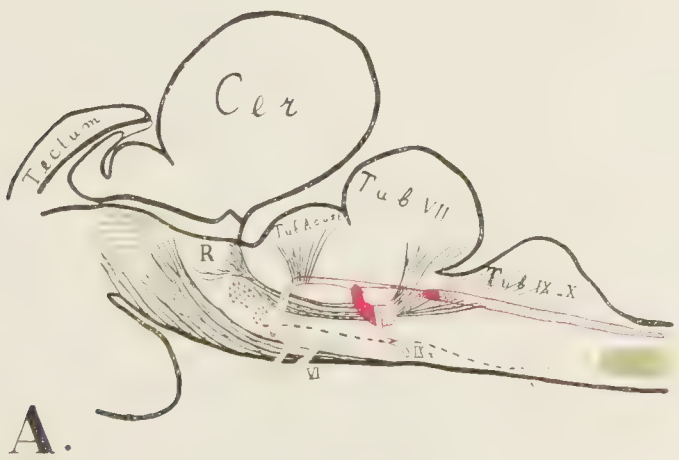
VARANUS.
AFRIC. LIZARD.



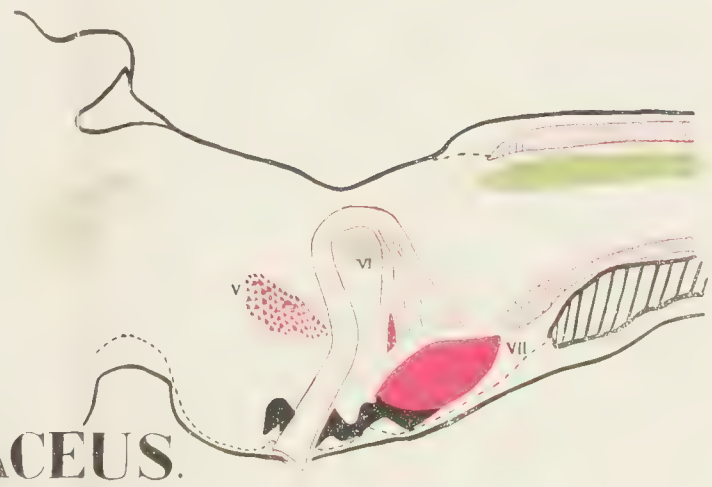
SCYLLIUM.
SHARK.



CICONIA.
STORK.



TINCA.
TENCH.



ERINACEUS.
HEDGEHOG.

RANA.
FROG.

HOMO.

PLATE II.

This plate can be obtained as a wall-diagram, seven times magnified (measuring 1.5 × 1.9 m.)printed in the same colors and provided with Latin inscription for the price of eight dollars at Wed. Ahrend & Zoon, publishers, Amsterdam.

animals with a small muscular stomach it is small). This nucleus for unstriated musculature of visceral character keeps its position next to its chief sensory center: its own sensory root fibers, as may be expected from a motor center which acts chiefly on reflex impulses from the viscera—its own sensory root being its chief stimulating center in the medulla.

The *ventral nucleus vagi,* whose constituents originally are in a dorsal position, may have shifted under the influence of the mid-ventral fiber system of the oblongata. It is striking that the formation of this ventral nucleus runs parallel to the development of the larynx-muscles, which are practically only well developed in mammals. It is also only in mammals that the entire ventral ambiguus is found,

That the formation of a center for sound-production has really to do with these cells seems to be proved by the condition found in birds, where a small number of vagus cells has shifted in a ventral direction—only a very short distance however—thus approaching dorsal cells of the hypoglossus column, which innervate the syrinx of these animals: *nucleus intermedius* X and XII.

Since it is well known that the sound-production in birds is effected by the collaboration of larynx and syrinx musculature, we find here a striking case of the arrangement of motor cells to one reflex center (*nucleus intermedius*). That in mammals also this nucleus shifts much farther downwards may be due to a greater influence of ventral reflex paths, probably from the sensory Vth part of the Xth.

The situation of the heart-center in the posterior third part of the *nucleus ambiguus* is very difficult to explain. In harmony with the position of all the other visceral centers in the dorsal nucleus, one would expect to find this also in the same, and I would be seriously inclined to doubt its presence in the ventral nucleus, if amongst others such a careful and painstaking experimenter as Kosaka had not come to this conclusion.

It is strange that this division of the ventral Vagus nucleus is even the first to migrate in a ventral direction. In contrast to the glosso-pharyngeus nucleus (afterwards constituting the anterior division of the ambiguus) it is already found to shift in some Reptilia and in all birds. Whether this shifting has to do with the

[23] Vermeulen, Note on the size of the dorsal motor nucleus of the X in regard to the development of the stomach, Verhandelingen der Koninkl. Akademie v. Wetensch., October, 1913.

transformation of circulation which occurs in higher animals or with homeothermia (temperature tracts lying ventro-laterally) I dare not say.

The ventro-lateral displacement and caudal outgrowth of the *accessorius nucleus* in mammals are more easily understood if we consider the great enlargement of its muscular system in these animals, where it has become a most important element in the movement of the upper limbs. Since the conscious movement of limbs is chiefly effected by peripheral fiber systems in the spinal cord, it is not strange to find the caudal enlargement of this nucleus combined with a ventro-lateral dislocation. That the accessorius nucleus has however to be considered as a caudal outgrowth of the dorsal X nucleus is not only proved embryologically in Mammalia, but also by the relations as found in sharks (Davidson Black,[24] van der Horst[25]), and the fact that in many full-grown mammals, chiefly ungulates (Vermeulen[26]), the accessorius nucleus exhibits still connections with the dorsal vagus nucleus.

One of the most easily demonstrated displacements caused by difference of stimulation and reflex action is shown by the *hypoglossus nucleus.*

As long as a muscular tongue does not yet exist, the corresponding musculature is found in the ventral part of the anterior body wall, and its motor roots may possess a corresponding sensory root with a ganglion. The motor nucleus is continuous with the cervical gray matter, and originally does not reach farther frontally than the posterior extremity of the vagus nucleus (see Petromyzon).

The formation of the tongue, and the part which this musculature acts in it, give rise to an entirely different reflex action of these muscles in so far as they take part in it. Deprived of stimuli which act on the body wall, they come entirely under the influence of the sensory innervation of the mouth, and as a consequence of this their motor root-cells shift in a frontal and dorsal direction, thus approaching this center. The displacement in mammals is so considerable that the cells at last reach as far frontally as the anterior extremity of the vagus nucleus, and the place which they acquire is next to the dorsal center of the taste fibers of the VII, IX, and X,

[24] Davidson Black, The motor nuclei in phylogeny. A Study in Neurobiotaxis, Journal of Comp. Neur., vol. 26.

[25] Van der Horst, Die motorischen Kerne und Bahnen in dem Gehirn der fische, ihr taxonomischer Wert und ihre neurobiotaktische Bedeutung. Sydschr. der Ned. Durk. Vereeniging.

[26] Vermeulen, Proc. Royal Society, 1915, Amsterdam.

near which also tactile fibers of the V, VII, IX, and X run (Wallenberg).[27]

If the opinion of Brun,[28] who recently asserted that the nucleus intercalatus of Staderini is a center for mouth reflexes, is confirmed —which I believe it will be—it is not strange to find the nucleus of the tongue closely adjacent to it. A more striking proof can hardly be given for the determination of the place of motor cell by neurobiotactic influence of the centers from which the majority of its stimuli proceed during life, or, in other words, a more striking proof of the important part which is acted by neurobiotaxis for the configuration of the nervous elements is hardly to be found.

It is not possible for me to give a fuller exposé of this process, and a more detailed discussion of the forms in which it appears, in these few pages. I will only add that the neurobiotactic factor is equally found in the arrangement of the sympathetic system, and according to Herrick,[29] it can be equally traced in the architecture of the forebrain (septum nuclei). Also the position of the spinal ganglia of most vertebrates outside the spinal cord in which they are originally found (*Amphioxus*) and the peripheral displacement of cells of the ganglion Scarpæ in the direction of the cochlea, when this appears in phylogeny, is a shifting in the direction of stimulation. Similarly the formation of the optic and olfactory bulbs, in the direction of the light and smell, is an expression of it.

Concerning the psycho-chemical way in which this process acts I have given further details in the Journal of Comparative Neurology[30] where also the improtant findings of Bok[31] concerning the stimulogeneous fibrillation of the axones are mentioned.

In conclusion I may add that I have very rarely found mechanical influence to be of importance in the determination of the places of cells in the central nervous system. Only in some cases large bodies, as the superior olive are seen to have an influence in this way. Their influence is, however, generally surpassed, and eventually annihilated, by that of stimulation.

Referring for details to other publications, I have thought this Journal a valuable occasion for a short communication on this subject, especially since all the authors who deal with taxis or tropism

[27] Deutsche Zeitschrift f. Nervenheilkunde, Bd. xi, 1897.

[28] Arbeiten an dem Neurologischen Institut in Zürich, 1912.

[29] Herrick, The Forebrain of Amphibia and Reptilia, Journal of Comparative Neurology, vol. xx, 1910.

[30] Further Contributions on Neurobiotaxis, No. IX, The Dynamic Polarization of the Neurones, Journal of Comp. Neur., vol. 27.

[31] Die Entwicklung der Hirnnerven und ihrer zentralen Bahnen, Die Stimulogenefibrillation, Folia Neurobiol., Bd. ix.

in or outside the nervous system have hardly mentioned phenomena concerning displacements of the cell bodies themselves; their observations and conclusions—concerning little but the outgrowth of the cells, not the place of the cell itself.[32]

As far as regards the outgrowths of the cells I may mention that an impartial judgment of the course of fiber-tracts in the nervous system, especially of lower vertebrates, seems to give us sufficient evidence to say that their arrangement is also determined by associative or correlated stimulations.[33]

So we find the interesting fact that the laws which determine the material arrangements in the nervous systems are strictly homologous to the laws of psychology.[34]

It is the more satisfactory to state this fact, since my researches on neurobiotaxis have not been started with this conception as "idée préconçue," but naturally have resulted in this conviction.

[32] See amongst others the interesting researches of Harrison, The Outgrowth of Nerve-fibers as a mode of Protoplasmatic Movement, Journal of Experimental Zoology, vol. ix, No. 4.

Burrows, The Growth of Tissues of the Chick Embryo outside the Animal Body with special reference to the Nervous System, ibid., vol. x, 1911, and Braus (loc. cit.).

[33] For fuller details concerning this special point I refer to my article on Neurobiotaxis in the Folia Neurobiologica of 1908, and to a lecture read before the Psychological Congress held in Frankfurt a. M., 1908.

Very interesting facts concerning the influence of correlative function on the formation of fiber tracts are found in Herrick's brilliant paper on The Centers of Taste and Touch in the Oblongata of Fishes, Journal of Comp. Neurol., 1906, and Bok's paper on Stimulogeneous fibrillation.

[34] For further details see Journ. of Comp. Neur., vol. 27.

A CRITICAL DISCUSSION OF THE NATURE OF ESSENTIAL MYOCLONIA

By L. Pierce Clark, M.D.,

NEW YORK CITY

If in 1881 Friedrich had deliberately attempted to confuse neurology in his original description of a type of nervous disorder by recording an unusual form of clonic muscular contractions which affected chiefly the muscles of the extremities and trunk, he could hardly have been more successful than in the outcome which has actually taken place. This mishap, however, was not essentially the fault of Friedrich, but owing largely to the character of the disorder, a form of which he had the honor to place on record, this confusion has naturally arisen.

We know that innumerable variant types of myoclonia were reported in the several years following Friedrich's original report of a disease or syndrome which he designated by the rather cumbersome title of paramyoclonus multiplex. A wordy scientific warfare succeeded between those who maintained that Friedrich's type must be paralleled exactly or the reported case might not be classed as Friedrich's affection, and an equally insistent group of workers that Friedrich's original case was itself but one of the varying types of myoclonia and therefore differing patterns of the same disorder were to be expected in subsequent reports of the myoclonias. The latter clinicians argued that the exclusives might as well maintain that differing types of muscular convulsions in epileptic seizures constituted different forms of essential epilepsy, and that an absurdity could be avoided in considering the myoclonias by admitting to this nosological entity all cases of chronic myospasm that embraced in the main the three or four cardinal symptoms of the syndrome.

To this latter view of the myoclonias, most clinicians of to-day have agreed, so that we now have a variety of subtypes both symptomatic or organic and those seemingly dependent upon no gross organic disorder or the essential myoclonias. The latter group moreover has undergone, even as essential epilepsy, more or less subdivisions. A few authors, notably the French, are inclined to make the classification of the essential myoclonias so broad that it

may include many of the chronic choreas, habit spasms, and the multiple tics, but this view has gained but little sympathy or acceptance in other countries.

As Oppenheim points out, if one attempts to select the myoclonias from the chaos of the motor neuroses, we are at once in difficulty. Too wide a departure from Friedrich's syndrome therefore makes us in danger of invading or including motor disorders quite distinct from the striking picture of myoclonia. There are not a few clinicians yet who doubt that myoclonia is an independent disease. Even Oppenheim is only willing to admit that the disorder is due to "mental degeneration," while Schupfer and Dana hold that only Unverricht's type, that of the association disease of familial myoclonia plus essential epileptic attacks, warrants the name of a distinct disease. However this may be, one may still designate in a loose clinical grouping the various case types of myospasm under the syndrome of the myoclonias until such time as the exact pathology of this group shall be determined. In the meantime we may continue to study more painstakingly the clinical forms of the disorder in the light of the newer anatomic and pathologic knowledge of structure and function of the cortex and midbrain. It is the writer's belief that the ultimate pathology of the myoclonic symptoms will be found to lie predominantly in the midbrain, and using the evidence to this end, this paper is prepared. Although the article contains but few new clinical data, a resumé digest of the portent of the work already done upon myoclonia seems worth while at this time. A critical summary of the real nature and pathology of myoclonia brings us not a little way in grasping the leads toward which further investigations would seem to promise much.

Owing to lack of a clear clinical picture, clinicians in general rarely diagnosticate the myoclonia cases. Therefore myoclonia is almost invariably referred to the neurologist as chronic chorea, multiple tic, or a peculiar motor type of adolescent hysteria. Hence we may be pardoned in calling attention to the main diagnostic features of the essential myoclonias. The disorder is chiefly to be recognized by clonic contractions which affect the proximal muscles of the extremities and trunk, rarely the face and fingers. That which is especially diagnostic about the muscular contractions is the fact that they are *short, sudden,* and *lightning like* in character. They involve usually a small number of muscles *which do not have a synergic action, i. e.,* those muscles that do not ordinarily coöperate together in purposeful acts. The effects of the muscular contrac-

tions therefore are slight, or entirely absent, in moving the limbs or trunk. The muscular contractions of the two sides of the body are often involved unequally in the one contraction and also not at or in the same time. Nor do the contractions follow each other in rhythm or with equal intensity. The various twitchings are separated from each other by intervals of varying duration. The contractions may effect a single muscles or parts of a muscle in such a manner that the movement as such cannot be voluntarily produced by itself, for example, the supinator longus, the biceps, quadriceps, femoris, semitendinosus, etc.; are simultaneously involved. Purposive movements, which are as a rule uneffected, have a soothing effect upon the spasm. Unpleasant emotions have the opposite effect. Twitchings diminished when the attention is distracted and usually disappear entirely in sleep. The tendon reflex may be unusually lively and often a simple touch on the skin intensifies the contractions. The motor excitement is usually the only positive symptom. Mechanical and electric excitability are normal.

From the very nature of the affection anatomic study is often rendered impossible. The course of the disorder is slow though enduring and those afflicted usually die ultimately of some intercurrent disease, making an autopsy very rare indeed. Our present knowledge of the essential disorder has largely been drawn from studies of the variant and progressive types of myoclonia associated with epilepsy or organic disorders. Obviously it is difficult in the extreme to separate the tissue changes of the complicating lesions from those more strictly due to the myoclonia itself. Ten years ago the writer stated[1] that little or no real advance in our anatomic knowledge of essential myoclonia had been made during the preceding decade. The same statement largely holds true to-day. Nevertheless the writer hopes to be able to show that essential myoclonia is an entity which is dependent on alterations in the extrapyramidal tracts of probable congenital origin and of the nature of abrotrophy, a term used by Gowers for certain premature disease processes of the nervous system without essential loss of certain cells or tissues and not caused by any apparent external influence. Such lesions could well be ultramicroscopic in character and have been postulated in numerous apparently functional nervous conditions. Slight displacements or obstructions in the motor paths would be sufficient to interfere with the innervation of the muscles and produce cloni, tremor, etc. (Oppenheim). The affection known as myotonoclonia

[1] Clark, Remarks on Myoclonus Epilepsy, with Report of a Case, Review Neurol. and Psych., July, 1907.

trepidans exhibits three types of hyperkinesis and is generally conceded to be due to physical or psychophysical traumatism. We know in the development of war neurology that such clinicians as Oppenheim and Mott regard all conditions with a causal element of physical concussion as practically organic. The latter view, which is by no means generally conceded, undoubtedly plays a prominent rôle in many so-called neuroses. However, that symptomatic myocloni occur as the result of lesions of the extrapyramidal tracts is well known and will be discussed as corroboration of the view that similar but ultramicroscopic lesions and abrotrophic changes may account for essential myoclonia in spite of the fact that in the new observations we have at present the pyramidal tracts as such are quite intact. It is, of course, conceded at the outset that the cortical theory of myoclonus is almost universally held (not the exclusively cortical) very largely because of the fact that degenerative myoclonus is usually associated with epilepsy of a progressive type. A majority of authorities hold that the affection is in part of subcortical origin and Oppenheim seems to regard the problem of localization as practically insoluble. Quite recently Dana has reiterated his opinion that "tics, torticollis, hereditary chorea and myoclonias" are of cortical origin, basing it on the presence of gross pathological lesions in the cortex in certain cases of these maladies.

The association of subcortical and cortical lesions may be variously interpreted. Aside from coincidence cortical involvement may represent a generalization of some process originally localized in the basic ganglia (pseudosclerosis), or lesions below the cortex may be secondary to those of the cortex. Sensible and ultramicroscopic alterations may be entirely independent of each other. Hence the author does not accept the view that the cloni in myoclonus-epilepsy are necessarily due to the sensible cortical lesions associated with epilepsy. In Dana's autopsy case of "mobile spasms" it is stated that both pyramidal and extrapyramidal tracts were both intact, thus implying that in such manifestations the conduction paths of all kinds were intact. Oppenheim on the other hand states expressly that the ultramicroscopic lesions should be seated in the paths of transmission. This discrepancy would appear to be of vital significance.

Up to 1913 we may take the excellent digest of the entire subject of the myoclonias made by Gorn.[2] As previously stated, myo-

[2] Gorn, Zeitschrift für die gesamte Neurologie und Psychiatrie, 1914, IX Ref., p. 377.

cloni were first mentioned in literature under such conditions as electric and rhythmic chorea and convulsive tremor. In this connection we may interpose the remark that the phenomenon known for ages as subsultus tendinum has never received any attention in literature although it may be placed among symptomatic cloni.

In 1881, as mentioned before, a definite clinical picture of myoclonias was given by Friedrich (paramyoclonus multiplex). The problem "essential disease or syndrome" came into existence at once and has never been satisfactorily settled. The clinical picture was submitted to various rational tests such as lumbar puncture, pupillary behavior, and it became much easier to say what it was not than what it was. The cortex and meninges, and the mental state were unaffected and the pupils were normal. The pyramidal paths were not involved. The greatest latitude was seen in the implication of muscles and muscle groups. It was believed at first that certain muscles, notably those supplied by the cranial nerves, were exempt, but it gradually became evident that no muscles, not even the smooth ones, have any absolute immunity. The intensity of the cloni shows great variation in the individual case, and this is true of the frequency which may vary between 10 and 240 per minute. Cloni may or may not cease during sleep and are sometimes aggravated.[3] Statements concerning depression of muscular force and electric excitability and presence of reaction of degeneration, disturbances of sensation, increase of tendon reflex, cannot be applied to the disease as a whole.

Certain affections presenting a sort of clinical autonomy were not at first regarded as paramyoclonus (electric chorea, fibrillary chorea, myokymia). These certainly differed from Friedrich's disease although to-day they are, as previously cited, included in a general group of essential myoclonias, *i. e.*, they are not symptomatic of other states and are not included in the degenerative forms to be mentioned later.

Ten years after Friedrich isolated paramyoclonus Unverricht described myoclonus-epilepsy, a disease association of familial degenerative incidence which has come to be recognized throughout most of the civilized world. It is naturally a mystery how such a disease could escape observation and as far back as 1871 Gaboriau in one of his romances has for a leading character a subject who might well have been a victim of this disease.[4] The Unverricht type

[3] Clark, A Case of Myoclonia Occurring Only After Rest or Sleep, Jour. Amer. Med. Asso., June 1, 1912.

[4] Clark and Prout, The Nature and Pathology of Myoclonus Epilepsy, Amer. Jour. Insan., Vol. LIX, No. 2, 1902, p. 187, citations from Gaboriau's novel, In Peril of His Life.

differs from the Friedrich type in being exquisitely typical and characterized by very striking behavior, such as good and bad days. The ocular muscles are the only ones exempt from cloni, a rather striking fact when we bear in mind the epilepsy-nystagmus familial degenerative type to be mentioned later. The symptomatology of the Unverricht type was studied intensively by Lundborg who elaborated, among other manifestations, the so-called psychoclonic reaction. This author also studied in great detail the genealogy of myoclonus-epilepsy families. The fact remains, however, that these subjects have typical epilepsy with cortical alterations and that they progress to the condition of post epileptic deterioration like other subjects with severe epilepsy.

It gradually became evident that Unverricht's type does not include all epileptics who suffer from myoclonus. The latter is sometimes encountered in mild types of epilepsy without tendency to deterioration and without familial incidence.[5] Quite different from the Unverricht type is an affection known thus far chiefly from descriptions by Russian authors in which partial epilepsy is seen in association with ceaseless cloni. An effort was made at one time to class all the movements in this affection as cloni, but the epileptic component seems beyond question. Nystagmus-myoclonus occurs for the most part only in Brittany and did not reach literature as such until about a decade ago. Its incidence in families is much the same as with Unverricht's type, and epilepsy occurs in blood relatives (and even rarely in the patients themselves). Autopsies have thus far failed to reveal any organic substratum for nystagmus-myoclonus.

Gorn analyzes all the alleged causal factors of the myoclonus group. In all types the male suffers most frequently, an argument rather against the hysterical theory. In regard to age, the Friedrich type attacks the adult which partly explains why myocloni in the young were originally classed as choreas. The Unverricht type begins in childhood, usually before puberty. Direct heredity is not seen, but subjects of this type are not able to support themselves and become house fathers or even carry on illicit love. Despite the heavy taint of some patients a history of this kind is not absolutely constant, and only the familial incidence is at times in evidence. Even this may be absent for sporadic cases of the Unverricht and nystagmus types can occur. But if we bear in mind that epileptics often spring from apparently sound stock these exceptional cases

[5] Clark and Prout, The Nature and Pathology of Myoclonus Epilepsy, Amer. Jour. Insan., Vol. LIX, No. 2, 1902.

do not alter the fact that a neuropathic-degenerative taint is almost always present, often with alcoholism in the ascendants.

Most of the general causes of disease favor the appearance of cloni, but not to the degree that improvement in these condtions will lead to cure. The muscle twitches which sometimes appear after muscular and nervous fatigue suggest a neurasthenic component and in certain cases the subjects have hysteria and especially post traumatic psychoneuroses. These types of myoclonus are better discussed under symptomatic forms in order to isolate if possible causal elements for the essential type. The intoxication theory has received more attention than any other. The earliest cases of myoclonus were seen in toxic-infectious fevers and subsultus occurs under similar conditions. Various drugs (chloral) can induce cloni when given in toxic doses and cloni develop at times after diphtheria and in lead poisoning. The disease has also been associated with tetany and parathyroid insufficiency. In certain cases alcohol abuse has acted as an exciting cause. On the other hand purely emotional causes, especially fright, have often precipitated the disease, and not a few cases have followed trauma and commotion. We are referring chiefly to the essential types of the disease. So unsatisfactory are all attempts to furnish a due motivation for the disease that many neurologists take refuge in the hysterical theory.

Gorn goes exhaustively into the subject of symptomatic myoclonus which may parallel the muscle behavior in the essential forms. It has been termed myoclonoid, reflex myoclonus, etc., and is to be understood as myoclonus which appears as an epiphenomenon in the course of other diseases. Particularly is this seen in the so-called myoclonoid "jerks" of matutinal epilepsy which are, however, but intricate or slight motor forms of petit mal. From one viewpoint the symptomatic affection is more instructive than the essential form because it should throw light on the genesis of the cloni just as Jacksonian epilepsy has been used to enlighten us regarding the nature of essential epilepsy. Thus it appears in multiple sclerosis, especially at the earlier stages, although it is by no means a frequent accompaniment. Very recently, as noted elsewhere, it has been seen in pseudosclerosis, and in the late stages of Wilson's disease.

Myoclonia has been seen in numerous forms of cerebrospinal syphilis, including paresis and tabes as well as simple meningitis; also in infantile cerebral hemiplegia (congenital) and hereditary ataxia. In circular psychosis it has been known to precede regularly the maniacal phase. As already mentioned it occurs in psy-

chasthenia, neurasthenia and especially in traumatic psychoneurosis. Its association with renal disease is by no means unknown and has much to do with a toxic theory of myoclonus. In parenchymatous nephritis, in uremia with cerebral edema and in anuria, its appearance is more than a coincidence. In another section of this paper will be found an account of myocloni in meningoencephalo-poliomyelitis, cerebrospinal meningitis and amaurotic family idiocy. A number of cases are on record of myocloni in acute myelitis. This by no means exhausts the list, but it serves little purpose to enumerate single cases of association. To sum up, the more frequent incidence is in multiple sclerosis, cerebrospinal syphilis and metasyphilis, renal disease, and especially, traumatic psychoneurosis. The claim has been made that typical cloni may be associated with choreiform movements.

There remains to be mentioned under symptomatic myoclonus the possibility that the latter may be an expression of ordinary hysteria. Such an opinion can be reached only by exclusion of all other factors able to produce the disease and hence involves the nature of essential myoclonus as well. The usual absence of stigmata and complete resistance to suggestive therapy should be sufficient to dispose of the hysterical theory. This leads naturally to the nosological position of myoclonus. As far as the individual muscle behavior is concerned, cloni cannot be differentiated from certain forms of tremor and athetosis on the one hand and the tics on the other. The chief difference between myoclonus and tics if the partial subservience of the latter to the will which makes possible an educational and analytical cure. In the so-called "tic disease" a psychic component is always present although cases occur which occupy the borderland between the two affections (coprolalia as a single psychic symptom of myoclonus). While according to book definitions choreatic and myoclonic movements differ radically cases occur which show both types of movement and myoclonus in children has usually imposed itself under the supposition that it is a form of chorea. To-day clinical neurologists continue to uphold this separation by regarding myoclonus as a disease of adults.

As before suggested, myoclonus has been variously regarded as a generalized tic, a part phenomenon of epilepsy, an expression of hysteria, a form of chorea, a congener of myotonia and other tonic spasms, a syndrome, an essential malady, a myopathy. The word "myospasia" has been introduced as a generic term for clonus, with myocloni and tics as "simple or impulsive myospasias." Seeligmuller's "myospasia congenitalis" suggests the inborn nature of

essential myoclonus. Hammond (before Friedrich's time) called the latter "convulsive tremor." It is worthy of note that the word myoclonus as originally used by Ziehen was without reference to Friedrich's paramyoclonus. The Unverricht type possesses analogies with Huntington's chorea along with the sharpest points of difference.

The data on pathological anatomy and localization show only too plaintly that the entire subject is barren of results. In Friedrich's paramyoclonus and in nystagmus-myoclonus no lesions whatever have been found. The majority of the cases of the Unverricht type have been negative in this respect despite the fact that the cortical lesions of epilepsy are expected to be present. On the other hand both hypertrophy and atrophy have been encountered in the primitive muscular fibers, evidently secondary in character (Hunt). In certain cases, perhaps in part of symptomatic myoclonus, evidences of diffuse corticomeningeal implication have been adduced, some of which agree with the alterations, in Huntington's chorea. These finds must be distinguished from those of myoclonus-epilepsy which are perhaps indistinguishable from those of advanced essential epilepsy. In certain cases of myoclonus-epilepsy the extensive lesions found suggest that the epilepsy itself was symptomatic[6] (Bresler and possibly Clark and Prout). The extensive histological changes found by Lafora and Glück involved the ganglion cells not only in the second and third layers of the cortex, but also those in the quadrigemina and thelamus. Sioli found in one case peculiar changes in the cerebellum and dentate nucleus. Not a few observers have found histological changes in the centers of the cord. Perhaps the majority of pathologists would agree that myoclonus has no structural basis, while in myoclonus-epilepsy the changes are chiefly due to the resulting lesions of epilepsy.

In the absence of a structural basis we are thrown back on theories of localization. Those who regard myoclonus as an essential malady have not unnaturally localized it in the spinal cord and the nuclei of the motor cranial nerves; because increased irritability in the ganglionic cells could in part account for the symptoms. Not only early but recent writers are partisans of this view. There are numerous facts which support this view and which do not necessarily militate against the participation of the cortex as a source of inhibitions. The mode of implication of muscles does not point to alterations in the cortex and narcosis to the production of unconsciousness does not at once cause the cessation of cloni. After deep

[6] Bresler, Neurologische Centralbl., 1896, p. 1015.

narcosis cloni begin before consciousness returns. Animal experiment appears to show that general cloni persist after elimination of the encephalon and even of the upper segments of the cord. A reflex spinal theory has some data in its favor.

Opposed to the motor spinocranial nerve nucleus theory is the cortical theory, the supporters of which are neither so numerous nor so well known as the advocates of the former. We do not here refer to the Unverricht type of the disease with its epileptic substratum. With this left out of consideration the arguments for a cortical origin are limited to the occurrence of cloni in paresis and other organic disease of the cortex and meninges, to the influence of the emotions upon the cloni, to the occasional occurrence of hemiclonus, etc.

It well appears that up to 1914 no serious attempt had been made to associate essential myoclonus with alterations in the basal ganglia or with the extrapyramidal paths or the so-called tonectic fibers, despite the evident close relationship between these various structures and muscles tonus on the one hand and various hyperkineses on the other. In other words, implication of these structures was neither affirmed nor denied, but simply ignored. But any future work on motor disorders will have to be based largely on what we know of the various nervous elements which make up the midbrain.

In order that we may further discuss the possible involvement of the midbrain in an intelligent manner, we must briefly review some of the more recent literature on subcortical motor functions, myoclonus and midbrain disease, extrapyramidal motor disturbances, disorders of the tonectic system, etc. As is well known, reference works are largely silent on these subjects. Periodical literature is not abundant, but certain articles have considered individual aspects. Among such are one by Flatau and Sterling on myoclonus symptomatic of disease of the midbrain. Professor Franz's summary of recent advances in our knowledge of the brain and remarks by Rhein on extrapyramidal motor lesions, and Pollock on the tonectic system and amyostatic syndrome are pertinent to our subject. In this connection Oppenheim's article on myotonoclonia trepidans and the one by Dana and Gere on the anatomical seat of mobile spasms, are of interest.

Does the myoclonus which is symptomatic of organic disease in the encephalon throw any light upon essential myoclonus? The recent literature of this subject is not large. An article by Flatau and Sterling[7] covers certain aspects of the problem. Emphasis is

[7] Flatau and Sterling, Zeitschr. f. d. ges. Neurol., etc., 1913, O. XVI, 143.

laid on the fact that Hitzig's studies of the cortical origin of convulsions have done much to obscure the fact that general convulsions can be set up by irritation of the pons. Even Lewandowsky states that the cortex is the only convulsible locality. Accurate study has shown, however, that subcortical centers—for example the corpora quadrigemina—play a subordinate rôle in their genesis (Ziehen claims that this rôle pertains only to tonic convulsions). Monakow claims that for the production of cloni, not only the cortex but the thalami, pons, medulla, and even the cord must function. It is held that in the absence of the cortex irritation of the inner capsule is unable to cause cloni. The nervous paths from cortex and subcortex to muscles comprise the pyramidal and extrapyramidal paths (the latter leading from the quadrigemina, Deiter's nucleus, etc.). In the ascent through the animal scale the extrapyramidal paths become increasingly insignificant in comparison with the pyramidal paths. As regards the conduction of impulses the midbrain (quadrigemina, thalami, pons) plays no small rôle. As far as anatomical data are concerned, we are certain only of one thing—that the terminal lesions of epilepsy when found seem to originate in the cortex.

Of other types of moment the choreatic and athetotic types, as well as rhythmical tremor may originate in the thalami, quadrigemina and peduncles—although Bonhoeffer claims that these movements really originate in the cerebellum whence they pass along its peduncle to the red nucleus of the thalamus, and not a few authorities agree with him. The precise localization may determine the character of the movements. A bullet in the quadrigemina produced automatic movements not unlike paralysis agitans, but one observer (Eisenlohr) believed that these were really due to irritation of the pyramidal tracts. A tumor of the quadrigemina caused a constant rhythmic clonus in the opposite half of the body, also suggesting paralysis agitans. Such examples are by no means isolated; in fact the evidence is abundant that morbid processes in the quadrigemina region are able to cause automatic movements. The conducting paths originate in the cerebellum and pass, through its arms, to the red nucleus of the thalamus and the quadrigemina. It must be admitted, however, that continuous movements—cloni of electrical character without locomotive effects—also occur in paresis and other forms of meningoencephalitis, and also in so-called epilepsia continua (Koshewnikow); but as far as the latter is concerned certian studies have appeared to show that while the cortex is involved the impulses originate in the thalami and quadrigemina

as a result of localized processes. Flatau and Sterling describe a unique case of meningo-encephalo-poliomyelitis following a head injury in a boy aged 1½ years. After initial convulsions there developed a myoclonus which persisted for 5½ months. Recovery suggested that the disturbance was functional. From the nature of the process the authors believed that the responsible lesions had been seated in the base of the brain—probably in the cerebral peduncles, thalami and quadrigemina. Owing to the very complex character of the case, theorizing was difficult. After the injury the child had passed through pneumonia and nephritis—the time of supervention of the latter was not known. Cerebrospinal and traumatic meningitis were excluded. The authors report a second case of myoclonus with other automatic movements in a case of purulent cerebrospinal meningitis in a child 20 months old. The sensorium was quite clear. These movements were associated with a peculiar type of nystagmus. The localization was thought to be similar to that or the preceding case. In a third case of polycloni in a child with amaurotic family idiocy the question of localization could hardly be agitated, as in this affection the entire central nervous system is believed to be involved. In addition to automatic movements there were no epileptic crises pointing to cortical involvement. Since in the first two cases the cortex was intact, the authors convey the idea that the automatic movements could only have proceeded from the basal ganglia, while in the third case the involvement of the cortex resulted in epileptic attacks while the continuous movements were of subcortical origin.

Franz[8] reviews the literature as follows: Mills considered the relationship of the cerebrum and basal ganglia to muscle tonus in connection with bilateral lesions of the caudate and lenticular nuclei. He opposes Luciani's teaching that the cerebellum presides over muscle tonus and believes that the tonectic system includes the midfrontal or midcentral cortex and corpus striatum which are connected by association fibers. He regards the caudate nucleus as "almost a part of the cortex." Holmes regards tone disturbances as due to overactivity of the subcortical motor centers when freed from cortical inhibition. This holds good especially for spasticity in paralysis. The involuntary movements associated with thalamic lesions are due to disturbance of the normal functional equilibrium between the cerebrello-thalamic and corticospinal system. Southard has described hyperkinetic conditions associated with thalamic

[8] Franz, Recent Review of Advances in Our Knowledge of Subcortical and Subsidiary Motor Functions, Psychol. Bull. for 1916.

lesions. He does not, however, believe that the thalamus possesses motor functions. He ascribes these hyperkineses to "withdrawal of corticothalamic inhibitory or 'switch setting' impulses," or of "atrophy or aplasia of certain cerebellar connections." Lloyd claims that the striatum has practically lost its importance in the phylogenetic scale, and disbelieves in a special lenticular nucleus syndrome. Nammack upholds the existence of the latter in connection with disturbance of the extra cortical motor system. Brown stimulated the basal ganglia of a chimpanzee. Not much was learned of motor phenomena, but apparently one red nucleus may preside over both halves of the body (homolateral flexion, contralateral extension).

When we come to consider the possible relationship of myoclonic symptoms to that of the extrapyramidal motor functions, the views of Rhein[9] are pertinent. Without any allusion to the tonectic system of certain authors, he believes that extrapyramidal motor disturbances are due in some manner to defects of a hypothetical cortico-lenticulo-rubro-cerebello-olivary tract necessary for proper muscle regulation. Any break in this chain could give rise to spasticity, pareses, contractures, tremor or other motor disturbance characteristic of extrapyramidal motor disturbances. Lesions limited to the rubrocerebellar and cerebellar-olivary tracts may cause hemiplegic spasms and hemichorea. In a lesion of the red nucleus dating from early childhood there were rhythmic contractions of the digits. Numerous cases are now on record of spasticity, contractures, tremors and choreiform movements or athetoses in which the pyramidal paths were intact.

The conditions attributed to disease of the lenticular nucleus have now become very numerous and comprise Wilson's disease, pseudosclerosis, Parkinson's disease, spastic pseudobulbar paralysis with choreo-athetoid movements, progressive athetosis, etc. (Spiller). In Wilson's disease of long standing the tremor seems to be replaced by tonic-clonic movements and recently before the Philadelphia Neurological Society cases have been reported in which myoclonic movements were present.

Mingazzini mentioned a fronto-cerebellar tract with probably traverses the anterior internal capsule, and regards this as the extrapyramidal tract. In a case of supposed Parkinson's disease he found a cyst which involved the caudate nucleus, lenticular nucleus and internal capsule, but the chief disturbance was thought to have occurred in the fronto-cerebellar tract which passes through this region.

[9] Rhein, Jour. of Nerv. and Ment. Dis., 1915, XLII, 802.

Förster and Kleist believe that paralysis agitans originates in the cerebellar cortex. Owing to lesions in that locality the cerebral cortex is unable to inhibit the movements.

So-called dystonia musculorum deformans, a familial choreiform affection, may be due to lesion of the lenticular nucleus, as may also von Bechterew's hemitonia apoplectica.

Of principal importance in this connection are the familial cases of myoclonus reported by Rhein in 1916 which Spiller pronounced to be examples of pseudosclerosis. Mills regarded the symptoms as due to lesion of the lenticular nucleus while Cadwalader had changed his diagnosis from pseudosclerosis to Wilson's disease. It was admittedly the first and only episode on record in which myoclonus had been the clinical expression of lenticular nucleus disease, although in advanced cases of Wilson's disease tonic-clonic contractions are said to replace tremor. Rhein denied pseudosclerosis and apparently had no theory of his own to offer. There were four cases in the same family and tremor as initial symptom had passed into severe cloni worse on emotion and intention. One of the patients could not walk, and presented muscular atrophy and contractures in the lower extremities. Spasticity and paresis were alike absent, but one patient showed slight rigidity.

When we come to examine more closely the tonectic system and amyostatic symptom complex, Pollock[10] believes that distinct from the alleged extrapyramidal paths which originate in the cerebellum and pass to the red nucleus of the thalamus, etc., is the so-called tonectic system of recent investigation which is believed to be distinct from the pyramidal system, but connected therewith and to preside especially over muscle tone. This system is cortical and chiefly midfrontal. The corpus striatum is an association or integration zone which is connected with the tonectic system. Data as to the existence of such a zone are found in the work of Liepmann on tonic preservation and of Wilson and Walsh on tonic innervation; in our knowledge of Westphal's paradoxical contraction, Hunt's sign in dystonia musculorum progressive, Schwab's phenomenon of intention hypertonia, Wilson's disease and pseudosclerosis. To a certain extent disturbance in this system may be responsible for Strümpell's "amyostatic symptom complex" which is conceivably present in pseudosclerosis, Wilson's disease, paralysis agitans with and without agitation and myostasy.

In order that we may gain a better knowledge of essential myoclonia, it is necessary for us to briefly review the myoclonic factor

[10] Pollock, Trans. Chicago So. Int. Med., February, 1917.

in myoclonus epilepsy. On account of the striking features of the Unverricht-Lundborg type of myoclonus, it merits a short though separate description. Some error has crept in since the disease was first recognized in 1891. While exquisitely familial it is not necessarily the product of a hopelessly degenerate stock, but sometimes springs from nominally healthy ascendants, and may occur without familial incidence. Nor should we straightway understand that all these subjects become helpless and are doomed to develop early dementia. It is best to think of the disease as crippling rather than destructive, like paralysis agitans for example. The disease, all things considered, runs unusually true to form but this does not mean that all cases are of the same severity.

Very characteristic is the onset in early childhood in the form of nocturnal epilepsy which is decidedly progressive and in from one to three years is succeeded by myoclonia. Inversion in this order of evolution is seen only in a small per cent. of cases and hardly constitutes a distinct type. Still more infrequently the two motor disorders appear simultaneously, chiefly when a fright has been experienced. It is possible to define the disease in such a way that chronological precedence of one form over the other is not essential, and as already stated this precedence is without effect on the further evolution of the disease. As soon as both motor disorders coexist in the subject he is said to be in the second stage of the disease. This period lasts until the subject becomes helpless and bedridden, but while exceptionally it is only a few years in length the third stage may not supervene until the patient is senile and the average duration is somewhere between ten and twenty years.

The Unverricht syndrome differs from the casual association of myoclonus and epilepsy in the character of the paroxysms of the latter, which are not only nocturnal at first but have a pronounced tonic component which tends to grow more pronounced. These tetanoid seizures have even been regarded as non-epileptic, but they are best understood as abortive attacks—since in certain cases they are succeeded by cloni and loss of consciousness. Since the patient is usually conscious he complains greatly of the pain and as the symptom becomes aggravated he may go through this painful experience every night. Fortunately, however, these tetanoid spasms may present spontaneous remissions, with or without periodical alternations. It is claimed that the more frequent the tetanoid attacks the milder is their expression within certain limits. Hence daily attacks are not necessarily severe in character. Nocturnal attacks persist throughout the second stage, which is in part char-

acterized by the appearance of diurnal attacks; but although they persist they become much less pronounced, through some rule of compensation by diurnal attacks.

The myoclonia in the Unverricht type is preceded by tremor and fibrillary or fascicular muscle twiching with perhaps muscle waves (myokymia). Clonic movements follow and sooner or later all the voluntary muscles participate. The order of participation is usually upper extremity, lower extremity, trunk, neck and face, interior muscles.

In the diurnal myoclonic attacks we see the peculiar alternation of "good" and "bad" days—quite characteristic of the Unverricht type. The motivation may be the same as in the bad and good nights of nocturnal epilepsy. After a quiescent day the cloni increase day by day until the supervention of a diurnal epileptic attack, which in turn is succeeded by a quiescent day. An entire cycle of this kind may last anywhere from a few days to a few weeks.

A sensoclonic factor (Lundborg) is evident from the fact that sharp impressions on the special senses aggravate the cloni; and an emotional factor (psychoclonic) can also be isolated. During sleep the muscles twitch somewhat, which fact may suggest that the movements originate in the subcortex.

Bad nights may have some effect in causing bad days and the progressive character of the disease tends to cause depression; while interference with eating by the cloni tends to impair the nutrition. Participation of the pharynx is the chief factor in this respect. The terminal stage so called is not synonymous with epileptic dementia for contrary to the accepted belief the epileptic component, instead of being progressive, is inclined to be effaced. It is the myoclonia which is the progressive component and which wears the patient out. The good, quiet part of the cycle gradually drops out and the cyclical character in fact is effaced completely. The patient, from his lowered resistance to disease, is quite apt to perish of some intercurrent malady, as tuberculosis. During the terminal stage the muscles acquire a peculiar rigidity, like that of katatonia. The mental state is also one of stupor and somnolence. The patient shows dementia and is also irritable and difficult to handle. He is bedridden, with bedsores, soils the bedding, and is emaciated and marantic.

The changes which have been found at times in the cortex are usually attributed to post-epileptic deterioration and dementia, so that the anatomical lesions are set down purely or by preference to epilepsy. But epileptic deterioration is not inevitable and in myoclonus-epilepsy the cortex may be normal. In a few cases cortical

changes were doubtless the result of an old meningitis. It must be remembered that myoclonus-epilepsy, at least in Lundborg's cases, not only appeared at times in the frankly imbecile, but was very seldom encountered in subjects with perfectly normal intellects. The psychic peculiarities, however, may not be in evidence until after the disease has developed.

Depression and alteration of disposition are commonly seen with some failure of the mental processes. Such phenomena could be only temporary and could the disease be cured might end favorably. We have said that the epileptic component need not become worse, but the early appearance of psychic epilepsy in young children, said to be very common, doubtless causes in certain cases precocious dementia. Stuporous and impulsive tendencies are both encountered and some violent patients require asylum control.

To go a little more into detail, the initial nocturnal paroxysms differ among themselves, for some would be termed typical epileptic seizures although as a rule they are best classed as atypical, tonic and conscious. There is no order about their sequence. Again after daily myocloni have become established, leading up as they do to epileptic crises, the latter also show lack of uniformity, some being severe—even serial and overlapping attacks and status have occurred—while others are mild. However, as already stated, there is a general tendency for the epileptic crises to die out with the march of the disease.

Lundborg has described the nocturnal attacks—he had the opportunity rarely encountered by studying them—with exceeding minuteness. They constitute a graphic picture of disease. But as we are now writing of myoclonia we will pass them by.

The myoclonia in the Unverricht syndrome are at first preceded by tremor and fibrillary contractions—at times by myokmia. The good and bad days are early in evidence. There is at first a simple myoclonic cycle, before epilepsy appears. In the quiescent phase the muscles may almost be in normal equilibrium while in the active phase the cloni may be almost ceaseless. Despite the alternating character there is no real periodicity. The cloni are of the electric type and the slow rhythm seen at times in other myoclonias apparently is not seen in the Unverricht type. In fact rhythm is for the most part absent. The cloni are bilateral without being symmetrical. Despite marked locomotive effects occasionally seen the cloni are mostly without such effects. The very essence of the movements is variability,—in degree, interval and synchronism.

Despite the automatic and unmotivated character of the cloni,

there is a pronounced psychic component through which the movements may be aggravated but never inhibited. If the patient knows that he is being watched or if his attention is directed to the movements, the latter are intensified. This behavior—the psychoclonic reaction of Lundborg—is in evidence on the bad days. Touching or handling the muscles, bright lights and loud sounds have an analogous effect (sensoclonic reaction).

In addition to the bad days the approach of an epileptic attack is associated with an aggravation of symptoms, or otherwise stated, a crisis occurs during an unusually bad day, when the psychoclonus and sensoclonus are apt to be in evidence. Aside from mere suggestive influence any vexatious experience may aggravate the movements. The subject knows this and imposes upon himself a defensive isolation, lying down and closing his eyes. He strives to immobilize himself, for mere turning in bed may cause cloni. Even if he fall asleep this holds good, a fact which hints that the motor impulses originate in the midbrain.

Voluntary movements may cause intention cloni; and conversely, the will has little or no inhibitory power over the movements. The reflex irritability is notably increased as shown by the behavior of the reflexes, irrespective of its action upon the cloni. As a matter of fact, aside from the results of handling the muscles, in which perhaps only the muscle sense and sense of touch are involved, the term reflex clonus is not used by Lundborg nor is there any account of a reflex component. Despite the calming effects of complete rest just mentioned, prolonged repose is of no benefit, for it only leads up to muscle unrest and may even seem to precipitate an epileptic seizure. The unfortunate subject is equally deprived of hope from exercise, which likewise aggravates his condition. A small quantity of a stimulant or sedative (alcohol, coffee, bromides) may exert temporary benefit which seems to hint at a cortical inhibitory factor, but, as in the case of repose, "a little more than a little is much too much."

As long as the patient is in the so-called second stage of the disease he should be able to walk, converse, eat and control his excreta. That he is often unable to walk is due largely to the psychoclonic reaction, for he does better when his attention is diverted from himself. If the sensoclonic reaction could be eliminated it is very probable that mere myoclonia would not be a crippling disease; for in walking the feet and cane, by contact with the ground, constantly affect the muscle and touch senses; while the eyes, which must be kept open, are exposed to bright light. The

patient does not desire to walk or even to stand, because aside from the cloni he is in a state of tremor. Again while walking another phenomenon may appear in the shape of an inhibitory tonic contraction which threatens a fall. We note here the close relationship between tremor, tonic and clonic contractions.

The speech disturbances show some analogy with those of locomotion, and in addition to cloni of the proper muscles contraction of the diaphragm is a disturbing element. On bad days the patient hardly speaks at all and on his best days has to speak very deliberately.

The act of swallowing may cause a sort of hydrophobic spasm, in addition to provoking cloni elsewhere. As a result of pharyngeal or esophageal spasm, denutrition is highly favored.

Aside from the disturbances as outlined above the general condition is good. There are no sensory disturbances, the muscles do not atrophy and retain their electric excitability. The chief somatic disturbances are only such as might result from underfeeding.

The mental state in Unverricht's syndrome is still obscure. To what extent does mental defect preëxist, to what extent is it due to epilepsy and psychic epilepsy, and to what to the simple wear and tear of the myoclonia, does not at present seem to be near solution.

In analyzing the few articles on myoclonus which have appeared in literature during the past few years, we find as a rule these have not added to our knowledge of the anatomic pathology of the disorder. Perhaps the most important is Oppenheim's description of myotonoclonia trepidans, but despite its name this condition is anything but new, for Oppenheim himself has known of it since 1891. It has been described heretofore under tremor and hysterical abasia. It is practically a commotional syndrome and hence associated with general disturbances. Its sponsor[11] is not inclined to place it among the traumatic psychoneuroses because he understands that all commotional phenomena have a material substratum. The affection shows plainly that tonic and clonic muscle movements and tremor may act as equivalents for each other, and that this intimate relationship bespeaks differences of localization may determine the form of motor disorder in a given case and we know that these disorders all shade into one another and seem to be combined in certain kinds of motor disturbance. We may see clonic twitchings with choreatic movements and it may be very difficult to distinguish between tremor and cloni. In Lundborg's myoclonus-epilepsy tonic behavior is sometimes witnessed. The chief point of resemblance

[11] Med. Klinik, 1915, XI, p. 1279.

between myoclonotonia trepidans and degenerative or essential myoclonia is the assumption of an organic substratum to account for the expression of the disease.

Of the more recent studies of myoclonus-epilepsy, that of Rechtanwald[12] is of interest because the family taint was very slight. The father and twelve brothers and sisters of the three victims were sound. Aside from a possibly epileptic brother (he seems to have outgrown the disease) the mother's family seems untainted. The epileptic children came in a sequence, between sound children and all were attacked in the ninth year. Two of the earlier healthy children showed slight exophthalmus and the mother may have gone through an abortive attack of Grave's disease. This detail recalls Lundborg's thyreogenic theory, the Swedish author associating his myoclonus-epilepsy with Grave's disease, tetany and katatonic rigidity. The cases of Rechtanwald are highly typical and in Lundborg's material the singling out of children from the midst of a healthy brood is sometimes seen. Rechtanwald performed lumbar puncture in his cases to exclude meningitis (which was actually present in Bresler's case).

Oddo and Corsy described four cases of epileptic myoclonus in 1913.[13] In two cases no familial incidence is mentioned. The third patient has a sister (not seen) who while not epileptic was said to have cloni, while the fourth patient had a brother with abnormal movements of some sort. As is well known, the Unverricht disease is not always familial. Cases III and IV were of very severe type and certainly belonged under true myoclonus-epilepsy, but in Cases I and II the epilepsy and cloni were alike mild and a progressive tendency and familial incidence not in evidence. Such cases could be termed pseudo-Unverricht, etc. There was in both a bad neuropathic history.

Moniz[14] reported two cases of essential myoclonus. Epilepsy is distinctly lacking and in one case there is no mention of a tainted stock. Apparently hysteria is excluded by absence of history and stigmata. The patient of degenerative stock suffered from coprolalia (compulsive repetition of a single obscene word) but maladie des tics is excluded. The word "essential" as applied to these cases means probably that they were neither symptomatic or hysterical. Moniz regards the so-called "myoclonus of degenerates" as equivalent to Brissaud's "variable chorea of degenerates."

[12] Rechtanwald, 1912.
[13] Oddo and Corsy, Revue de psychiatrie, Vol. XVIII, 1913, p. 397.
[14] Moniz, N., Iconographie de la Salpêtrière, 1913, Vol. XXVI, p. 84.

Jacquin and Marchand[15] describe a case of "progressive myoclonus epilepsy" in a tuberculous girl of pronounced tuberculous ancestry. The stock was not neuropathic and there was no familial incidence. The case was apparently symptomtic throughout, something almost unheard of. Epilepsy began at ten, promptly followed by mental failure. This condition at first passed for juvenile paresis. Cloni appeared at fifteen years. But the inception of the disease was much earlier, for when three years old the patient had suffered from some intracranial mischief expressed by convulsions. The authors assume the presence of a chronic meningitis with cortical sclerosis, nonsyphilitic and non-tuberculous. Spinal puncture excluded these affections. The girl died at twenty and the autopsy revealed evidences of meningitis. A systematic study of the brain seems not to have been made.

In a very brief episode of family myoclonus described by Stewart,[16] the evidence shows that the disease was not of the Unverricht-Lundborg type. Three out of four children in a family showed cloni of a mild type and the oldest also showed myotonia in some of the shoulder girdle muscles. Family taint is not mentioned.

Friedrich[17] (not the original of the name who first described paramyoclonus) in connection with a case which he terms paramyoclonus, states that the cloni in such cases suggest some organic disease of the cerebellum-thalamus system. In certain cases, like his own, slight implication of the right pyramidal path might explain the involvement of the facial nerve and right upper extremity (his case was more or less unilateral). As a general proposition frequent rhythmic muscular contractions are to be referred originally to foci in the cerebellum (Klien and Schilder separately reached this conclusion, the former from study of continuous rhythmic spasm of the esophagus and the latter from studies of chorea and athetosis).

Austregesilo and Ayres[18] of Buenos Aires describe two cases of familial myoclonus epilepsy in a brother and sister. The observations are incomplete. Of lesions cited to explain the mechanism of the disease, Lafora and Glück claim to have found lesions in the quadrigemina and bulb; Gonzales and Rossi saw chronic meningitis with cortical sclerosis and atrophy of the nervous centers. Both

[15] Jacquin and Marchand, L'Encephale, 1912, VIII, p. 205.

[16] Stewart, Proceedings Royal So. of Med., 1913, VI, Neurological Section, p. 58.

[17] Friedrich, Deutsch Zeitschrift für Nervenheilkunde, 1913, Vols. 47–48, p. 141.

[18] Austregesilo and Ayres, Revue neurologique, 1914, XXII, i, 746.

author teams as well as Volland report spinal cord findings. Wolland and the majority of writers mention cortical lesions.

In 1911 Westphal described familial myoclonus in two sisters which closely resembled Huntington's chorea, save that the movements were true cloni. There was no epilepsy, but in both cases there was mental failure. Hysteria could be excluded, as could organic disease. The cloni suggest Friedrich's syndrome, but in other respects the disease is more like the Unverricht-Lundborg type, although the absence of epilepsy decidedly excludes the latter.

Conclusions from the preceding data and opinions have to do first with hyperkineses in general, and second, with myoclonus, with especial reference to the part played by the midbrain in their genesis. In regard to rhythmic automatic movements in general, the widest differences of opinion appear to prevail as to the relative part played by the cortex and midbrain. According to one view the impulses originate in the cortex; or if they originate at a lower level it is because cortical inhibition is withdrawn. Another view would make the impulses originate in the midbrain to be reflected to the cortex, then to behave like original cortical impulses. A third view upholds a cerebellar origin, with or without a cortical factor. According to the particular view held, special tracts are imagined which preside over muscle tone. One such tract is supposed to begin in the cerebellum and pass through the red nucleus and quadrigemina, constituting an extrapyramidal tract. One writer believes that the extrapyramidal tract begins in the cortex and passes in succession through the lenticular and red nuclei to the cerebellum and thence to the olivary body. All opinions of this sort are based on the slow cumulation of evidence that rhythmical automatic movements occur with intact pyramidal tracts. That definite paths exist is assumed because isolated lesions in the midbrain produce symptoms not accounted for by irritation of circumscribed localities. Injury to a single nucleus causes certain motor phenomena, not because impulses can originate in such locality, but because the structure lies in a particular tract for the transmission of impulses.

Opposed to the conception of an extrapyramidal tract which originates in the cerebellum—although not necessarily excluding it outright—is that of a tonectic system which is predominantly cortical and is connected with the midbrain only through certain fibers which pass through the edge of the internal capsule. These fibers are believed to lie within the pyramids—are intrapyramidal instead of extrapyramidal. The cerebellar theory of muscle tone appears to be the result of the teaching of Luciana, which is not accepted

by many clinicians. All of the types of abnormal muscular movements of an automatic, rhythmic type are believed to be associated with tone disturbances—with interruption of tonic impulses. At the same time tonic rigidity, spasticity, contractures, etc., are presumably due to irritation of these tone maintaining tracts; so that clinically we may see the association of hypertonus with rhythmic movements as in paralysis agitans and Wilson's disease. It is not our purpose to consider all the hyperkineses in this paper, but only myocloni; and it must be confessed that unless cloni be regarded as a sort of equivalent for tonic contractions and tremor there is but little direct allusion to them in the recent developments.

We are assured that in the advanced stages of Wilson's disease tremors may be replaced by clonic movements; while the Philadelphia Neurological Society cases recently reported show even at the outset of the affection that a full fledged myoclonus of the Friedrich type may be present. The diagnosis in these cases was paramyoclonus multiplex in presumable disease of the lenticular nucleus with spasticity and trophic lesions. Another Friedrich, in reporting a case of paramyoclonus in 1913, before much of the recent agitation about nonpyramidal transmission, sought to explain its mechanism, which was largely untilateral, by invoking the presence of an organic lesion of the cerebellum-thalamus system. That cloni may originate in cerebellar foci he thinks very probable from studies by Klein on rhythmic spasm of the esophagus and Schilder on chorea and athetosis. In this connection we may emphasize that both choreatic and athetoid movements may shade into myocloni.

A stumbling block to speculation is seen in the fact that in most of the evidence which associates rhythmic movements with certain centers in the midbrain, the lesions and movements were unilateral save in affections essentially bilateral. Although essential myoclonus may predominate on one side and even appear as hemiclonus (?) we associate myoclonus with bilateral disturbances. A tumor in the quadrigemina has been known to cause hemiclonus, perhaps however only as a result of irritation of the pyramidal path. No doubt that the bilateral character of essential myoclonus has been a powerful reason for regarding the latter as a functional affection.

In the article by Flatau and Sterling much is said of the implication of the midbrain in myoclonus, but the argument is supported by cases of chorea, athetosis and tremor. There is but little reference to myoclonus in the writings of others. Something could doubtless be made of a theory of Koshewnikoff's epilepsy by a Russian writer,

Choroshko,[19] has written a monograph to show that in this affection the impulses of the continuous cloni originate in the basal ganglia whence they are reflected to the cortex.

Flatau and Sterling report two cases of symptomatic cloni which they believe to have been due to basilar meningitis which implicated the basal ganglia (cerebral peduncles, thalami and quadrigemina). The cortex was not involved and the condition ended in recovery. A similar mechanism is assigned in a case of cloni with amaurotic family idiocy, but the fact that the entire encephalon is involved in this affection makes a demonstration impossible. As far as we know in but one case of degenerative myoclonus were lesions especially noted in the midbrain. In this observation (Lafora and Glück) the cortex was also involved.

As a result of the clinical study here undertaken one is impressed by the evidence that lesions in certain parts of the cerebellum, the cerebral cortex or in the midbrain may give rise to myoclonia. In all such pathologic data whether the cerebral cortex or the cerebellum is mainly or primarily involved the midbrain and the caudate nucleus and putamen (neostriatum) in particular may show some form of disease alteration. As Hunt[20] contends, the corpus striatum is the great infracortical center for the control and regulation of automatic and associated movements. It is composed of two cellular systems, viz., the small ganglion cells of the caudate nucleus and putamen (neostriatal) and the large motor cells of the globus pallidus mechanism (pallidal). The function of the neostriatal cells is inhibitory and coördinating; that of the pallidal cells is motor. Loss of the small cell inhibitory system is followed by chorea; loss of the large cell motor system by the paralysis agitans syndrome; viz., rigidity, tremor, and disturbances of automatic and associated movements. A destructive lesion involving both types of cells in the caudate nucleus and putamen (the état marbré) produces the Vogt syndrome of the corpus striatum, viz., spastic diplegia with athetosis, rhythmic oscillations and pseudobulbar palsy. A massive lesion of the whole corpus striatum as in progressive lenticular degeneration produces the Wilson syndrome,—tremor and rigidity of the paralysis agitans type, together with tonic and clonic spasms and occasionally choreic and athetoid movement (Gowers tetanoid chorea).

In Hunt's opinion, the Vogt syndrome and Wilson's syndrome

[19] Choroschko, 1907.

[20] J. Ramsay Hunt, Progressive Atrophy of the Globus Pallidus, Trans. Amer. Neuro. Asso., 1917, p. 164.

therefore represent different degrees of involvement of these two cellular systems. The occurrence of muscular rigidity, rhythmical tremor, chorea, athetosis, tonic, clonic and mobile spasms will depend upon the distribution and extent of the lesion in the corpus striatum and the relative degree of involvement of these two cellular systems. He holds therefore that athetosis is simply a combination of chorea and rigidity from simultaneous destruction of the smaller (inhibitory) and larger (motor) cell types of the neostriatum. The globus pallidus is the motor nucleus of the striate body and through its connections with important centers in the hypothalamic region,—the nucleus ruber, corpus subthalamicum and substantia nigra,—exercises a controlling influence upon the intersegmental nervous system through the medium of the extra-pyramidal motor tracts. The corpus striatum has also close relation with the cerebral cortex, the cerebellum, and the peripheral sensory mechanism, through its connections with the great sensory correlating station, the optic thalamus. The type of the lesion may well be in the nature of a system degeneration (abiotrophic). As Hunt, whose work upon this region is most suggestive to the ultimate solution of mobile spasm and myoclonia in particular, has contended, the vascular, perivascular lesions, toxic degeneration, tumor, lues, inflammation, etc., may be the cause of juvenile paralysis agitans based upon case-material showing progressive (cellular) atrophy of the globus pallidus. Similar types of lesions affecting the neostriatum must be looked for in future if we are to understand the intricate and delicate mechanism of a disturbance of the tonectic control disordered in mobile spasm and the myoclonias.

In conclusion one may say that aside from myoclonia being a symptomatic accompaniment of various organic disease more or less pronounced it appears to exist solely in an ultramicroscopic lesion in the midbrain per se; an abiotrophy of the neostriatum or lenticular region between the corpus striatum and the globus pallidus is the most probable seat of the lesion in which the tonectic function of the neostriatum is affected.

128 East Sixty-first Street.

UNIFORM STATISTICAL REPORTS ON INSANITY NOW ASSURED. AN OFFICIAL CLASSIFICATION OF PSYCHOSES[1]

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Psychiatric progress has been seriously hampered by an unfortunate absence of accurate scientific information which would warrant definite conclusions regarding many matters of far-reaching importance. In our search for knowledge we naturally turn to the published works of recognized authorities whose observations are based presumably upon a wide experience with the subject under discussion. We soon find ourselves overwhelmed with theories and confronted with a startling absence of established facts. Widely heralded writers, in some instances without any actual experience in the care or observation of the insane in any considerable numbers, discuss psychiatric topics voluminously, often reflecting views generally entertained a generation ago, but long since discarded. At best, we are likely to find personal opinions advanced as accepted facts. The textbooks are filled with unsubstantiated statements regarding the frequency of various forms of insanity and the recovery rate of certain psychoses. These are usually based upon the personal observations of the author in question or upon the statistical data available from his own hospital. It is only by accurate statistical studies that we can arrive at conclusions of any great value regarding matters upon which our fundamental conceptions of psychiatry largely depend.

The etiology of insanity has long been a favorite topic of discussion. A brief reference to the publications of some of our well-known authors will, I think, be sufficient to show that further information on this important subject is very essential. Heredity is usually looked upon as one of the most important factors in the production of mental disease, and it unquestionably is. To what extent is it responsible for dementia præcox or manic depressive insanity as compared with the various forms of mental deficiency or epilepsy? Are the Mendelian theories relating to heredity sufficiently estab-

[1] Read before the Boston Society of Psychiatry and Neurology, February 20, 1919.

lished to warrant a complete revision of our views on this subject? These questions can be answered only by a careful analysis of the facts.

The importance of mental defects and insanity as related to criminality, prostitution, alcoholism and pauperism is now quite generally accepted. Further statistical studies, however, are absolutely necessary if conclusions of any value are to be reached. The infrequency of clear-cut psychoses due to the use of any single drug is surprising. Statistics of nearly forty thousand committed cases of insanity show that psychoses due to cocaine alone, for instance, are exceedingly unusual, morphine or some other factor almost always complicating the situation.

Our knowledge of epileptic psychoses is perhaps one of the most discouraging features of psychiatry. We know that nervous and mental diseases, feeblemindedness and alcoholism are prominent in the family history of epileptics. Attention has been called recently by L. Pierce Clark and others to the so-called "epileptic constitution." If we are to determine whether or not there is such a thing as an epileptic constitution and what its relation to that disease really is, we must know definitely what percentage of cases show the characteristics of that mental makeup. There is, unfortunately, no satisfactory classification of epileptic psychoses. We know, of course, that a large majority of epileptics ultimately reach an advanced state of mental deterioration. We do not, however, know just what this percentage is. We know that many epileptics show preparoxysmal states; others are subject to postparoxysmal conditions; while some exhibit only interparoxysmal episodes. In many cases there are associated psychoses, such as manic depressive insanity, which, however, have no definite relation to the epilepsy. There are also other conditions which are probably purely epileptic in character. These matters require considerable discussion, careful analysis and much further consideration, which should be based upon trustworthy statistical information.

We are certainly in need of definite data relating to the psychoneuroses. The necessity of this has, I think, been emphasized by the examination of recruits at the beginning of the war and subsequent developments overseas.

Constitutional psychopathic inferiority is now recognized by the federal government as an adequate reason for rejecting immigrants. The relation of this condition to the various psychoses is also worthy of much more careful study.

The frequency of different forms of insanity has long been a

topic of discussion, as has the recovery rate. Our information on these subjects is, however, practically useless, as it has not been based on the analysis of a large number of carefully studied cases. We can only determine the relative frequency of the various forms of dementia præcox by going over carefully the material available in our large hospitals.

It has long been customary to state in textbooks that certain mental diseases were peculiar to given races, or that they were prevalent in certain communities, or limited largely to various stages of life. These are all questions which can be definitely settled in time, when more facts are available. It will, I think, be conceded that this information must be obtained from institutions, where extended observation is possible and where the insane are under constant supervision. It can be obtained in no other way. The fact that there were over 200,000 insane in the institutions of the United States in 1917 is sufficient evidence that there is no lack of material for such studies. Reports on occasional cases are practically of no value. The official publications of various institutions and the annual reports of a few state departments contain statistical information which can be subjected to intelligent study and analysis. Any effort to make a comparative study of conditions prevailing in different communities or to make statistical studies of psychoses on any elaborate scale has, however, been difficult, if not impossible.

The cost of the care and maintenance of the insane is in itself a question of the utmost importance. There are quite frequent legislative investigations along this line. Unfortunately, it is very difficult to get at the facts. Some states include the cost of repairs and extraordinary improvements in the cost of maintenance. A few state departments in computing the cost of care deduct all receipts for reimbursing patients. Others take into consideration the value of articles produced in the manufacturing departments and the value of the farm products raised. There is no uniformity. A superficial comparison of annual reports would convey the impression that the per capita cost of maintenance in Massachusetts is double that of some of the other states, whereas the real difference consists merely in the method of bookkeeping. It is, of course, equally important to know the cost of construction, the number of employees authorized by the various institutions, etc.

The correlation of statistics regarding the insane in various states has been difficult owing to the multiplicity of methods of administration. Six states have no central administrative control of the insane whatever. In Massachusetts the insane, feebleminded,

epileptics, inebriates and drug habitues are under the general supervision of a Commission on Mental Diseases. In New York there is a State Hospital Commission; in Maryland, a State Lunacy Commission. In Illinois the institutions for the insane are under the executive control of a Department of Public Welfare, succeeding a former Board of Administration. In Utah there is a State Board of Insanity. In twelve states there are Boards of Control.

In seventeen states the institutions for the insane are under the supervision of State Boards of Charity. In one state only, New Hampshire, they are under the State Board of Health. In forty-two states they are under some form of central control. No two of these states in compiling statistical reports has used the same classification of insanity. As a matter of fact, very few states have consistently used any classification at all, usually leaving the method of reporting psychoses to the individual hospital. The reports of the last few years show everything from dementia to chronic delusional insanity, and have embraced practically every psychiatric term coined during the last century.

Repeated efforts have been made to remedy this unfortunate condition of affairs. The Association of Medical Superintendents of American Institutions for the Insane in 1869 prepared a set of statistical tables which were used more or less for some years but never officially adopted. At the annual meeting of the American Medico-Psychological Association at Niagara Falls in June, 1913, a committee was appointed for the purpose of formulating a plan for the compilation of statistical data on the insane in the hospitals of the United States and Canada. At the annual meeting of the Association in New York in 1917, the committee submitted a report recommending the adoption of a set of statistical tables and a classification of mental diseases to be used by all institutions.

The conclusions reached by the committee are well illustrated by a quotation from their report to the Association:

"That the statistical data annually compiled by the various institutions for the insane throughout the country should be uniform in plan and scope is no longer open to question. The lack of such uniformity makes it absolutely impossible at the present time to collect comparative statistics concerning mental diseases in different states and countries, and extremely difficult to secure comparative data relative to movement of patients, administration, and cost of maintenance and additions. The importance and need of some system whereby uniformity in reports would be secured have been repeatedly emphasized by officers and members of this Association, by statisticians of the United States Census

Bureau, by editors of psychiatric journals, and by administrative officials in various states. We should know accurately the forms of mental disease occurring in all parts of the country; we should know the movement of patients in every hospital for the insane; we should know the cost of maintenance of patients and the amounts spent for additions and improvements in every state hospital; we should be able to compile annually complete data concerning these and other matters, and compute rates and draw comparisons therefrom. Such data would serve as the basis for constructive work in raising the standard of care of the insane, as a guide for preventive effort, and as an aid to the progress of psychiatry.

"Your Committee feels that the first essential of a uniform system of statistics in hospitals for the insane is a generally recognized nomenclature of mental diseases. The present condition with respect to the classification of mental diseases is chaotic. Some states use no well-defined classification. In others the classifications used are similar in many respects, but differ enough to prevent accurate comparisons. Some states have adopted a uniform system, while others leave the matter entirely to the individual hospitals. This condition of affairs discredits the science of psychiatry and reflects unfavorably upon our Association, which should serve as a correlating and standardizing agency for the whole country.

"The large task of your Committee therefore has been the formulation of a classification which it could unanimously recommend for adoption by the Association. The task was accomplished only after several prolonged conferences at which classifications now in use in various states and countries, and the recommendations of leading psychiatrists were considered. The classification finally adopted is simple, comprehensive and complete; it copies no other classification but includes the strong features of many others; it meets the demands of the best modern psychiatry, but does not slavishly follow any single system. In short, your Committee has endeavored to formulate a classification that could be easily used in every hospital for the insane in this country and that would meet the scientific demands of the present day."

The following classification of mental diseases was recommended and adopted by the Association:

1. Traumatic psychoses:
   - (*a*) Traumatic delirium.
   - (*b*) Traumatic constitution.
   - (*c*) Post-traumatic mental enfeeblement (dementia).
2. Senile psychoses:
   - (*a*) Simple deterioration.
   - (*b*) Presbyophrenic type.
   - (*c*) Delirious and confused types.

(*d*) Depressed and agitated states in addition to deterioration.
(*e*) Paranoid types.
(*f*) Pre-senile types.

3. Psychoses with cerebral arteriosclerosis.
4. General paralysis.
5. Psychoses with cerebral syphilis.
6. Psychoses with Huntington's chorea.
7. Psychoses with brain tumor.
8. Psychoses with other brain or nervous diseases. The following are the more frequent affections and should be specified in the diagnosis:
   Cerebral embolism.
   Paralysis agitans.
   Meningitis, tuberculous or other forms (to be specified).
   Multiple sclerosis.
   Tabes.
   Acute chorea.
   Other conditions (to be specified).
9. Alcoholic psychoses:
   (*a*) Pathological intoxication.
   (*b*) Delirium tremens.
   (*c*) Korsakow's psychosis.
   (*d*) Acute hallucinations.
   (*e*) Chronic hallucinations.
   (*f*) Acute paranoid type.
   (*g*) Chronic paranoid type.
   (*h*) Alcoholic deterioration.
   (*i*) Other types, acute or chronic.
10. Psychoses due to drugs and other exogenous toxins:
   (*a*) Opium (and derivatives), cocaine, bromides, chloral, etc., alone or combined (to be specified).
   (*b*) Metals, as lead, arsenic, etc. (to be specified).
   (*c*) Gases (to be specified).
   (*d*) Other exogenous toxins (to be specified).
11. Psychoses with pellagra:
12. Psychoses with other somatic diseases:
   (*a*) Delirium with infectious diseases.
   (*b*) Post-infectious psychosis.
   (*c*) Exhaustion-delirium.
   (*d*) Delirium of unknown origin.
   (*e*) Cardio-renal diseases.

(*f*) Diseases of the ductless glands.
(*g*) Other diseases or conditions (to be specified).

13. Manic-depressive psychoses:
    (*a*) Manic type.
    (*b*) Depressive type.
    (*c*) Stupor.
    (*d*) Mixed type.
    (*e*) Circular type.
14. Involution melancholia.
15. Dementia præcox:
    (*a*) Paranoid type.
    (*b*) Catatonic type.
    (*c*) Hebephrenic type.
    (*d*) Simple type.
16. Paranoia or paranoic conditions.
17. Epileptic psychoses:
    (*a*) Deterioration.
    (*b*) Clouded states.
    (*c*) Other conditions (to be specified).
18. Psychoneuroses and neuroses:
    (*a*) Hysterical type.
    (*b*) Psychasthenic type.
    (*c*) Neurasthenic type.
    (*d*) Anxiety neuroses.
19. Psychoses with constitutional psychopathic inferiority.
20. Psychoses with mental deficiency.
21. Undiagnosed psychoses.
22. Not insane:
    (*a*) Epilepsy without psychosis.
    (*b*) Alcoholism without psychosis.
    (*c*) Drug addiction without psychosis.
    (*d*) Constitutional psychopathic inferiority without psychosis.
    (*e*) Mental deficiency without psychosis.
    (*f*) Others (to be specified).

The following statistical tables were adopted by the Association on the recommendation of the committee:

1. General information.
2. Financial statement for the year.
3. Movement of population.
4. Nativity of first admissions and of parents of first admissions.

5. Citizenship of first admissions.
6. Psychoses of first admissions.
7. Races of first admissions classified by psychoses.
8. Age of first admissions classified by psychoses.
9. Education of first admissions classified by psychoses.
10. Environment of first admissions classified by psychoses.
11. Economic condition of first admissions classified by psychoses.
12. Use of alcohol by first admissions classified by psychoses.
13. Marital condition of first admissions classified by psychoses.
14. Psychoses of readmissions.
15. Discharges classified by psychoses.
16. Cause of death classified by psychoses.
17. Age at death classified by psychoses.
18. Duration of hospital life classified by psychoses.

Since the official adoption of these statistical tables, the Association's committee has prepared an elaborate statistical manual explaining their use. This includes explanatory notes intended to answer any questions which may arise in connection with either the classification or the statistical tables.

The report of the committee represented a consideration of the entire subject extending over a period of about four years, during which time practically every psychiatrist of note in the country was consulted. To use the phraseology of the committee, quoting again from their report, it is well worth while to emphasize the fact that the classification adopted "copies no other classification, but includes the strong features of many others; it meets the demands of the best modern psychiatry, but does not slavishly follow any single system." All debated points were carefully avoided as far as possible. Only generally recognized entities were included. There is no reason why it should meet with any opposition. As a matter of fact, it has not. The Association now has a standing committee on statistics which will make such modifications and amendments in the statistical scheme as may be found necessary from time to time. The committee in 1918 as designated by Dr. E. E. Southard, President of the Association, consists of the following: Dr. A. M. Barrett, professor of psychiatry and neurology, University of Michigan, chairman; Dr. Adolf Meyer, professor of psychiatry, Johns Hopkins University; Maj. E. Stanley Abbot, McLean Hospital; Dr. James V. May, superintendent Boston State Hospital; Dr. George H. Kirby, director of the Psychiatric Institute, Manhattan State

Hospital, New York City; Dr. Owen Copp, superintendent Pennsylvania Hospital, Department for Nervous and Mental Diseases; and Dr. Samuel T. Orton, clinical director and pathologist, Pennsylvania Hospital, Department for Nervous and Mental Diseases. Lt. Col. Thomas W. Salmon, medical director, Maj. Frankwood E. Williams, associate medical director, and Dr. Horatio M. Pollock, consulting statistician, were designated by the National Committee for Mental Hygiene to represent that organization on the committee.

The practical operation of this plan for obtaining statistical reports from institutions of the country has been assured by the establishment of a Bureau of Statistics of the National Committee for Mental Hygiene at its office at 50 Union Square, New York City. The work of this bureau is officially coördinated with the Committee on Statistics of the American Medico-Psychological Association. Since this work was undertaken, the Association's classification has been adopted officially by the commissions and various central boards of control in the following states: Arizona, California, Illinois, Kentucky, Maryland, Massachusetts, Missouri, Nebraska, New York, Ohio, Pennsylvania, Tennessee and Wyoming. Its official recognition by other states is merely a matter of time. It has already been adopted by 145 of the 156 state hospitals for the insane in the country, including all of the institutions in forty different states.

The Bureau of Statistics has furnished all of the public institutions with complete sets of forms for the statistical reports. The success of this important movement would appear to be definitely assured at last and it unquestionably constitutes one of the greatest developments of modern psychiatry. The adoption of the classification of psychoses throughout the United States will alone do more towards raising the standards of hospital care in this country than anything attempted or proposed heretofore.

In conclusion, I wish to appeal to all who are interested in the progress of modern psychiatry to spare no efforts towards making this undertaking an unqualified success.

Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

The Three Hundred and Seventieth Regular Meeting,

Held at the Academy of Medicine,

February 4, 1919

The President, Dr. Frederick Tilney, in the Chair

A CASE OF TUMOR OF THE SPINAL CORD WITH OPERATION

Dr. C. C. Beling and Dr. Alfred S. Taylor presented this case, an American woman, thirty-nine years of age, who is to-day apparently well. The patient was first seen on January 6, 1916. Three months before she noticed that her feet were numb, especially the ends of her toes. After a short period of time, how long she does not definitely remember, she began to experience a feeing of general stiffness and lameness, which increased gradually. This was followed by an intense localized pain in her back, across her shoulders and radiating down the right arm as far as the elbow. It was more excruciating at night, especially after she went to bed. In her own words, "One day it was an ache, the next day it was a pain and the next day it was as if I were being lashed across my shoulders." From then on the numbness in both lower extremities increased and was more marked in the right. The right leg felt much stiffer than the left during locomotion. Her bowels were constipated and she experienced some detrusor weakness in urination.

Examination showed a Brown-Sèquard type of lesion of the spinal cord at the level of the fourth dorsal vertebra. She entered the Newark City Hospital on January 11, 1916, and remained under observation until January 15. Blood and urine examinations were negative and Wassermann tests of the blood and spinal fluid were negative. Roentgenograms showed some obscure bony thickening about the fourth and fifth dorsal vertebræ. About January 25th the sensory disturbances extended upwards and spread into her arms and hands, and the paraplegic symptoms became more pronounced.

Regarding the sensory findings made the day before operation, the relative levels of the receptors for touch, pain, heat and cold were inter-

esting. The pain receptors occupied the lowest level, the touch receptors the next, followed by the heat receptors and the cold receptors. Another remarkable feature of their distribution in the skin was their coalescence and interlacing at the axillary and cubital flexures. These sensory features were evidently of biological significance and showed an evolutional adaptation of the organism to environmental influences.

Operation was advised and was performed on January 31, 1916, by Doctor Taylor. A right unilateral laminectomy was done, involving the laminæ of C.vi to D.ii inclusive. When the bone was removed there was a palpable tumor beneath the dura, just about in the middle of the exposure. The dura was split the full length of the exposure, and a soft, friable, vascular, lobulated tumor was found, situated chiefly on the right side of the cord dorsally, and extending a little backward and over to the left of the median line dorsally, and forward along the right lateral aspect of the cord. The tumor was about 6 cm. long x 2.5 x 1. It appeared to be situated beneath the arachnoid membrane. After the arachnoid was divided over the tumor it could be peeled out with comparative ease, and seemed to have no direct adhesions to the cord substance. The posterior veins of the cord were intensely congested. The cord was somewhat flattened postero-laterally on the right side. After careful hemostasis, the edge of the dura were sutured by interrupted fine catgut sutures. The muscles and aponeurosis were closed by chromic catgut and the skin by silk. No drainage was used.

Reaction from the operation was good; there was little or no nausea. On the second day the temperature was 103.6, and gradually went down to normal on the fifteenth day. Then it went up and down irregularly between normal and 101 until the twenty-ninth day, after which it stayed normal. This rise in temperature was later found to be the result of infection of vaginal excoriations, the result of an old forgotten pessary. For the first few days the pulse was about 120 per minute, then gradually settled down to 88. The blood pressure varied between 110 to 146 during the first few days, but after the sixth day never rose above 110.

On February 3, three days after the operation, she had an involuntary movement. On that same day she felt a desire to urinate, and was able to hold urine until the bedpan had been brought to her. On the 4th of February she felt a smarting pain about the vulva, which was somewhat excoriated. On February 6, six days after operation, the sutures were removed, and she had a good primary union. At this time she had regained complete control of bladder function. On February 14 she sat up in a chair for half an hour. On February 19 she felt pain in her left side, which had been previously anæsthetic. On February 21 she remembered that a pessary had been inserted several months previously and left. This pessary was removed with considerable difficulty, was encrusted with lime salts, had caused considerable vaginal ulceration and foul discharge, which had excoriated the vulva. This had undoubtedly

been the cause of her irregular temperature, which ceased after the pessary was removed and she had been given a few douches. On March 6, the thirty-fifth day after operation, she had a large, formed, voluntary stool, and from that time on had control of the bowel. On March 11, 40 days after operation, she was able to take a few steps, with assistance, and was taken home on that date. From this time on there had been steady improvement.

Pathological examination and report state that the tumor was an atypical neurofibroma. At one point near the middle of the tumor a nerve was found, the branches penetrating the growth. It was very cellular in some places, while in other places fibrous elements predominated. The blood vessels showed dilatation, thickening, congestion, and a nuclear increase in the vessel walls. In some places the vessels appeared obliterated and there were many small hemorrhages distributed throughout the field.

Dr. Edward D. Fisher asked if there was any suspicion of the tumor being intraspinal or extraspinal.

Dr. I. Abrahamson thought it was very unusual in a unilateral tumor to get bilateral sensory symptoms so early. All the signs seemed to have pointed to its being an extra medullary tumor. Fourteen years ago he showed a case of extramedullary tumor without pain in which the first symptom was paresthesia, at first in the toes of the right foot and soon afterwards in the left toes, one of the earliest cases of neoplasm of the cord without pain that he had ever seen. The tumor was found, as diagnosed, antero-laterally situated.

Dr. Joseph Byrne remembered a case parallel with this one except that the growth was a little further down in the cord. In that case, the symptoms were almost like those of Doctor Beling's case, beginning with root pains around the level of the twelfth thoracic on the left; this was followed by stiffening in the left foot and then by weakness in the other foot after several years. This tumor took from ten to eleven years to develop to full maturity. In the meantime patient gave birth to three children. Doctor Taylor removed the growth in a unilateral laminectomy as in this case. Notwithstanding the fact that the tumor was as large as a Brazilian nut the exposure through the unilateral laminectomy gave a very satisfactory view of the growth and the cord and was quite adequate in every respect. Though the tumor was successfully removed the patient succumbed the day following operation. She had been a victim for years of mitral insufficiency.

ADDRESS OF THE RETIRING PRESIDENT. THE OPPORTUNITY OF AMERICAN NEUROLOGY

Dr. Frederick Tilney delivered this address in which he ignored the academic, for in the light of the great changes that had occurred throughout the world in the past two years the opportunity of American

neurology was practical, broad in its scope, compelling in its demand, and entering with insistence into the life of every neurologist in this city. Recent and present events made the future for them alluring to contemplate. Among the changes that the war had brought about was the prominence given to learning and the pursuit of knowledge, probably because it had been shown that education was one of the main supports of civilization. Renewed interest had been aroused in the psychological studies of man and his conventions. The destruction of war had placed Europe at a disadvantage in its intellectual pursuits. This fact should be recognized at once in America as an opportunity for service, the purity of motive being enhanced by the lack of aggrandizing competition. America, having at last taken her place beside the valiant, hard-pressed champions of right and turned the scales to victory, had come to know her usefulness. The entire country seemed everywhere to recognize this; everywhere was a new spirit, a new alertness and comprehension. What was true in all other lines of activity, commercial, intellectual, educational, was also true of the medical profession. The opportunities for work in the growing fields of human service were the chief topics of conversation in medical circles and among medical men. The phase that interested neurologists most intimately was the development and advance of neurology in this country, and it was to the opportunity presented by combined and well organized effort that American neurologists must address themselves. Assuming that this fact was recognized in a general way, practical consideration made it necessary to consider the problem from the standpoint of locality, and the question arose, how could each contribute most and proceed most efficiently in the general forward movement in the interests of neurology. Other cities throughout the country would have their problems to solve, but those here in New York were particularly difficult and demanded not merely vision and patience, but a large and generous consideration of the whole situation. There was no place to-day where it could be said that the diseases of the nervous system received adequate post-graduate attention. New York City contained in its many scattered institutions a wealth of neurological material probably surpassed nowhere in the world. Here also was a distinguished group of workers in neurology and psychiatry whose distinction and services could be enhanced by coördination in their efforts. With such an obvious opportunity and need, together with the material and the workers, New York could readily be made a leading center in neurology and psychiatry. The fundamental requirement to achieve this end was coördination, and if this could be brought about it would serve to do away with many of the difficulties which stood in the way of neurological progress, and would mobilize the wealth of clinical, pathological and morphological material to mutual advantage as well as for advanced teaching and research in neurology and psychiatry. The success of such an undertaking would depend almost

entirely upon the individual enthusiasm and real devotion for the best interests of this particular subject.

In retiring from the office of president of this Society, Doctor Tilney expressed his sincere appreciation for the loyal support that had been accorded him in his attempts to serve the best interests of the society during the past two years. It gave him great pleasure to welcome Doctor Timme to the chair.

LAMINECTOMY FOR INTRAMEDULLARY (?) TUMOR OF THE SPINAL CORD REMOVED BY TWO-STAGE OPERATION: LATER LAMINECTOMY AND POSTERIOR ROOT SECTION FOR SPASTICITY: REMARKABLE IMPROVEMENT

Dr. Elsberg presented this case: A young woman, 17 years of age, who was admitted to the Neurological Service of Dr. Sachs, Mount Sinai Hospital, in January, 1912. She gave a history dating back a year, of increasing weakness in all four extremities with marked sensory disturbances and changes in her reflexes. She had been treated for a period as a case of Pott's disease and had been in a plaster cast. Her symptoms were those of a compression of the spinal cord at the seventh dorsal level and she was transferred to the Surgical Service for operation. On March 20, 1912, Dr. Elsberg performed a laminectomy, removing the arches of the sixth and seventh cervical and first and second dorsal vertebræ. When the dura was opened a tumor two inches long situated on the posterior surface of the cord was exposed. The tumor was either covered by a thin capsule or it was covered by a thin layer of spinal cord tissue; this could not be definitely determined. The tissue over the tumor was incised and the wound then closed for the time being. A specimen of the tumor was removed for examination. The patient had lost complete control in the lower extremities and had very little power in her upper extremities when she was operated upon. Within a few days of the operation she improved very markedly and had recovered considerable power in both upper and lower extremities.

One week later the wound was re-opened and the tumor was found to be lying outside of the cord. The pathological report was that the tumor was a fibro-lipoma. When attempt was made to remove the growth it was found to be still partly imbedded in the cord, but with care it was carefully peeled out of its bed. As the result showed, this procedure was wrong. The operation was done in the early period of the knowledge of intramedullary surgery and the proper procedure should have been to have excised the tumor outside of the cord and to have left the remainder in situ. It was always most inadvisable to attempt to enucleate a tumor when partly imbedded in the cord substance, because even with the gentlest manipulation there was severe

trauma to the cord. Recovery from the second operation was normal, but the patient presented within twenty-four hours all the symptoms of complete transverse lesion of the cord with paralysis of all the extremities and less of all reflexes. This condition persisted; she developed large bed-sores and a severe cystitis, had irregular fever from the cystitis, the bed-sores lasted for many weeks and her condition was deplorable. She remained so for several months, and then gradually improved. The lower limbs, however, gradually became spastic, and by April of the following year, were markedly contracted, and flexed at the knees and hips almost to the body. Finally an attempt was made to ameliorate her condition a little bit by posterior root section for the spasticity of the lower limbs. On April 2, 1913, laminectomy was done and the second, fourth and fifth posterior roots on each side were divided. The patient recovered satisfactorily from this operation and the contractures in the lower limbs gradually relaxed so that within two months the legs were fully extended. For about two years she had little power in her lower limbs, but considerable return of power in her upper limbs, and her condition was considered hopeless. In 1918, she returned to the hospital remarkably improved. The power in her upper extremities was now normal and she had good power in her lower extremities excepting for a slight limp on the left side when she walked. She has remained in excellent condition since that time and she was presented at the meeting, and walked around without any trouble, with only a slight limp. The patient was presented in order to show what remarkable recuperative powers the spinal cord has even after a number of years, what can be accomplished by surgery, and finally as an evidence of the dangers of intramedullary surgery.

Dr. Byrne remembered seeing this case at the Neurological Hospital some years ago before she went to Mt. Sinai for the second operation. At that time she had very poor use of her limbs and he tried to think of some reason to account for this. He concluded that the interference with cord function was the result of an inflammatory reaction following the evulsion of the tumor at the first operation in that region and the cord succumber, a condition similar to spinal shock. He thought the case remarkable as illustrating what surgery could do for one so helpless. Considering the condition in which he saw the patient, one would have thought it almost impossible that anything could have been done to restore function to the degree that she now enjoyed.

ADDRESS OF THE PRESIDENT ELECT. A CONSTRUCTIVE PLAN FOR ADVANCEMENT IN NEUROLOGICAL THERAPEUTICS

Dr. Walter Timme delivered this address in which he deplored the fact that neurology had made only moderate advance in recent years, the real advances in this special field having been made by other than

neurologists; as, for instance, the spirochete in paresis, demonstrated by a bacteriologist, and salvarsan introduced by a biochemist. Neurologists should be far ahead on the highway of modern advance, and recognition of their failure to be in the vanguard would, it was earnestly hoped, bring about constructive changes and plans for the immediate future. A glance at recent transactions of neurological societies would show the fairness of this criticism, which was intended to be constructive, not destructive, and which referred not to any one or any group, but to all as a collective unit. These transactions were clouded in a maze of qualifying phrases, limiting applications and newly coined terms which prevented in many cases any approach at understanding. Another disconcerting feature to be found in them was the reduction of individual experiences to statistical tables. When a man reduced his observations, say of disseminated sclerosis, to figures, apportioning a certain percentage to respective types, grouping them under certain symptoms, etc., it would appear that he felt that this was the end of the subject for him, and this represented his attitude toward his patient. Once let the diagnosis of disseminated sclerosis be made and all further interest in the patient was lost. This might be cited about almost any other organic neurologic condition. It was this method of closing a subject that had led organic neurology into a box cañon from which there was no escape ahead, but all egress must be made by retreat.

Such a condition of affairs was not found in other fields of medicine; witness the introduction of serum therapy, of protective vaccines, the discovery of the hemolytic reactions, the invention of the electrocardiograph and other epoch making advances. Against these advances in other fields of medicine neurology could show nothing in the cure of conditions that should be considered within its particular domain. As for the neuroses all that was done for them was to classify and reclassify them, and the psychoses were regarded in terms of terminology and statistics. The paths for emergence toward the light were occupied by other than neurologists; the endocrinologists were concerned with the dystrophies, the myopathies and the asthenias, and the subject of visceral neurology belonged almost exclusively to them. Poliomyelitis had become the concern of the pediatrists and orthopedists. The genitourinary specialist included neurosyphilis in his domain. The dentist cured the spondylites, the neuralgias and reached out for the insanities. The psychanalyst made heroic attacks on every single condition coming under the category of neurology and psychiatry, and frequently with success. It was time for the neurologists to join the order of the day and become revolutionists. It should not be difficult to get together in a spirit of harmony and coöperation and formulate a plan whereby methods of stagnation should be abandoned for those of active endeavor and accomplishment.

Doctor Timme suggested the following as a constructive plan of action:

Why could not an authoritative body representing American neurology choose from among its members a number to whom would be assigned a specific neurologic disease or syndrome for treatment? Each member of such a group might take a subdivision of the subject chosen and bring it up to date. A year might be allowed for the work. At the end of that time, there would be accessible in compact form all that had been written upon that disease throughout the world to date. Two such groups a year would soon give to neurology a series of archives which would be invaluable as starting off places for investigation. This concrete method of obtaining the best results in a short time might very well be initiated by the New York Neurological Society in collaboration with neurological units elsewhere throughout the country. The publication of such exhaustive reviews might then be properly within the scope of the American Neurological Association.

A second recommendation, a corollary to the former, might be of value in fostering a spirit of research and investigation. This would embody the reward of a prize for the greatest yearly advance made in some neurological subject, or for the winner in a competitive essay.

By these two means, an immediate direct stimulus would be applied to American neurology which would give to it a dynamic character and which would be cumulative as it progressed. There was a broadening scope for American neurology and a great desire for unification of neurologic interests, particularly in this city, which would make it the center of neurologic thought and advance. The immense economic factor that problems in neurology and psychiatry had become in modern organizations had been made plain through the great war and a tremendous awakening in all branches of these sciences was already manifest. The position, the power and the ability to encompass this great end were only awaiting the will to utilize them.

THE LESIONS ENCOUNTERED IN OPERATIONS FOR OLD INJURIES OF THE SPINAL CORD. WITH REMARKS ON THE INDICATIONS FOR TREATMENT AND RESULTS OBTAINED BY SURGICAL INTERFERENCE

(With Lantern Slides)

Dr. Charles A. Elsberg read this paper. Among two hundred spinal operations performed at the New York Neurological Institute and at Mount Sinai Hospital, a number of old traumatic lesions had been encountered, which could be divided into those which involved the membranes and those of the cord and roots. Combinations of these types were often observed in a single patient. Many injuries to the vertebral column and spinal cord produced an irremediable cord lesion, but in a small number it was not severe so that improvement was possible and

some of these required operative interference. Changes in the dura frequently resulted from trauma to the spine. The dura might be much changed and so greatly thickened that it exerted pressure on the cord, in which case excision of the thickened part might be followed by improvement of the symptoms. The appearance of the dura might be so altered as to be mistaken for an extradural neoplasm; great care in excising it should be taken in order to avoid injury to the cord beneath. The cord might be adherent to the dura and the arachnoid sac obliterated, or the arachnoid sac found to be shut off above and below the lesion. Calcareous deposits on the inner surface of the dura might cause some root pains or marked cord symptoms. They should be removed, but great care should be exercised, for they were often firmly attached to the surface of the cord. Sometimes symptoms very like those of extramedullary neoplasm were caused by a mass of scar tissue formed from adhesions between the pia of the cord and the dura. Part of this cicatricial tissue might be so firmly adherent to the cord that the only course to pursue was to make parallel incisions through the scar tissue. Cicatrices in the dura, especially around the cauda equina, might cause severe root pains; excision of the scar tissue would usually relieve the symptoms, but it might sometimes be necessary to divide or excise the affected roots.

The changes observed in the arachnoid varied widely. Sometimes it was slightly thickened and cloudy; at other times a localized area on one or the other side of the cord was thickened, cloudy and adherent to the inner surface of the dura. More often, the arachnoid was not only thickened and adherent to the dura, but had also formed adhesions to the spinal cord so that cavities filled with fluid might result. New blood vessels were apt to be formed if these arachnoid changes occurred in the neighborhood of the posterior nerve roots. In those patients where the arachnoid was destroyed and the arachnoid sac obliterated in the traumatic area, the subarachnoid space was found to be shut off above and below and filled by pent up cerebrospinal fluid.

The appearance of the spinal cord months or years after injury also varied widely. Extremely small gross changes might produce very severe symptoms and very marked loss of function. The cord, however, often appeared larger than normal and its consistency less firm. Signs of an abnormal amount of fluid within were observed where there was a cavity in the cord. The largest cavities were usually seen in the lower dorsal lumbar and sacral regions. In some of these patients drainage of the fluid into the subdural space might result in great benefit to the patient. Very marked cord symptoms might be caused by distortion or narrowing of the spinal canal by new formed or dislocated bone. The cord might be stretched over a projecting mass of bone and be also subjected to pressure in which case marked cord symptoms might result. Great improvement had often followed the removal of the projective piece of bone, and the marked angulation described might be overcome by wide decompressive laminectomy.

There was no well supported evidence that the tissues of the cord could regenerate; therefore, operations for complete division of the spinal cord should never be attempted.

Indications for operative interference in lesions following old injuries of the cord could be summed up as follows: (1) Surgical relief was impossible if symptoms of complete transverse lesion had existed from the time of the trauma. (2) There was no hope of benefiting a patient with symptoms and signs of incomplete cord lesion who had large bed sores and was much emaciated. (3) Individuals who had improved but still had paraplegia should be operated upon unless there was dissociated disturbance of superficial sensation. (4) If there was considerable return of power, but locomotion was still interfered with by the spasticity which had become stationary, operation was followed by satisfactory results. (5) Severe root pains, if they could not be otherwise relieved, might demand operative interference. Among the last 200 laminectomies performed by Doctor Elsberg, twenty operations were done for spinal lesions due to old trauma to the vertebral column. Of these, eight were completely relieved of symptoms and six were greatly improved. In six there was little or no improvement.

Dr. Walter F. Schaller, of San Francisco, complimented Doctor Elsberg on his excellent and timely presentation of a subject of interest to all neurologists. He considered it quite possible that in post-war surgery there would be an increasing number of these old spinal injuries as compared with former times. In recently reviewing the war injuries of the spinal cord he had had no personal experience and he wished to ask if Doctor Elsberg had ever noted such cases. For instance, the presence of meningeal adhesions had been noted developing soon after gunshot injuries both above and below the wound and this explained the rarity of serious complicating meningitis in these cases. Further, the presence of circumscribed serous meningitis was often referred to in traumatic spinal cord conditions, and the speaker wished to know if Doctor Elsberg had encountered this condition frequently.

Dr. Hyman Climenko said that some three or four years ago, together with Doctor Newhoff he made a study of a group of cases of old injury to the spinal cord, and obtained some results that might be of both medical and legal value. One patient, a painter forty years of age, had fallen from a scaffold and suffered from a complete paraplegia. He was confined to bed for about eight months when he began to improve gradually and steadfastly until at the end of about one year he was able to return to his work. Four years after the injury the symptoms of paraplegia returned and the patient was sent to the Central and Neurological Hospital. Here he presented a typical picture of spastic paraplegia with distinct level symptoms. Operation was performed by Doctor Newhoff who found a thickened dura with numerous adhesions. A piece of dura was excised and the adhesions freed. The cord did not appear to be

badly damaged. The patient made an uneventful recovery from the operation, his paraplegic symptoms rapidly improved and within less than two months he was able to leave the hospital and return to his work. Within a year he returned, again paraplegic. The symptoms now had developed considerably. This case illustrated the fact that one must be careful about giving a good prognosis in court proceedings in so-called cured traumatic paraplegias. This case was also in accord with the observation quoted by Doctor Schaller regarding adhesions above and below the level of the traumatic lesion. Another remarkable case was that of a negro who suffered from a syphilitic paraplegia. Specific treatment had no effect and operation was decided upon. Here too adhesions were found and freed and the patient improved for a while. The symptoms, however, soon returned. In this series also there was a case of multiple sclerosis with level symptoms. A laminectomy apparently helped the patient considerably, but the symptoms soon returned. All these cases were under observation for a considerable length of time and in general it might be said that they all improved after operation, though sensation returned much more and earlier than motor powers. The pathological findings in these cases were almost the same as those seen by Doctor Elsberg.

Dr. Elsberg assured Doctor Schaller that he had been on the lookout for so-called circumscribed serous meningitis. He had seen it in patients with injuries affecting the dura, but the process usually involved the arachnoid membrane and not the pia mater. Whenever he had seen an inflammatory process of the pia inside the arachnoid, he had considered the process as a meningo-myelitis. He had seen collections of fluid in the arachnoid sac, and felt it was due to an inflammatory process and adhesions of the arachnoid and not of the pia. After old severe injuries one might meet with adhesions between all the membranes and the cord, and he had long ago learned that in cases of that kind operative interference did no good.

PREVALENCE OF INFECTIOUS LETHARGIC ENCEPHALITIS

Dr. I. Abrahamson called attention to the alarming frequency with which this condition was now being encountered in private practice throughout the city. Various types had been established. Among them was a type where the third nerve was involved, or the pons and medulla or the paraplegia or hemiplegia type. There was a type with involvement of the cervical cord. One case he had seen was an acute Parkinson beginning with diplopia and ptosis, a highly intelligent man who had been absolutely without symptoms before, whose statements were fully corroborated by his wife.

Dr. Abrahamson had just received the discussion of infectious encephalitis which preceded an attack of influenza on the other side and

which the Royal Medical Society had studied. The report was dated October 22, 1918, and Sir William Osler, Dr. George Draper and Colonel James Newsholme were members of the committee. They first studied the cases from the point of view of botulism and found they could exclude it. They then considered the relationship of the condition to poliomyelitis but it was found to differ very materially; animal experiments were done but in no case did they get any picture resembling poliomyelitis. The condition was *sui generis* and differed from all analogous conditions.

There were many of these cases in New York at present. The distinguishing features were lethargy and all grades of encephalitis. This was an important and really infectious disease and the Neurological Society ought to do something as a body to study it. The speaker moved that a committee be appointed to get in touch with the Board of Health and make this a reportable disease, and also to go to the various hospitals and study these cases individually and in groups, and perhaps be successful in isolating the infectious agent, which was probably of the same nature or allied to the so-called influenza.

Dr. William Leszynsky said that he had seen a number of these cases of lethargic encephalitis accompanied by symptoms of polioencephalitis and that the prognosis was favorable. He nevertheless approved the move to appoint a committee to study the condition.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

Regular Meeting, December 19, 1918

Dr. Charles G. Dewey, Presiding

CYSTICERCUS RACEMOSUS (TAENIA SOLIUM) OF THE SPINAL CORD

Dr. P. C. Knapp presented a report of a case which had been operated upon after having been on the nerve service of the Boston City Hospital for some time. The patient was twenty-five years of age and had suffered since childhood with momentary periods of unconsciousness and dizzy spells and there were occasional convulsions. In the latter he bit his tongue. He reported also headache and aura. There had been in later years three or four attacks a year. An attack of the previous year, in which there had not been loss of consciousness, had been followed by a dead sensation of the right arm and leg and severe headache. For two years there had been several attacks of severe pain

on both sides of the chest. A little more than a year before numbness of the legs developed and intermittent pain and dyspnea were present. There were ataxia, and pains in the legs and shortly before coming under Dr. Knapp's care severe pain in the abdomen high up on the left side.

Examination showed exaggerated reflexes, double clonus and double Babinski. The abdominal and cremasteric reflexes were absent. Ataxia and astasia were present. The pupils were normal and the Wassermann test negative. Below the area of the fourth and fifth dorsal segments there was hypalgesia. There was tenderness over these vertebræ.

On March 5 a laminectomy of the fifth dorsal vertebra was done. At this level, there was discovered an irregular, translucent, cystic mass 5.5 by 1 cm. in size and the spinal fluid was under tension. The mass was enucleated and proved to be a cyst in which was found the *Taenia solium.* The patient was in a poor condition for a time and manifested a paraplegia with the neurological signs mentioned. Decubitus became extensive and the bladder was paralyzed. The patient died in August, having left the hospital in June against advice.

Dr. A. R. Kimpton, who performed the operation, said that the anemic area in the cord had but little abnormal appearance but was hard and cystic to the touch. The mass, which slipped out readily upon incision, proved to be a multilocular cyst. Though cases have been reported from autopsy containing cysticercus, this was the only case, so far as Dr. Kimpton knew, of removal of such a tumor during life.

PROTHYMIA: NOTE ON THE MORALE-CONCEPT IN XENOPHON'S CYROPEDIA

Dr. E. E. Southard stated that the setting forth of the morale-measures in Xenophon's Cyropedia reveals probably a behavioristic application of morale as the Greeks saw it. This morale as Xenophon represents it is not the same as the modern story of morale. The roots of the words in which Xenophon describes this morale are those having to do not with mere feelings but with movement and speed also rather than with mere strength. These are words which indicate the thoracic location of the emotions rather than that in the head but this emotional expression is behavioristic rather than felt emotion.

A principal term in the list, *prothymia,* hints of motion and it is used generally in compounds where it signifies "heart" in a figurative sense. *Pro,* the prefix, signifies pushing forward in space. *Thymia* is familiar in modern compounds, such as hyperthymia, parathymia, etc., which describe different phases of emotion. Dr. Southard suggests that the term prothymia is euphonious, contains a variety of meanings and may be used as an adjective or a substantive.

THE MILITANT

Dr. E. B. Lane presented the difficulties of diagnosis and proper advice to be given in regard to individuals who come under this designation and concerning whom the advice of the alienist is sought. They should be recognized as a type in themselves who act insanely, lack insight and are without repentance, but who are not demented, do not show the delusions of paranoia nor have they hallucinations and confusional states. He outlines their typical history. They are usually women of the type who have been very efficient when young but probably difficult to get along with and considered temperamental. The individual may have been a business or professional woman. She has perhaps married and had children whom she has managed with apparent success until the time of their independence. Then the mother sets out to make her authority felt in interference, particularly in the case of the daughter. Her meddlesome attitude extends to servants and interferes with friendships, although she may still hold social offices because of her ability and still existing charm. She arouses many petty jealousies at home and abroad and perhaps even spreads suspicion into her husband's business relations. She interferes with the daughter's interests even to villifying the character of a possible lover and perhaps tarnishing the daughter's name.

She is able cleverly to deny all this when brought to the physician and urges him to continue his examination of her. She may have forearmed herself against legal difficulties by the securing of a lawyer and she may be seeking evidence against the husband in test of his sanity. At an institution little evidence of mental disease is obtainable but the woman represents herself as abused and persecuted. She is released and then her militancy extends to more aggressive accusations against her family. These cases resemble paranoia but it is difficult to establish any delusions. They do however belong in the group of the litigant and querulent in age incidence and hopelessness of treatment. They go at times to extremes of brutality. They are allied to those with uncontrollable impulses, their sense of power destroying affection and judgment and leading to all resourcefulness to satisfy their desire. In conduct they are insane, for they are not consciously responsible for their evil doing. Punishment only aggravates them and makes things worse. They make most uncomfortable inmates of institutions to which they are committed.

Dr. H. B. Howard told of a case of this sort, a man under observation for ten years. The object here of the jealousy and militancy was the son, a more successful business man. The father succeeded finally in undermining all the son's business relationships. Only one slight delusional idea had been manifest.

Dr. Southard asked whether deterioration was to be regarded as a

constant characteristic of such cases and suggested that they were parabulic rather than paraphrenic, which made the question of commitability difficult. Was there not a relation here with a mild sadism, he asked.

Dr. G. A. Blumer said he believed deterioriation eventually took place in most cases. He had known a man who for thirty years had kept his place successfully in business but all the time had harbored suspicions against his wife, which he only brought to light on a recent trip to Europe. Since then he has developed definite delusions and is confined as insane.

Dr. Lane closed by saying that he thought this group should be as committable as are cases of kleptomania and pyromania. An understanding of their unreasonable and incomprehensible actions is often impossible.

Current Literature

I. VEGETATIVE NEUROLOGY

2. ENDOCRINOPATHIES.

Bergé, A., Schulman, E. Pituitary Polyuria. [Presse Méd., Dec. 5, 1918.]

This patient showed a variable polyuria, pronounced at night. The output of urine at times measured more fluid than that taken in the twenty-four hours. The food did not seem to modify the output. The urine seemed normal. When the patient was given the extract of the posterior lobe the polyuria was diminished. Case necropsy showed eight gummata in the hypophysis, mostly in the pituitary.

Olaechea, M. G. Pituitary Syndrome. [Anales de la Facultad de Medicina, Sept.–Oct., 1918.]

This case history is said to be similar to one reported by Claude and Lhermitte in 1917 as a case of infundibular syndrome from a tumor in the third ventricle. The first symptoms in this patient, a woman of 35 years of age, were impairment of vision and diminished sensation to touch in the right side of the face, mucosa of the teeth, and a marked hyperesthesia on the right side of the tongue. There was right-sided deafness and exaggerated tendon reflexes. Bilateral choked disk explained the failing vision. In walking she deviated to the right and the head was bent to the right. Blindness was total after 10 months and muscular contractions interfered with chewing. There were periods of narcolepsy and polyuria. The cerebrospinal fluid contained tubercle bacilli and a more or less diffused tuberculous leptomeningitis was diagnosed—which pressing on the infundibulus, the trigeminus, the auditory and the motor pathways, caused the symptoms.

Yamuda, M. Coagulation of the Blood and the Relation between Thyroid and Bone Marrow and between Spleen and Bone Marrow. [Biochem. Zeitsch., 1918, 87, 273–330.]

Finding that thrombin increases in bone marrow and in blood serum upon removing the thyroid, while after removing the spleen thrombin decreases in the serum but remains stationary in the bone marrow, the

author regards the spleen and thyroid as antagonistic in remote effects upon metabolism.

Asher, L., and Dubois, M. The Coöperation between Spleen, Thyroid, and Bone Marrow. [Biochemische Zeitschrift, Vol. LXXXII, Nos. 3 and 4, 1918.]

These authors have found that removal of the spleen in rabbits to whom large quantities of iron were administered, produced a transitory increase of the hemoglogin and the number of erythrocytes. It must be admitted that, besides the disappearance of the hemolytic factor, there is a direct excitation of the bone marrow, because it constantly pours young types of red blood corpuscles into the circulating blood. Removal of the spleen does not change the number of white cells, but it just results in a decrease in the number of lymphocytes and an equivalent increase of the elements of the bone marrow. This phenomenon is considered by the writers as a lesion of the lymphatic apparatus. A differentiation of the leucocytes lead them to look upon this lesion as an excitation of the leucopoietic system. A lymphocytosis progressively takes place which the writers consider to be a phenomenon of the hypercompensation. Since in the normal animal the excitation produced by the absence of oxygen is made evident by a very temporary decrease in the number of erythrocytes and hemoglobin, in animals having undergone splenectomy this decrease is very marked. The duration of convalescence from anemia is of much shorter duration in splenectomized animals than in normal animals. It brings about a hyperproduction of red blood corpuscles which does not occur under normal circumstances.

Removal of the thyroid glands results in a small decrease in the number of erythrocytes while the percentage in hemoglobin is not changed. This would seem to indicate that a paralysis of the erythroblastic system occurs, although it may be latent. Thyroidectomy at once results in a relative lymphocytosis. The excitation from absence of oxygen does not cause any change in the blood formula in thyroidectomized animals even when the dose of substance avid for oxygen is doubled in quantity which, in normal animals, would result in a change of the blood formula. This fact may be explained by a lack of excitability of the hematogenous systems. The absence of the thyroid gland imposes a much longer convalescence in anemic animals than in those possessing the gland. If both the spleen and thyroid are removed from a rabbit, the only results are a slight decrease in the percentage of hemoglobin and a relatively greater decrease in the number of erythrocytes. This phenomenon does not occur when thyroidectomy is done on an animal who has previously been splenectomized. In an animal thus rendered slightly anemic an excitation of the bone marrow subsists, because in these circumstances it still produces young types of red blood corpuscles. It is probable that this excitation is due to a paralysis of the thyroid system re-

sulting from removal of the gland. The number of the white cells diminish after the operation. The equilibrium of the leucocytosis is due to the splenectomy, while the paralysis resulting from thyroidectomy only maintains a stability in the leucocytic formula after a rather long lapse of time. The effects of an artificial dyspnea are encountered if, besides removal of the thyroid, splenectomy has been done. Temporary anoxygenation changes the hematologic formula in every species of animal excepting those who have been thyroidectomized, in the sense that a leucocytosis is produced. Convalescence from anemia is the same in an animal from whom the thyroid and spleen have been removed as in a normal animal. The anemia produces during convalescence an increase of the white cells of the bone marrow in all animals excepting those who have been thyroidectomized, which is a sign of hyperactivity of the bone marrow. Here, therefore, there is a paralysis of the bone marrow without any interference on the part of the thyroid. These results allow one to conclude that there exists an antagonism between the spleen and the thyroid gland as far as the formation of blood is concerned upon the condition naturally, that no hypothesis as to the mechanism is offered. The thyroid accelerates this formation, the spleen delays it. Their regular coöperation results in normal functionating of the hematogenous systems, but this does not exclude the possibility that other glands of the vascular system do not play a part in these functions. [C. G. C.]

Streuli, H. Oxygen Want in Animals deprived of Thyroid, Spleen, or Both. [Biochem. Zeitschr., 1918, 87, 359–417.]

"In rats deprived of the thyroid, oxygen want produced but little distress; in those without a spleen there is more sensitiveness to oxygen want than normal, whereas when both organs are removed, the animal reacts in the normal way. The bearing of these observations on mountain sickness is discussed." [W. H. D. in Physiol. Abstr., Nov. and Dec., 1918.]

Kendall, E. C. Thyroid Hormone and Its Relation to Other Ductless Glands. [Endocrinology, April–June, 1918.]

Kendall describes how the active substance of the thyroid has been isolated and analyzed, its empirical and structural formulæ determined, its synthesis completed, and its physiological action studied in a large number of patients at the Mayo Clinic. In considering the rôle of the other ductless glands of the body, Kendall states that they assume positions secondary in importance to the thyroid, and that their part may be preparing the various metabolites for their final action with thyroxin (the active constituent of the thyroid), with the production of energy. In addition to this duty the task of taking care of byproducts and elaborating other substances must be accomplished by some agent in the

body, possibly the parathyroids and others of the ductless glands. A detailed description of the structural formula of thyroxin is given. It contains an indol group with the iodines attached to the benzene ring, and on the carbon atom adjacent to the amino group of the indol ring there is an oxygen atom. The physiological activity of the substance is produced by the CO.NH groups. In explaining the action of iodine in the compound the theory is presented that it renders the active groups more reactive.

Olivier. Galvanic Current in the Treatment of Exophthalmic Goiter. [Paris médical, October 5, 1918.]

Two cases are reported in which the ultimate results of treatment by galvanic electricity proved highly gratifying. The first case was that of a woman of twenty-six years, suffering from the disease for three years, in whom hematoethyroidin had failed and section of the cervical sympathetic had been refused by the surgeon, owing to the patient's extreme weakness. Her weight had become reduced to about eighty-one pounds. A sixty volt galvanic current was subsequently employed, with broad electrodes over the neck and back, the former being negative and the latter positive. The amount of current was gradually increased to eighty milliamperes. Thirty-seven treatments in all were administered, at first daily, later at increasing intervals, up to one week. Each sitting lasted about half an hour. Five months after the beginning of treatment, the patient weighed one hundred and thirty and her pulse rate had fallen from 140 or 150 to eighty. The second patient was a woman of forty-eight years, with extreme tremor preventing locomotion, a pulse rate of 180, a large soft goiter, diarrhea, vomiting, and marked emaciation. Forty-two galvanic treatments were given. After the eighth treatment the patient could already walk a considerable distance. When seen three years later she was in good health. The author deems the galvanic current one of the best procedures in exophthalmic goiter. The ordinary dose of twenty-five to thirty-five milliamperes is, however, insufficient, even if combined with faradic electricity; a much stronger treatment is required.

Leclerc and Masson. Goiter with Metastases. [Presse Médicale, Jan. 2, 1919.]

These authors report the case of a man aged sixty-seven years, with a small goiter, apparently ordinary in type, of the left lobe of the thyroid, in whom a large metastatic tumor of the size of two adult fists developed on the left eleventh rib and was removed surgically. The original goiter was so small that the patient's attention had never been drawn to it, and had probably been present a long time. The costal tumor had begun to appear two years before. The patient recovered from the operation, but less than six weeks later succumbed after exhibiting spinal symptoms—

paraplegia of the lower extremities, neuralgic pains, retention of urine, and incontinence of feces—suggesting dissemination of the tumor cells in the vertebral structures. Microscopic examination of the costal tumor showed it to be a thyroid adenoma of a variety intermediate between the fetal and the colloid types.

Olivier. Exophthalmic Goiter treated by Electricity. [Paris Méd., Oct. 5, 1918.]

Two extremely serious cases are reported with prognosis of death from heart failure. Interest attaches also to the intensity of the electric treatment applied. Sixty volts and 80 milliampères were applied from large electrodes at the neck and back. Twenty-seven half hour sittings were given one of the two women patients, aged 42 and 26, and forty-two to the other, beginning daily, the interval afterwards being increased to a week. Rapid recovery ensued, followed by great activity on the part of the younger in managing her soldier husband's farm. Ipecac, digitalis and opium are given at times when strain is greatest.

Lian, Camille. Hyperesthesia of the Thyroid Region as a Sign of Mild Graves's Disease. [Presse Médicale, Dec. 26, 1918.]

The author sought to discover some physical sign which would permit of definitely ascertaining the presence of incipient exophthalmic goiter as a cause of persistent tachycardia. He believes this condition is sometimes responsible for cardiac acceleration even where the latter is but slight or appears only in the standing posture or upon exertion. Neither the occurrence of the tachycardia chiefly in the morning hours with an accompanying high blood pressure, nor a concomitant dilated condition of the aorta is a definite indication of the goitrous origin of a case of tachycardia. Sympathetic hypertonia may cause the latter condition in the absence of any thyroid disturbance. Examination of the thyroid gland itself and of the eyes can alone supply an answer to the question of thyroid etiology. Graefe's and Stellwag's signs are of great significance in this connection, as are also a widening of the palpebral fissure and diminished frequency of the act of winking in well-marked cases; Möbius's sign is more difficult to interpret. Stress is laid on the fact that these signs may be positive in the absence of any exophthalmos. As for the thyroid gland itself, Lian calls attention to the diagnostic value, in early cases, of an area of skin hyperesthesia having the form and situation of the thyroid, elicited by palpation of or testing with a pin-point the front and sides of the neck. As the point is drawn over the skin the patient experiences in the thyroid region a sharp burning or deep pricking pain. In typical cases the area of hyperesthesia corresponds rather accurately with the shape of the thyroid; in others, the hyperesthesia may extend down to the manubrium sterni or completely cover the anterior and lateral surfaces of the neck. Among ten cases in

which the author recently noted thyroid hyperesthesia, in seven the diagnosis could not have been decided upon without this sign. The hyperesthesia disappears in more advanced cases, presumably because the capsule, at first distended by the enlarging gland, has finally given way and been relieved of tension. Lian thinks many instances of tachycardia, at first sight apparently of neurotic origin, can be definitely ascribed, by means of this sign, to incipient Graves's disease.

II. SENSORI-MOTOR NEUROLOGY

1. CRANIAL NERVES.

Allen, W. F. Application of the Marchi Method to the Study of the Radix Mesencephalica Trigemini in the Guinea-Pig. [Jour. Comp. Neur., Feb. 15, 1919.]

The writer reviews previous findings in regard to the mesencephalic trigemini with those of his own investigations and concludes that the fibers both ascending and descending are sensory and that the descending fibers of the mesencephalic root are the portion for muscle sense. His summary of the observations of others and his own is as follows:

The results of the previous experiments confirm May and Horsley's conclusions that the mesencephalic trigeminal root contains both ascending and descending fibers. The former take origin from sensory cells in the semilunar ganglion and the latter from globular, unipolar cells in the alar (sensory) plate of the mesencephalon, and from a caudal continuation of these cells, known as the locus ceruleus, which extends downward into the motor area of the pons.

Upon emerging from the inferior colliculus the mesencephalic root is composed mainly of descending fibers. They continue caudad through the locus ceruleus above the trigeminal motor nucleus, bend laterally and ventrally around the caudal end of this nucleus, to pursue a cephalic course between the trigeminal motor and sensory (substantia gelatinosa) nuclei, and here intermingle with the trigeminal motor root fibers, which follow along the ventral surface of the trigeminal sensory root, through the ventral border of the semilunar ganglion, to eventually form the motor components of the nervus masticatorius, for the masseter, pterygoid, and temporal muscles. None of the descending mesencephalic root fibers followed the few motor fibers into the mylohyoid branch of the nervus mandibularis, nor entered the purely sensory divisions of the trigeminal nerve. It will be seen that these results confirm May and Horsley in that the descending mesencaphalic root fibers enter the trigeminal motor root, but disagree with them, that they end in the semilunar ganglion. It is apparent that their studies in chromatolysis, which were at variance and held in subjection to their results from a study of Marchi preparations, were in accord with Allen's results from Marchi preparations.

The ascending mesencephalic root fibers taking origin from sensory cells in the semilunar ganglion follow along in the ventral half of the trigeminal sensory root. Upon entering the pons they join with the descending mesencephalic root fibers to form the mesencephalic root or tract. In pasing between the trigeminal motor and sensory nuclei they appear to make up about one third of the mesencephalic root. Since a large number of these fibers and collaterals go to the trigeminal motor nucleus, the ratio of ascending to descending fibers in the mesencephalic root cephalad of the trigeminal motor nucleus is reduced something like 1 to 7 or 8. The number of ascending fibers continues to decrease gradually as the mesencephalic root passes through the inferior colliculus, until no ascending fibers were found in the mesencephalic root cephalad of the trochlear nucleus.

Without a knowledge of the character and position of the cell bodies of the descending mesencephalic root fibers, it might be assumed, since these fibers entered the motor root and traveled in the so-called purely motor divisions of the trigeminal nerve that they were motor fibers. The writer, after making a careful study of these globular unipolar mesencephalic root cells, noting their position in the alar (sensory) plate, and comparing them with both the sensory cells of the semilunar ganglion and the motor cells of the trigeminal motor nucleus, agrees with Johnston and Willems that they are sensory rather than motor and favors Johnston's hypothesis that they represent neural crest cells, which were not extruded or possibly were extruded and later pulled back, when the medullary folds of the midbrain rolled up to form a tube. So far as known, there would be no need in the trigeminal nerve for a special motor nucleus, like the salivatory nuclei of the facial and glossopharyngeal nerves; the trigeminal motor nucleus should be fully capable of regulating the contractions of the masticator muscles.

Granting that the descending mesencephalic root fibers are sensory, it follows from their distribution that they are not carriers of cutaneous sensations, else they would be distributed to the maxillary, ophthalmic and sensory branches of the mandibular nerve; hence they must be muscle sense fibers. In fact, it is difficult to conceive how muscle sense, say from the masseter muscle which surely must possess muscle sense endings, could reach the trigeminal nerve other than through the masseter branch of the nervus masticatorius, which fibers Allen has shown do not enter the semilunar ganglion nor the trigeminal sensory root.

There can be no question but that the ascending mesencephalic root fibers are sensory. Since they were not found in the dorsal part of the sensory root, they probably did not come from the ophthalmic and maxillary (general cutaneous) divisions of the trigeminal nerve. More than likely, the ascending mesencephalic root fibers are also carriers of muscle sense. Inasmuch as no descending mesencephalic root fibers were present in the nervus mandibularis proper in the guinea-pig and Willems

found no chromatolysis of the mesencephalic root nucleus cells after severing the mylohyoid and digastric nerves, it is quite possible that these ascending fibers came from the mylohyoid and digastric muscles, and entered the main mandibular nerve through the nervus mylohyoideus. It should be noted that some of the degenerated ascending fibers seen in the mesencephalic root as it passes between the trigeminal motor and sensory nuclei may be cutaneous fibers and collaterals from the sensory nucleus going to the motor nucleus.

It was stated that many fibers and collaterals from both the ascending and descending mesencephalic root fibers went to the trigeminal motor nucleus and to a group of small cells situated medial and dorsal to the trigeminal sensory nucleus. The former evidently form reflex arcs with the motor cells and the latter may be a muscle relay station (?) to the cerebral cortex, like the sensory nucleus (substantia gelatinosa) for the cutaneous sense fibers.

Little was accomplished in the way of observations on animals for the reason that there were many obstacles encountered in making satisfactory lesions that would destroy all muscle sense fibers going to the masticator muscles. To be absolutely certain of accomplishing this, it would be necesary to destroy both semilunar ganglions and the motor roots passing through them or the equivalent, which would of course result in a complete paralysis of the masticator muscles. In those experiments where the left mesencephalic root was severed in the pons, with little danger to the brachium conjunctivum, no difference could be detected in the action of the left masticator muscles in these animals and those of normal animals. Something interesting might result in severing both mesencephalic roots in the pons of an animal and testing its ability to compete with a normal animal in eating blindfolded a mixture of lettuce and tough roots. Also muscle spindle preparations from the masseter muscles of an animal having its mesencephalic roots severed in the pons would likely show some degeneration.

The results of the previous experimental work on the mesencephalic root, which have been obtained mainly from counting the chromatolytic cells in the mesencephalic root nucleus after severing certain branches of the trigeminal nerve, may be summarized as follows: For the rabbit Willems and Kosaka found no chromatolytic cells in the mesencephalic root nucleus, except after serving the N. mandibularis or its motor branches. In the dog Kosaka found a few degenerated cells in the mesencephalic root nucleus after destroying the N. maxillaris and certain sensory branches of the N. mandibularis. In the monkey May and Horsley found absolutely no chromatolysis in any of the mesencephalic root cells after a lesion of the N. ophthalmicus and N. maxillaris; while Kosaka describes a few disintegrated cells in the mesencephalic root nucleus following a lesion of the N. maxillaris. Of these three investigators Kosaka is the only one to claim any general cutaneous fibers

arising from the mesencephalic root nucleus and his results in the monkey are diametrically opposed to those of May and Horsley.

It is possible that there may be some variation in different vertebrates concerning the distribution of the fibers from the mesencephalic root nucleus and that some animals may have an appreciable general sensory component, but the weight of evidence so far favors the conclusion that the descending fibers of the mesencephalic root are concerned only with muscle sense. This is certainly true for the guinea-pig, where after a lesion of the mesencephalic root in the pons, the degenerated fibers were traced in a series of Marchi section solely to the masticator muscle branches of the N. masticatorius. It might be mentioned in this connection that the degeneration shown by the Marchi method is more convincing than a few disintegrated cells in central nucleus as resulting from a peripheral lesion of its fibers. For the chromatolysis method to be conclusive a number of cells should be shown to have undergone degeneration.

From the data at hand the writer would regard the mesencephalic root as the muscle sense portion of the trigeminal nerve, having its ganglion cells located both in the semilunar ganglion, and in the midbrain and locus ceruleus. The peripheral processes of the latter constitute the so-called descending fibers, which follow the trigeminal motor root fibers into the masseter, pterygoid, and temporal branches of the nervus masticatorius. The peripheral processes of these semilunar ganglion cells may go through the mylohyloid branch of the nervus mandibularis to the mylohyoid and digastric muscles; while their central processes enter the pons through the trigeminal sensory root and constitute the so-called ascending fibers of the mesencephalic root. Fibers and collaterals from this system are distributed to the trigeminal motor nucleus and to a group of small cells situated medial and dorsal to the trigeminal sensory nucleus. [Brink.]

Testut, L., and Marchand, L. Trigeminal Palsy. [Presse Méd., Jan. 27, 1919.]

The paralysis in this patient implicated the sensory and the motor fibers. It was a result of cerebrospinal meningitis. The progressive paralysis of the muscles of mastication and the anesthesia reached their height in eleven months, and then slowly improved to some extent. He also has attacks of pain at times, spreading to the back of the neck and the occipital region.

Frazier, Charles H. An Operable Tumor Involving the Gasserian Ganglion. [Amer. Journ. Med. Sci., 1918, CLVI, p. 483.]

With few exceptions, tumors of the Gasserian ganglion are really tumors of the middle or posterior fossa with only coincidental involvement of the ganglion and not infrequently of other contiguous nerves,

e. g., third, fourth or sixth cranial. In Frazier's case, operation was performed within three months of the appearance of symptoms. A man, 53, had suffered for three months from severe "jumpy" pain in the area of the second division of the left trigeminus, which later became worse and was followed by numbness in upper lip which was associated with, or followed by, neuralgia above the left eye. Alcohol injections gave only partial relief, so patient preferred a radical operation. Frazier exposed the tumor: the dura was easily separated over the greater portion of the tumor, but the latter was firmly adherent in the neighborhood of the second division and of the sensory root. The sensory root was avulsed, and the tumor removed *in toto* and afterward the outer two thirds of the ganglion was taken away because of the possibility of its being infiltrated with tumor-cells. Recovery of patient and healing were rapid. Patient seen fifteen months later, had no signs of recurrence, apart from certain paresthesiæ which might well have been due to the sensory root avulsion. The tumor was an endothelioma. [Leonard J. Kidd (London, England).]

3. SPINAL CORD.

Christian. The Nervous Symptoms of Polycythæmia Vera. [Amer. Journ. Med. Sci., October, 1917.]

This is a discussion of ten cases where nervous symptoms were present, and that in which such nervous phenomena have led to mistaken diagnosis and even to cerebral operations. Patients with polycythæmia vera are often not abnormally cyanosed, and may even show pallor due to vaso-constriction or peripheral circulatory failure. With nervous symptoms predominating the diagnosis is not made. The majority of cases described in literature showed nervous symptoms. The commonest were vertigo, fullness of the head, heartache, pain and prickling sensations in the extremities, ringing in the ears, staggering gait, muscle weakness, and blurring and other disturbances of vision. In Christian's ten cases the most frequent nervous symptoms were headache and dizziness. Next common were disturbances of vision, often temporary, transient blindness, hemianopsia, and diplopia. Paresis and paralysis of various parts were also found. These nervous symptoms are the result of disturbances in the central nervous system. Post-mortem vascular thrombosis was found in some cases, arising partly from disease of the vessel walls and partly due to the changed condition of the blood. Areas of cerebral softening were found in another case, without thrombosis or lesion in the vessel wall. All Christian's cases occurred in persons between the ages or 50 and 60. He suggests that the blood condition may exist for a long time before such definite symptoms appear, and this is supported by the fact that high blood counts indicative of polycythæmia occur among members of families and no symptoms are present.

Odier, Charles. The Non-Liability to Neuralgia of the Five Lower Sacral Roots. [Arch. Suisses de Neurol. et de Psychiat., 1918, III, p. 185.]

The writer records a case of painless sacral zona in a man of sixty-eight. As a rule, zona is exceptionally painful in elderly persons. At the onset there was anal and perineal pruritus, which extended gradually to the left side of the penis and scrotum and the left testis. On scratching himself locally the patient noticed an eruption of red pimples. There was no pain whatever. Two or three days later there were unpleasant paresthesiæ which were limited to the left thigh and spared the perineal, genital, and gluteal regions. After two or three days more they quickly disappeared with the pruritus. The eruption lasted for some weeks. The writer attributes the absence of pain in his case to the absence of the jugal cul-de-sac of Nageotte in the lower sacral nerve-roots. He agrees with the teaching that the localized interstitial gangliitis of zona is of itself painless. When neuralgic pains appear in zona, they are due to a transverse interstitial radiculitis which is an indirect effect of a meningitis of the jugal cul-de-sac and not a direct effect of the primary gangliitis. If, by reason of the absence of this jugal cul-de-sac, as in the sacral area, a jugal meningitis does not appear, a transverse interstitial radiculitis is not produced, and the zona remains painless. This fact shows that the degenerative lesions of the dorsal nerve-roots are of themselves painless, just as is the primary inflammatory lesion of the dorsal-root ganglion. The writer has found, in cases of wounds of the lower sacral roots, that their degenerative or regenerative lesions are likewise painless, even when the nerve fibers of pain-sensibility are affected.

Leonard J. Kidd (*London, England*).

Mussio-Fournier, J. C. Paraplegia Due to an Intra-Spinal Hydatid Cyst. [Arch. de Méd. des Enfants, 1919, XXII, p. 80.]

A boy of twelve years, of good health and antecedents, had felt a pain in the upper dorsal region every year, from the age of three years, for a period of about fifteen days; this occurred only while he was walking. This pain, treated as rheumatic, seems to have disappeared always spontaneously.

A fortnight before admission to hospital this dorsal pain was accompanied by sciatic pains. A few days later he had difficulty in walking, and fell readily. Physical examination showed good general health and fair intelligence. From the feet up to the eighth thoracic root area there was hypoesthesia for touch, heat and cold, and for pain, both superficial and deep. But the sensory areas of the third and fourth sacral roots were relatively unaffected. There was testicular hypoalgesia, and bilateral Lasègue's sign. In the lower limbs there was motor weakness, but all their movements could be performed in decubitus; there

was ataxia, both static and dynamic. No muscular atrophy. Increase of all lower limb tendon-jerks. Bilateral ankle clonus. Bilateral Babinski's sign. Lively defence reflexes. Hypotonia. The sensory objective signs described for the legs extended over the trunk up to the eighth thoracic root area. Normal abdominal, bulbo-cavernous, and anal reflexes. Sphincters normal. Gait ataxic. No Rombergism.

Slight pain was felt on pressure over the fifth dorsal vertebra and over the posterior one fourth of the right sixth rib. This was the exact region where the pains during walking had been felt.

At this spot radiography revealed a vertebral osteitis. The cerebro-spinal fluid was normal, with negative Wassermann reaction. Normal urine, also cuti-reaction. The diagnosis at first made of this difficult case was a probable syphilitic costo-vertebral osteitis producing the paraplegia, the upper limit of the compression being situated at the eighth thoracic segment. Specific treatment failed, and the paraplegia became steadily worse. Operation revealed the hydatid cyst. Improvement followed.

The writer draws attention to the following points in his case: (1) The importance of the hydatid cyst; (2) its probable latency in the intraspinal localization and its possible confusion with a primary vertebral osteitis; (3) the value of the relative sensory preservation of the two lower sacral areas as favoring the extrinsic origin of the clinical picture (Babinski); (4) the absence of root signs in a compression-paraplegia of long duration; (5) the intense hypotonia of the paraplegia coinciding with exaggerated tendon-jerks and ankle clonus; (6) the testicular hypoalgesia; and (7) the presence of Lasègue's sign in an affection of the dorsal vertebral region. [Leonard J. Kidd (London, England).]

Luckie, L. F. Fracture of Vertebræ. [Journal A. M. A., Feb. 1, 1919.]

Luckie reports a case of fracture of cervical vertebræ due to an aviation accident. The patient had consulted a number of physicians and surgeons without obtaining relief, but was practically cured by the use of a device which, Luckie says, literally hung the patient from his own shoulders, and was the only method used besides massage. The disability, which was due to the grinding of the bones together, showed itself in boring headaches and pains in the arms and stiffness of the muscles, rendering the patient discouraged and almost hopeless of cure. The value of the appliance was that immobilization was obtained, and the vertebræ held apart from each other, thus allowing new cells to grow and recalcification to take place. Another important advantage was that the apparatus was so made that the patient was not confined to his bed and did not have to change or remove it whether waking or sleeping.

The article is illustrated, showing the apparatus and the condition of the patient before and after treatment. He was able to return to duty as a military aviator.

4. MID BRAIN.

Ellis, R. S. Purkinje Cells in Normal, Subnormal, and Senescent Human Cerebella, with Some Notes on Functional Localization. [Jour. Comp. Neur., Feb. 15, 1919.]

The variability in the number of Purkinje cells observed by the author under different conditions and the possible relation of this to observed functional defects in various cases led him to this study, the results of which he summarizes as follows: The main purpose of this paper was to show the numerical differences in Purkinje cells in normal, subnormal, and senescent cerebella. From the data submitted it is evident that in cases of extreme mental defect due to agenesis or to the early action of toxins during intrauterine life, there is an evident deficiency in the number of these cells. Similar reductions in the number of cells due to various causes are found in senescence (and paresis). In the subnormal cerebella the evidence indicates that the normal number of cells has never been present in a developed form. In the senescent (and paretic) cases, however, the small number is due to disintegration. The anterior lobe of the cerebellum shows the greatest deficiency in cells in both the subnormal and senescent cerebella. The biventral lobe shows the greatest variation in both types of cases. In some cerebella it shows the greatest loss of cells and in others the least loss. The differences between the two hemispheres in respect of cell number average less in subnormal cerebella than in normal ones. This probably has a relation to the differences in the degree of unilateral dexterity found in normal and subnormal individuals, *i. e.*, normal people are usually more distinctly right or (left handed) than are the subnormal, who tend to be more ambidexterous. The deficiency in cell number affords in large measure an explanation of the motor defects found in subnormal individuals. It shows, furthermore, that in idiocy and in imbecility we may expect to find the whole brain defective rather than the frontal lobes only, while the higher grade of defectives (morons) probably show very slight deviations from the normal. Further studies in this field on better material with better known clinical histories in which is included a study of blood vessels, nerve fibers, neuroglia, and a cytological study of all the important types of cell are necessary to bring out the more detailed differences between these types of cerebella. For a review of the literature on the clinico-pathological study of the cerebellum with a detailed report of a single case see Archambault.[1] [J.]

[1] Journ. Nerv. and Ment. Dis., Oct., 1918.

Stern, L., and Rothlin, E. Effects of Direct Application of Curare to Various Parts of the Cerebellum. [Arch. Suisses de Neurol. et de Psychiat., 1918, III, p. 234.]

The writers have applied curare, by means of Battelli's method, to various parts of the cerebellum in dogs, cats, rabbits, and guinea-pigs. They conclude that the cerebellum contains true motor centers, situated, not in its cortex, but in its deeper layers. The cerebellum has no special center related to psychical or emotional manifestations. Localized stimulation of the cerebellum by curare does not produce any visceral effects nor any others which can be attributed to stimulation of the sympathetic or of the parasympathetic nervous system. . . . Stimulation of the cerebellum by curare produces more or less extensive motor phenomona, but not epileptiform convulsions. The peculiar psychical or emotional state, described formerly by Pagano, and the sympathetic, parasympathetic, and epileptiform phenomena are produced only when the curare acts upon the fourth ventricle, that is to say, when it mixes with the cerebrospinal fluid and so reaches the nerve centers surrounding that ventricle. The characteristic agitation which is produced by the introduction of curare into the fourth ventricle is sometimes accompanied, in the dog, by an elevation of temperature, which is sometimes very marked, while in cats and guinea pigs this is never seen, but rather a lowering of temperature which is often considerable. These effects appear with greater intensity and rapidity when the amount of curare introduced into the cerebrospinal fluid is large and when its diffusion in that fluid is rapidly produced. Leonard J. Kidd (*London, England*).

Demole. Five Tumors of the Pontine and Cerebellar Regions. [Rev. Méd. Suisse Romande, 1918, XXXVIII, p. 446.]

Specimens of five tumors shown to the Medical Society of Geneva:

1. A glioma, size of a pea, found in left side of floor of fourth ventricle. No symptoms during life. The tumor was composed of neuroglial cells surrounded by a dense fibrillar network.

2. A tumor of the vermis cerebelli, which had destroyed the dentate and the roof nuclei, of the size of a cherry. No mention of any cerebellar symptoms in patient's history. It was found at necropsy of a woman of forty-nine, admitted for melancholia. She died from a strangulated hernia. The tumor was not connected with ependyma or the meninges. It was formed of small round cells juxtaposed without interposition of fibrils (? neuro-blastoma, ? glio-sarcoma).

3. A cholesteatoma of left ponto-cerebellar angle, found at necropsy of a man of fifty- eight who died from pneumonia. No nervous symptoms had been present. It was formed of transparent masses enclosed in a sac. The microscope shows a germinal layer, uni- or pluri-stratified, formed of pavement epithelial cells inserted on a fine conjunctive membrane, and of desquamated cells with granules of keratohyalin; giant epithelial cells here and there. Cortex cerebelli slightly atrophied.

4. A neuro-fibroma of right auditory nerve, of size of a nut, cystic and hemorrhagic, penetrating the enlarged auditory meatus; at its periphery it blended with the separated fibers of the auditory nerve; the facial nerve was intact. It was found in a man of eighty-eight who had suffered from senile dementia and unilateral deafness.

5. A sarcoma of left auditory nerve, the size of a large nut, lobulated, which had blended with and separated the fibers of this nerve, and had penetrated the enlarged meatus. It was found at the necropsy of a child, eight years old, who had not been deaf. A week before her death, which occurred suddenly, there was hypertension, followed by paralysis of left facial and oculomotor nerves, vertigo, titubation, and a left Babinski plantar response. The tumor had invaded the left cerebellar hemisphere, and had compressed the left facial and oculomotor nerves. Histologically it is formed of polymorphous cells separated by collagen fibrils. It was very vascular, and had invaded the cerebellum. [Leonard J. Kidd (London, England).]

Porter, Langley. Intrathecal Injections of Horse Serum in the Treatment of Chorea. [Am. Ped. Soc., May, 1918.]

Porter of San Francisco reported seven cases of chorea treated by the injection of horse serum and another case treated by the injection of salvarsan six to twelve hours after the preliminary intrathecal injection of horse serum, in order to test whether the patients were sensitive to the serum. The first four received an initial injection of 20 c.c. of normal inactivated horse serum, half an hour after a half c.c. of the serum had been given subcutaneously. Five of the patients received a second injection on the fourth, fifth and sixth days following the initial treatment. The use of the serum within the spinal canal had been followed by an immediate reaction of prostration, headache and sometimes by severe vomiting, and by a later reaction of the usual symptoms of serum disease. The most striking results from the use of the horse serum followed in maniacal and severe cases. Porter hopes that further investigation will establish the sera as a valuable measure in the treatment of suspected cases of chorea.

5. MENINGES.

Gillet, A. S. Early Lumbar Puncture in Meningism. [Practitioner, Vol. 101, 1918, No. 1, J. A. M. A.]

The author presents an analysis of sixty-five case histories. Rash was absent in forty-eight; ten showed a diffuse scarlantiniform rash, observed between the seventh and twelfth days of disease. Petechial hemorrhage was apparent in three, one being very profuse. Four cases presented a papular rash within the first five days, the earliest observed being on the first day of disease. The pulse was extremely variable, no two cases being alike; increased in fifty-eight and keeping about normal

(70 to 90) in the remaining cases. Features common to all were irregularity and variability, the frequency rarely being as high as the temperature would lead one to expect. An irregular, quickly variable pulse is nearly always present when the disease has obtained a firm foothold. In the majority of cases (fifty) the temperature rose suddenly to a height varying from 101 to 105. In eleven cases the rise was more gradual, taking from eight to sixteen hours to register above 100, and four cases were entirely afebrile. Headache was always present, but only in twenty-three cases was it definitely allocated to the occipital region, the remainder showing a general ache all over the head of a severe and, in a few cases, unbearable nature. The general appearances in the majority of patients was typical: A flushed face of a slightly dusky tinge, and an extremely worried and anxious expression, coupled with dullness and apathy. General malaise and, in a few cases, a very definite nasopharyngeal catarrh, such as precedes measles. Vomiting was absent in thirty-two cases. Herpes, when present, always affected the lips, but fifty-two cases showed no sign at all of this affection. The pupils: Two main features were noticed in all cases as being constant: (1) dilatation generally equal, sometimes unequal; (2) reaction to light always sluggish. Strabismus was absent in fifty-six cases; nystagmus, absent in fifty cases; ptosis, absent in fifty-five cases; conjunctivitis, absent in fifty-five cases; suppurative choroiditis was present in three cases. The knee jerks were absent in sixteen cases; Babinsky, present in twenty-three cases; abdominal reflexes absent from the first in fifty-six cases. A leukocytosis was present in all cases. The counts varied from 28,000 to 32,000.

Stiffness of the neck: This sign was of the utmost value. In no single case was the stiffness absent, varying naturally in amount from the severe type—giving later the true retraction of the head and perhaps opisthotonos—to the milder cases with comparatively slight stiffness, increased when the head is flexed. Definite retraction was observed in forty-two cases, but it was not a decided feature until a date varying from two to five days after the onset of the disease. Kernig's sign, too, was almost equally constant, there being only three bilaterally found in 58 of the cases. Lumbar puncture is a need, and at the earliest moment, especially in patients presenting fever with stiff neck and no other leading symptoms.

Nobecourt, P., and Richet, C., Jr. Incidence of Cerebrospinal Meningitis in French Army. [Presse Médicale, Sept. 26, 1918.]

Endemoepidemiological data are presented concerning the occurrence of meningococcic cerebrospinal meningitis among the French troops. The disease disappeared during the latter half of the year 1917, but reappeared in the month of December and underwent an epidemic recrudescence in the first half of 1918. Disseminated cases occurred at various

points in the army, and likewise aggregations of cases in the same units without, however, the production of actual epidemic foci. American troops seemed predisposed to the disease. The two forms of the meningococcus, A and B, were detected in the same infected foci. Severe meningitis began to be noted with the appearance of the B type of meningococcus, which seems to be particularly virulent. Polyvalent serum appeared to have but little action on it, and often it resisted even a specific serum.

Lacy, G. R. The Bacillus Influenzæ in Sinusitis and Meningitis. [Journal of Laboratory and Clinical Medicine, Nov., 1918.]

Bacillus influenzæ were recovered from the spinal fluid of two infants who finally died with influenzal meningitis, and the organism was also found in cultures from two cases of frontal sinusitis. The clinical histories and bacteriological studies are reported in full. Two types or forms of the *Bacillus influenzæ* were present—the small, short type and the long filamentous or streptothrixlike forms (involution forms). Lacy emphasizes the importance in cases of meningitis, of indefinite etiology, of centrifuging the spinal fluid and culturing it on various media, always using blood agar. At least forty-eight hours' observation should be made before submitting a negative report. Sinus infections with *Bacillus influenzæ* should have early and adequate drainage to prevent the danger of a complicating meningitis. In one of the cases of frontal sinusitis a vaccine was prepared and given at four-day intervals. There was a decided improvement in the patient's general condition. Vaccine therapy was not so successful in the second case.

Royster, L. T., and McDowell, W. P. Meningitis. [Journal A. M. A., Jan. 11, 1919.]

These authors give an account of the outbreak of meningitis in that city under conditions of overcrowding and especially rigorous weather. They describe the local geographic conditions, and give the statistics of the disease. Between Jan. 1 and May 15, 1918, there occurred in the city and its contiguous suburbs, forty cases of cerebrospinal meningitis —twenty-two of the patients were male and eighteen were female, thirty-one white and nine colored; nineteen over 15 years and twenty-one under; twenty-two died and eighteen, or 45 per cent., recovered. Several cases have occurred since, all recovering, which, if added, would make the percentage better. The severity varied from mild to fulminant, death in the latter often coming within a few hours of the onset. The symptoms are described, chiefly those ordinarily observed. In the fulminant cases the early use of serum appeared to have no effect. Not one sign with the exception of the retraction of the neck was constant enough in the early stages to be of diagnostic value. In all cases there was a definite facies, a peculiar fixed stare which is almost pathogno-

monic to one experienced with the disease. Lumbar puncture revealed *Diplococcus intracellularis* in thirty-six cases. In three cases lumbar puncture was not done, the diagnosis being clinical only. In one other the spinal fluid was negative, but the organisms were abundant in a blood smear, as was the case in two others. This was found early in the disease, which would indicate, strongly, a bacteremia before it became localized in the brain and cord. In one case a mixed infection with *Streptococcus mucosus* was found. In the serum treatment, commercial stock serum was used, and the intraspinal method only was employed, and the average number of injections was five. The authors regret that the intravenous method was not used in some of the severe cases. One patient took one injection, refused further treatment and recovered. It was quite apparent that the outbreak originated from without, as there were no centers of infection found. Five died without treatment, one because of the fulminant nature of the case, and the others because of the late diagnosis. With the single exception of mother and child, none of the patients even knew each other. Several cases are reported, and the following comprise the special observations made: "1. We treated only the patients under 15 years of age, but observed most of the others. 2. Intensive treatment should be conducted early. 3. Since the disease probably starts as a bacteremia, we think it advisable, at least in the early stages, to use serum intravenously as well as intraspinally. 4. Patients that are not well clinically after seven days' treatment rarely recover ultimately. 5. It is rarely necessary to give as much serum in the spine as the fluid withdrawn, 30 c.c. being a good average adult dose, and 15 c.c. a god child's dose. 6. Prolonged serum treatment frequently keeps the temperature raised without doing good." A map showing location of the cases accompanies the article.

King, W. W. Cerebrospinal Meningitis. [Journal A. M. A., Dec. 21, 1918.]

The author reports a rapidly fatal case of cerebrospinal meningitis in a previously healthy mulatto child. Death occurred about fifteen hours after the onset, and the diagnosis was made by the blood revealing the meningococcus. The diagnosis was especially important, as it occurred in the populous part of the city, and the rapidity with which it became fatal caused considerable alarm. Its bacteriologic confirmation was, of course, very important. The germs were so numerous in this case that it suggests the possibility of the advantages of the method in other cases in which the specific germ may occur in sufficient numbers for diagnostic purposes. That this is not more often used is apparently due to the belief that the organisms are too few in the blood stream to be readily demonstrated. To determine the value of the method certain facts must be obtained, King says, such as: "1. The frequency with which the meningococcus may be so found. 2. The number of slides necessary to

examine before a negative result is announced; that is, the quantity of blood required. 3. Whether it is in the very severe or fulminating cases only that it may be found; if longer search may not show it in the milder cases also. 4. If not demonstrable practically in the milder cases, in what degree of severity it may be expected. If limited to only certain very severe cases, it would still be very valuable, as it is precisely in such cases that prompt diagnosis is desired. 5. In other cases in which it may be encountered, how early and how late this may be possible."

6. BRAIN.

Ordoñez, E. S. Fracture of Skull in Children. [Arch. Esp. de Pediatria., Jan., 1918.]

Ordoñez bases his study upon six cases of fracture of the skull in children from 4 to 12 years old, all but one of whom recovered. The necropsy findings in this case are included in the study. The child's brain is more resistant to traumatic injury than to other pathogenic influences. Yet traumatism is not without its special dangers to the child. Even when the brain is not exposed simple enclosed fractures may result in Jacksonian epilepsy, particularly if the frontoparietal region is the one sustaining injury. Abstention should be the rule with closed fractures. If there is paralysis or epilepsy, or if other symptoms of pressure are grave or prolonged, intervention is prescribed. Otherwise spontaneous subsidence of the concussion or even of focal symptoms may be awaited. Ordoñez reports one successful case where abstention proved successful even with a compound fracture, the opening being small. The making of a large opening invites the danger of prolapse and deep infection following.

Villaret, Maurice, and Faure-Beaulieu, M. The Nervous Syndrome of the Retro-Parotidean Space. [Presse Médicale, 1918, XXVI, p. 591.]

The writers record instances of the nervous syndrome of the retro-parotidean space which Villaret described in 1916. It differs somewhat from the syndromes of Avellis (hemi-paralysis of palate and larynx), of Schmidt (hemi-paralysis of palate, larynx, and sterno-mastoid and trapezius muscles), of Jackson (Schmidt's syndrome with hemi-paralysis and hemi-atrophy of tongue), and that of Tapia (hemi-paralysis of tongue and larynx with integrity of the velum palati, with or without palsy of sterno-mastoid and trapezius). In the syndrome of Villaret, which is liable to be produced by wounds of the retro-parotidean space, there is hemi-atrophy and hemi-paralysis of the tongue, with sympathetic involvement on the same side (enophthalmos, narrowing of the palpebral fissure, and myosis), with paralysis of the vocal cord on the same side, hoarseness, dysphonia, and affection of the glosso-pharyngeal nerve on

the side of the lesion, shown by disorders of the taste function of the back of the tongue. The writers point out that the recognition of this syndrome is not of merely theoretical interest, but in certain cases it can enable us to make an exact clinical localization of the offending body, such as a fragment of a shell or a bullet. [Leonard J. Kidd (London, England).]

Pike, F. H. Remarks on von Monakow's Localization in the Cerebrum. [Jour. Comp. Neurol., Oct., 1918, 29, No. 5.]

Contrary to the view of Goltz, von Monakow supposes that after injury to the higher levels of the nervous system the cells of the lower lying systems may regain all their normal functions, and that the function of the lost parts is indicated by the minimal deficiencies observed after long periods of recovery. A more definite cerebral localization than von Monakow's is suggested by Hughlings Jackson's principle of an alteration in the quantity of nervous energy that passes over a given system of conduction paths after a lesion of other associated paths. The greater severity of shock in man over that in animals is not to be considered good evidence of greater cerebral function in man.

Sherrington, C. S. Stimulation of the Motor Cortex in a Monkey, Subject to Epileptiform Seizures. [Brain, 1918, 41, 48–49.]

As the seizures were during mastication, particularly if the bit of food was large, the tongue area of the motor cortex was electrically stimulated and was found to give epileptiform reactions of unusual strength, while no reactions could be elicited from stimulation of other regions of the exposed cortex.

Sharpe, C. T. Edema of the Brain. [J. A. M. A., Jan. 18, 1919.]

Edema of the brain as a clinical entity and as a clinical type of an infectious disease is taken up by the author in this article, who asks how many of us are prepared to admit this from our own observation. It may and does appear at different periods in the course of an infectious disease, and if it occurs early may hide the true nature of the disorder. The predominance of an atypical rash may seriously confuse the diagnosis. In the recent epidemic of poliomyelitis, unusual chances for the study of brain edema were afforded. The mental condition of the patients is a striking feature, and its variations are numerous, whether with or without paralysis. In his study of cases Sharpe found the Macewen sign insufficient, and adopted a modification, basing the findings on the difference in resistance noted on percussion. The amount of the edema changes the clinical picture from the accepted type in many cases. Mental symptoms may predominate from the beginning, or may appear many hours after the onset, even as late as the third week, or until after convalescence has begun. It would seem that there is some analogy

between syphilis and the other infectious diseases. The cutaneous symptoms may be present without any nervous involvement, and vice versa; or the former may be so slight as to be overlooked. There seems to be an interrelationship between the cutaneous symptoms and the cerebrospinal pressure, the cerebral manifestations sometimes masking the cutaneous evidences in the disease. The primary involvement of the nervous center may far outweigh the clinical symptoms otherwise in infectious diseases like poliomyelitis, meningitis, etc. In early stages the evidence of the edema is to be found in the stupor, retraction of the head, a cephalic cry, the upward turning of the eyes, muscular twitchings, tache cérébrale, delirium disproportionate to the temperature, a marked Macewen sign, the presence of increased reflexes and then again their absence, and in some rare paralytic cases, other positive signs. Lumbar puncture verifies the diagnosis. In the later stages, there is melancholia, and the phobias in some cases; in others, hyperexcitability and maniacal symptoms. All these conditions, combined with the Macewen sign and reflexes of the early period and spinal fluid findings, establish the diagnosis. It is possible even to see the edema. Varying degrees of retinitis, congestion and blurring of disk have been noted. The mental symptoms may be at times detected after the patient seems perfectly well. The temperature may also be deceptive in the later stages, abnormally high while the patient seems well. Sharpe asks if there is not a direct relationship between the spinal pressure and the cutaneous circulation, the increase of one reducing the other, and he suggests that one is justified in holding that there is a balance of pressure between the two. In some of his poliomyelitis cases the sweat glands seemed to act as a safety valve, and cutaneous edema with leukocyte infiltration is a feature of scarlet fever and the exanthems. If, as our grandmothers used to say, "the rash strikes in" we would suspect the cerebrospinal axis would be the part to show it. Eight cases are reported, and the following conclusions are offered: "1. Edema of the brain occurs in the infectious diseases. 2. Its presence not infrequently masks the symptoms of the disease in which it is due, and it may be considered as a type per se. 3. The primary involvement may be that of the central nervous system. 4. There is an interrelationship between the cerebrospinal pressure and that of the cutaneous circulation. This relationship is one of direct variation. 5. The outbreak of a marked cutaneous eruption in a case presenting symptoms of intracranial pressure is a favorable prognostic omen. These patients recover. 6. Lumbar puncture is indicated in these cases. 7. White light electric baths, in that they favor an increased cutaneous circulation, are beneficial and are preferable to hot tubs of from 105° to 110° F., though the latter are productive of good results."

Woltman, H. W. Brain Changes and Pernicious Anemia. [Arch. Int. Med. Jour., 1918, No. 6, J. A. M. A.]

Woltman examined the brains of seven persons who died of primary idiopathic pernicious anemia. The most salient features in the pathologic anatomy of these brains, were the following: 1. Not only do degenerated areas of the Lichtheim type, such as are typically found in the posterior and lateral funiculi of the spinal cord in pernicious anemia patients, occur in the medullary portions of the brains of these cases, but they occur with about the same frequency, though their demonstration may be rendered more difficult. 2. Patients who show degenerative changes in the spinal cord at necropsy, usually show the same type of lesion in the brain also. 3. In addition to these focal degenerative areas found in the white matter, which may or may not be associated with blood vessels, one also finds a diffuse degeneration, which, though it is, as a rule, somewhat more striking in the long association tracts, also occurs in the short commissural fibers passing from one gyrus to another, thus rendering the view untenable that it is the distance of these fibers from their trophic centers which is instrumental in causing the degeneration. 4. The gray matter is by no means immune from the destructive process. This is usually focal in character, and begins around the pyramidal cells of the marginal gray layer, the cells themselves being ultimately destroyed in the process, this, in turn, giving rise to a secondary and very diffuse degeneration of the medullated fibers in the white matter. 5. Though some degeneration was noted in the fibers of the internal capsule and in the long tracts passing through the pons, the degeneration at this level was less intense than that seen either in the cord or in the brain. 6. The appearance of these plaques, not only around the blood vessels but also around some of the larger pyramidal cells, seems additional evidence that lymph stasis is an important factor in the production of these foci. 7. Well marked psychoses, such as are occasionally associated with pernicious anemia, probably have little or nothing to do with these destroyed areas. 8. The milder mental manifestations such as somnolence, apathy, and terminal delirium, are probably in a measure dependent on these lesions, though the chief causative agent of these symptoms is probably the toxin itself.

Thompson, Herbert E. A Case of Brain Tumor Showing Extensive Destruction, with but Few Diagnostic Symptoms. [Boston Med. and Surg. Journ., 1917, CLXXVII, p. 592.]

Patient was a man of seventy, who three years ago began to wander away from home at times. Quite early in the course of his illness he had loss of sphincter control. There was gradually increasing physical weakness and mental confusion. He became more irritable, and memory failed. He lay in bed a great deal, and often rose at night to look for burglars. He is said to have had a few attacks in which he became

pale, rigid, and confused; after these he could sleep for a long time, but no definite convulsions were noticed. He became very untidy in dress. Answers to questions were mostly relevant, but incorrect. Marked dermographia. Blood serum negative Wassermann. No definite paralysis or aphasia: no history of headache. Necropsy: a glioma of the brain, which had caused extensive cerebral destruction. It involved the anterior portion of the corpus callosum, white matter of left frontal lobe, caudate and lenticular nuclei, and the internal capsule. The right frontal lobe was only very slightly involved. [Leonard J. Kidd (London, England).]

Mairet, A., Piéron, H. Headache after Shell Concussion. [Par. Méd., July 6, 1918.]

The authors report headache and tenderness along the course of the trigeminal nerve after a shell concussion. On pressure pain is felt upon the emergence of the nerve, especially above the orbit, pain is felt which spreads along the great occipital nerve to the back of the head. They believe that minute suffusions of blood probably cause the irritation.

Chalier, J. Cranial Trauma and Greying of the Hair. [Progrès Méd., 1918, 210.]

The record of a case of a soldier aged twenty-four, who gave no hereditary or personal antecedents of importance, but who seven months after the receipt of a wound of the left parietal region, not involving the bone, developed canities of the left eyebrow and of the hair of the scalp and beard on the side of lesion. The canities was accompanied by almost complete loss of sensibility of the left cornea and disappearance of the corneal reflex on this side.

Bayliss, W. M. Gum Injections in "Shock." [Jour. Phys., Apr., 1918.]

Bayliss finds that a low blood pressure brought about by various factors, hemorrhage, muscle injury, temporary local anemia, slight hemorrhage with exposure to cold or plus acid injection, diminished oxygen supply, can be permanently restored by intravenous injection of 6 per cent. gum acacia in 0.9 per cent. sodium chlorid. If the bulbar centers have already been paralyzed by lack of oxygen or there has been section of the spinal cord in the cervical region this is unavailing. So also is transfusion, which does not in any case show any advantage over the gum, unless hemorrhage has caused the loss of more than half the blood total. The gum must be administered slowly. When a progressive delayed fall of pressure has been produced upon injections of acid, neutralization by an alkaline produces no effect. It is concluded therefore that the effect is due to some other changes and not to the acid as such. Gum injections prevents the development of shock symptoms

where these would be expected. The gum maintains an adequate supply of oxygen by a good circulation which oxidizes the acid products and prevents the formation of oxygenated blood. A slight rise in hydrogen-ion concentration may be of advantage in assisting in the arterialization of the blood through the respiratory center. [J.]

Vignes, H. Intracranial Hemorrhage in the New-Born. [Prog. Med., Paris, Sept. 21, 1918, 33, No. 39, p. 321.]

Although prognosis may not be absolutely fatal, the sequels in those who survive justify any measures that will remove the extravasated blood. Probable symptoms with hemorrhage above and below the tentorium are described. Immediate operation and reduction of loss of blood to the minimum will aid in keeping down the mortality which to date is 50 per cent. Lumbar puncture, twice or thrice a day, if it brings blood, may be useful. Incision of the fontanel and dura, and rapid evacuation of blood in this way has been tried by Simmons in some desperate cases. The skull should be opened on the side opposite the arm exhibiting the most pronounced convulsions. Blood not clotted should be for a day puncturing if hemorrhage in the ventricle is suspected. Bilateral trephining will relieve the pressure. In case of bulging brain, without hemorrhage, an injury below the tentorium leaves the child quiet but somewhat cyanotic and with nystagmus. Blood flowing down the spinal subarachnoid space causes stiffness of the neck, and diffuse rigidty, with erection. Lumbar puncture always shows blood and the fontanels do not bulge. A case with subtentorial hemorrhage calls for Cushing's occipital incision.

Clark, L. P. Treatment of the Epileptic. [Journal A. M. A., Feb. 9, 1918.]

Clark compares the progress that has been made in our views of epilepsy and its treatment to those changes somewhat similar in our notions of treatment of consumption. The old fashioned sedative treatment with the bromides is less popular today and few physicians hope to cure the nerve disorder when seizures have become frequent and exhausting and the patient's ability for proper self-direction of his life is markedly impaired. It is beginning to be realized that so-called idiopathic epileptics are rarely, if ever, free from the hallmarks of their disorder mentally and physically during the intervals between their seizures, and the broadest possible therapy is demanded to cover their entire life activities. When one studies the majority of patients carefully, their peculiar make-up is recognizable and the peculiar personality most frequently dates from birth. The disease has been in evolution for years and the grand mal attack has been preceded by years of minor seizures, absences, vertigoes, etc. It is important therefore that the lay public should be educated to recognize the potential epileptic. The

author insists on the importance of an early diagnosis. The detection of epilepsy when the grand mal attacks have begun does not offer a favorable prognosis. The writer compares epilepsy with tuberculosis which, in its pure developed symptoms, is hardly hopeful. The make-up of the epileptic is apt to show supersensitivity, egotism, and defective primary endowment of instincts, showing a lack of an easily adjusted or rich emotional life during his childhood and adolescence. The fault is quantitative as well as qualitative and makes the early diagnosis somewhat more possible. The writer thinks that, for some years to come, our main efforts to better the condition of the epileptic will have to be centered on the recognition of him as a person badly adapted to his surroundings. We should study our individual cases more carefully from this point of view, he promises to present, at another time, a careful digest of the potential epileptic character shown in a composite picture drawn from a large case material. In this article, however, he confines himself to a more or less complete analysis of a few cases. These all showed defects in infancy and adolescence, supersensitiveness with its customary accompaniments of shyness and self confidence, etc. The possibility having these highly sensitized persons avoid undue stresses in life and thus bringing them up in proper educational and political surroundings is pointed out. The writer has seen several cases of epileptics who lived a care-free life as members of clerical orders. When not obliged to engage in active pastoral and church duties of the usual type, they had obtained decidedly favorable results. The epileptic, he concludes, must be the object of earnest treatment, based on the study of the fundamental make-up of the primary life endowment and the therapy should be governed largely by the results of that study.

7. SYPHILOSES.

Tzanck, Bernard A. Treatment of Nervous Syphilis by the Intravenous Method Combined with Spinal Aspiration. [Par. Méd., May 11, 1918.]

The authors apply this treatment to secondary syphilis and in retarded syphilis. Their method is a combination of intravenous injection of 914 in increasing doses 0.15, 0.30, 0.45, 0.60, 0.75, 0.90, 0.90, 0.90 followed in the next five minutes by lumbar puncture. There must be a sufficient quantity of liquid (more than 10 cm.) to afford a realization of the meningeal disturbance and to permit of control operations, such as counting the Nageotte cells, leucocytes, etc. The accidents of this procedure are not different from those in salvarsanotherapy and include the pain of lumbar puncture. Lumbar puncture has always been well tolerated and particularly when there was meningeal alteration. In primary syphilis with a positive Wassermann after intensive and prolonged treatment, subarachnoid injections of 914 have seemed to be the preferable method, with a dosage of less than 0.01 gr. The spinal

substance is here intact. The condition of the spinal substance in retarded syphilis prevents on the other hand such forcible treatment. Then lumbar puncture establishes a sufficient permeability and irritability of the meninges and permits of serological modifications.

Emphasis is laid upon the need of further investigation, from this point of view of the various quantities of serum which give the surest and most constant indications of the actual condition of the lesion, for the serological alterations can not always be taken as proof of amelioration. Headache disappears regularly and trembling, frigidity and other subjective symptoms show improvement clinically. Objectively nothing more can be claimed than arrest of further development of the disease; the objective symptoms cannot be removed.

Cornwall, Leon H. Syphilis in its Relation to Central Nervous System. [The Military Surgeon, Nov., 1918.]

Strict attention to all the details of preparation of reagents, distilled water and glassware is imperative, else the reaction is valueless. For the detection of the very early stages of paresis with but few symptoms the colloidal gold reaction is the most valuable test that we possess. Unless test tubes are shaken immediately after the addition of the colloidal gold solution to the dilations of spinal fluid typical reactions characterized by a pale zone at the top of the tubes are obtained. Paretic fluids yield the greatest number of reactions, showing complete decolorization of colloidal gold in Zone I or the paretic zone. Among other diseases without luetic etiology, the spinal fluids of which react in the same manner, are lateral sclerosis, brain tumor, meningitis and eclampsia. The intensity of the reaction may be temporarily increased after treatment.

Lereboullet, J., and Mouzon, J. Tabes in Children. [Paris Méd., Jan. 4, 1919.]

This case of a boy of 15 with inherited syphilis was under continuous observation for two years. The symptoms began with right ocular palsy and ptosis, and violent cramps in the right leg. The Argyll Robertson pupil, the diminished knee jerks, and lymphocytosis in the spinal fluid made the diagnosis. Treatment brought about amelioration with persistence of the rigidity of the pupils and the loss of the tendon reflexes. The Wassermann reaction was positive. One brother and the mother had positive serological findings. Two similar cases reported, the ocular paralysis and loss of the tendon reflexes being accompanied by a positive seroreaction. Attention is called to late tabes as a possible inherited condition.

Book Reviews

Friesner, Isidore, and Braun, Alfred. Cerebellar Abscess. Its Etiology, Pathology, Diagnosis and Treatment. Including Anatomy and Physiology of the Cerebellum. Paul B. Hoeber, New York.

This book affords a clear and practical presentation of this important clinical subject from the various aspects under which it should be approached. The anatomy and physiology of the cerebellum are first discussed in its anatomical and functional position in relation to other brain structures and the important position it occupies in muscular coördination and control. In discussing cerebellar abscess in its origin and development particular emphasis is laid upon its close connection through structure of the cerebellum and in etiology of the abscess with the static labyrinth. The vast majority of cerebellar abscesses the writers find in the literature and in their own experience, are of otitic origin. They describe the process and the pathways by which such disturbance extends to the cerebellum together with the resulting type of abscess and its pathology. They review at length the clinical symptoms by which cerebellar abscesses may be detected with reference to the necessary differential diagnosis. Operation they believe to be the only treatment for abscess of the cerebellum and briefly suggest the operative lines to be followed.

The clearness of the book is enhanced by anatomical and clinical illustrations, which are supplemented by the first scientific reproductions of the cerebellum reproduced from Vesalius. An extensive bibliography adds to the value of the work.

Franz, Shepherd Ivory. Handbook of Mental Examination Methods. Second edition, Revised and Enlarged. The Macmillan Company, New York.

The formality of psychological tests, which too often annuls their practical value in the service of medicine or elsewhere, is so well obviated by this very practical and flexible presentation of the principles of these tests, that the book well merits this second and enlarged form in which it appears. To be sure it is written chiefly with the application of the principles to definite psychiatric situations. This however only renders more conspicuous the actual value of such testing when and only when applied with the flexibility and latitude which human psychical material normal or abnormal requires. The author has tried to reach a happy practical middle ground where a working accuracy and

precision are available through the tests applied, but where the broader more fluid mental attitudes are also given their actual diagnostic and clinical value. He justly claims a union of science and common sense in his manner of treatment. He performs also a somewhat neglected service in defining and distinguishing terms which are used too often with a vague interchangeableness. These are the terms psychology, psychiatry, psychopathology and neurology together with their derivatives.

His discussions of sensation, memory, association and other divisions of psychological material are well considered and clearly and simply expressed and again serve to unite the psychology of the academic classroom with the practical aspects of psychiatry or any other human application. A chapter of special interest is devoted to "Speech and Aphasia." One could wish that he had pressed a little more fully and deeply into those mental factors, particularly memory and association in the light of the deeper material which analytical psychology at least brings to light. This he has only lightly touched. Nevertheless, his outlines of the tests of various kinds actually given and his descriptions of their use are eminently simple and practical. The book serves as an excellent and instructive guide both to such actual clinical testing and to the psychological principles and facts which underlie clinical value.

JELLIFFE.

Nonne, Max. SYPHILIS AND THE NERVOUS SYSTEM. For Practitioners, Neurologists and Syphilologists. Authorized Translation from the Second Revised and Enlarged German Edition. Second American Edition Revised. CHARLES R. BALL, B.A., M.D. J. B. Lippincott Company, Philadelphia and London.

In making a second edition of the translation of this valuable work of Nonne the translator has made use of the third German edition and thus brought the work up to date for his readers. This the author had done by the introduction of the latest findings in regard to the subject and newest contributions in the cytological, serological, chemical and pathological fields, and in the establishment of the now undoubted relationship to tabes and paresis to syphilis through Moore's and Noguchi's findings in regard to the *Treponema pallidum* in the brain and spinal cord.

The work is a very full and detailed treatment of the entire subject of syphilis in all its aspects as related to the nervous sysem. It is written from a wide clinical experience, a long and wide familiarity with the literature and a keen practical following of the discoveries and developments in this important pathological and clinical field. The whole subject is treated in all its phases, neurological, psychiatrical, prophylactic with a clearness which arises out of an attention to detail and at the same time a sound and comprehensive grasp of facts; with

a sobriety of judgment which arises out of long experience and a high ideal of medical practice as well as of social responsibility. This latter is particularly evident in the prophylactic considerations and in fact in the whole attitude toward the subject. In the discussion of the various forms of neurological involvement, of hereditary infection or of any other phase there is no tendency either to minimize or to unduly magnify facts or to confuse signs and symptoms with those others due to other causes.

Attention is given to pathology and to etiology and then to the various symptomatological manifestations in brain and spinal cord. This includes the manifestations through affection of the cranial nerves, the meninges, vascular involvement and also involvement of peripheral nerves. A special chapter is given to the association of neuroses and psychoses with syphilis of the nervous system while paresis is treated in a chapter of its own. Emphasis is laid upon the fact that syphilis is far more frequently present in the cerebrospinal form than in either the spinal or cerebral forms alone. Special attention is given to the Wassermann reaction, the method of obtaining it and its significance together with mention of other tests. The author has added by request a special chapter upon salvarsan therapy.

JELLIFFE.

Freud, Sigmund, LL.D. TOTEM AND TABOO. Resemblances between the Psychic Lives of Savages and Neurotics. Translated by A. A. Brill. Moffat, Yard & Co., New York, 1918.

The book consists of four chapters, entitled: (1) The Savage's Dread of Incest; (2) Taboo and the Ambivalence of Emotions; (3) Animism, Magic, and the Omnipotence of Thought; (4) The Infantile Recurrence of Totemism.

Freud unites totemism, taboo and exogamy, and instead of regarding their interrelationship as arbitrary or accidental he tries to show that they have all developed out of the same Oedipus conflict or family romance that plays such a large part in the genesis of present day neuroses. Taboo, as he says in the preface, he can treat with confidence for it exists today, but the original meaning of totemism he can only guess at through the study of children. Though his conclusions may seem rather improbable, he believes that they may be more or less near the truth, which is now so hard to reconstruct.

The psychology of savages of today, he says, resembles an earlier stage of our own mental development, out of which our neurotics have not grown or to which they have regressed. The taboos of primitive peoples can be matched by those in a compulsion neurosis, which could in fact be accurately described as "taboo disease," for its "délire de toucher" corresponds exactly with the savage's taboo in its apparent lack of motivation, its enforcement through inner need rather

than outer compulsion, its contagious displacement, and its causation of ceremonies. These seemingly meaningless ceremonies and prohibitions are felt by both savage and neurotic as necessary to ward off some terrible disaster. The two oldest and most important taboos are against killing the totem and sexual relations within the totem clan.

The totem, usually an animal, is the guardian of the clan which takes its name and regards it as ancestor. It spreads its protection over the clan which in turn must not harm it. Children belong to the mother's clan and must marry outside it into some other clan of the tribe, thus preventing incest between son and mother or sister. Although individuals must not harm the totem, there is a ceremonial feast in which the whole clan together kills and eats it, a renewal of the blood relationship between the totem god and his worshippers in which the guilt of the murder is shared by the whole clan. These ambivalent emotions of loving and fearing [killing] the same animal Freud finds in some modern children who made totems of horses, dogs, and chickens, the fear in each case being traced back to the father and his threats of castration [on account of masturbation].

This mixture of fear and affection towards the totem coupled with the taboo prohibitions leads him to believe that the origin of it all is the familiar Oedipus conflict revealed by psychoanalysis, the desire of the son to get rid of the father and have the mother to himself. He takes it for granted that this actually happened in the most primitive stage of human development and that the resultant feelings of remorse, fear of reribution, and ambivalent affection on the part of the sons towards the murdered father are the source of totemism and its accompanying taboos. A sense of guilt and an attempt to allay divine wrath seem to have been the basis of all religion.

The fact that expiation for the breaking of a taboo lies in renunciation is taken as proof that renunciation is itself the basis of the observance of taboo. Thus the taboo seems to be originally designed to check some strong inclination of the unconscious. The average civilized man is protected from incest by an unconscious aversion and disgust and consequently feels no fear of it, but primitive man, apparently lacking this defence reaction, did consciously fear it, and to protect himself erected the system of taboos which prevented relations with female relatives and thus made the murder of the father of no advantage. The death wish towards the father and its resultant sense of guilt are reflected in the taboos on dead enemies and relatives and against touching chiefs or kings. Every endeavor is made to induce the spirit of the killed enemy to forego revenge, and even the return of the spirit of a relative who died naturally is felt to be very dangerous especially to his nearest of kin, who will not allow his name to be mentioned for fear of recalling his spirit. "The first moral restrictions are reactions to a deed which gave the authors of it the conception of crime. They

regretted this deed and decided that it should not be repeated and that its execution must bring no gain."

Whether or not the reader will assume with Freud that "In the beginning was the deed," he cannot help finding the hypothesis and the arguments supporting it of compelling interest. In this short space it is impossible to do more than hint at them. The translation has been so skilfully done that one forgets the book was written in a foreign language.

DUDLEY WARD FAY.

Paterson, A. Melville. THE ANATOMY OF THE PERIPHERAL NERVES. Henry Frowde, Oxford University Press; Hodder and Stoughton, Warwick Square, E. C., London, 1919.

This book recommends itself for its practical simplicity of aim and the manner in which this is attained. It has been prepared as a detailed concise guide for the aid of the surgeon who needs a ready knowledge of the peripheral nerve anatomy. There is no attempt at discussion of function beyond a brief statement of the part supplied and also of the interrelation of the various parts of the nervous system. For space has been given also to the sympathetic system and to the cranial nerves in order to give practical completeness to the outline of the peripheral nerves. The work is an anatomical one well furnished with illustrations, but it is such with a clear idea of the entire nervous system and its interdependence. Care has been taken to avoid a false dogmatism in regard to obscure nerve origins and the like and the book has everything to recommend it in the way of clearness, accuracy and application to practical physiological and surgical use. The brief references to functioning are also supplemented by a discussion of the morphological development of the spinal nerves and the limbs which they supply, in connection with the formation of the limb plexuses. The same method is followed in the presentation of the sympathetic system and the cranial nerves.

JELLIFFE.

Schulmann, E. SYPHILITIC EXOPHTHALMIC GOITER. [Thèse Paris, 1918, Maloine, Editor.]

Schulmann believes that all evidence points to the fact that syphilis has an important place in the etiology of exophthalmic goiter. Hitherto this has been neglected as a factor even though the multiplicity of the effects of syphilis is well accepted. It is acknowledged now, in the more precise pathology of Basedow's syndrome, that it is due to a lesion of the thyroid. This begins at first as a scarcely perceptible thyroiditis but develops progressively into a dyshyperplasia of the gland which gradually vitiates the glandular secretion. Since tuberculosis, typhoid and other infections initiate this process it would seem reasonable to include

syphilis. He believes that when once the syphilitic causation of this disease has been recognized numerous cases of this origin will be discovered.

It is found clinically that the spirochete can produce within the thyroid a secondary and a tertiary thyroiditis, gummatous, sclero-gummatous or interstitial, and certain syphilitic dysthyroidisms, among which are myxedema and exophthalmic goiter. Schulmann himself notes twenty-two cases of acquired syphilis where this syndrome appeared. It may manifest itself at any stage, even a very late one of the disease. The later appearance of the syndrome does not seem to depend upon the initial localization of the disease, the degree of infection, nor the intensity and persistence of the treatment. The syndrome appears also in hereditary syphilis, but here the formes frustres will be present, and since these arouse question there may be fruitful study here by joining laboratory with clinical research. The writer finds in three cases of conjugal Basedow's syndrome manifestations of syphilis. He believes that this infection may also explain the problematic familial Basedow, once attributed to hereditary neuropathy.

In the study of a family, a report of which the author gives, he sees associated with symptoms of goiter which is unmistakably syphilitic, dental signs, leucoplasia, deafness, chronic hydarthrosis, chronic rheumatism and the like and there was positive Wassermann reaction in the blood of each individual. Clinically the entities associated with Basedow's syndrome are always or frequently those attached to syphilis, *i. e.*, tabes, general paresis, epilepsy, chorea, etc. The morbid associations appearing with exophthalmic goiter speak very frequently of its specific origin.

Certain recent endocrinological work bears upon this subject, such as Reid Hunt's acetonitrile test, which Schulmann has used once successfully, Abderhalden's dialytic test, test for hyperadrenalism in the blood, test for deviation of complement with alcoholic extract of goiter as antigen and the action of extract of the hypophysis according to the method of Claude, Baudoin and P. Porak, all of which lead to a knowledge of the disturbance caused by the secretion of a vitiated thyroid. In a better knowledge of the formes frustres diagnosis can be made earlier and treatment instituted earlier. Either mercury or arsenic may be used in treatment, which should be intense and persevering. In stubborn cases iodo-iodide may be added. While ordinary sufferers from Basedow's syndrome are intolerant of iodine and the different forms of iodide, the syphilitic cases derive great benefit from them. Other preparations useful in Basedow may be used with the remedies mentioned if these prove insufficient, serotherapy or radium- or radiotherapy. [J.]

Obituaries

MAJOR ALFRED REGINALD ALLEN

Major Alfred Reginald Allen of the 314th Infantry, Seventy-Ninth Division of the United States Army, Associate in Neurology and Neuropathology in the University of Pennsylvania died at Nantillos, near Montfaucon, France, of a shrapnel wound in the head received while directing his battalion in action, September 30, 1918. He was struck at four o'clock in the morning and did not regain consciousness; his body was buried with military honors near the spot where he fell.

Major Allen was born at East Greenwich, R. I., on May 26, 1876, being the oldest son of the Rev. George Pomeroy Allen. His preliminary education was obtained at Selwin Hall, near Reading, Pa., after which he entered Lehigh University (1893–94) and the Medical School of the University of Pennsylvania, where he received his medical degree in 1898. After completion of his internship at the Howard Hospital he became associated with Wier Mitchell as a personal and hospital assistant and remaining under these favorable auspices for several years adopted neurology as a career.

In 1906 he was made a member of the Neurological Staff of the University of Pennsylvania, serving as Instructor in Neurology and Neuropathology and Lecturer on Neurological Electrotherapeutics until 1911 and as Associate in Neurology and Neuropathology from 1911 until the time of his death. He was in addition Assistant Neurologist to the University Hospital and one of the Chiefs of the Neurological Clinic. For a number of years he was Assistant Neurologist to the Philadelphia General Hospital, and during several years conducted courses in Neuropathology in connection with the Philadelphia Postgraduate School of Neurology.

In 1903, he was elected a fellow in the College of Physicians of Philadelphia; and in 1908 secretary and in 1910 president of the Philadelphia Neurological Society. He was a member of the American Neurological Association of which he was secretary and treasurer from 1909 to 1917; and was an original member and during

MAJOR ALFRED REGINALD ALLEN

1914 and 1915 president of the American Psychopathological Association. At the Sixteenth and Seventeenth International Medical Congresses held at Buda Pest (1909) and London (1913), he was secretary of the American delegation and was active in the administrative as well as scientific activities on both occasions.

Dr. Allen's neurological contributions are all characterized by painstaking study and at the same time by a notable originality of expression and thought. He was essentially a student and interested above all other considerations in the enduring value of his contributions. Of his various publications those which best indicate his final development and capacity are the studies on "Injuries of the Spinal Cord" and "Surgery of Experimental Lesions of the Spinal Cord," etc. As a result of these investigations, he suggested a practical surgical procedure which later was successfully utilized by Professor Charles H. Frazier—a longitudinal incision directly through the injured portion of the cord to secure drainage of blood and serum for the purpose of relieving pressure and preventing subsequent biochemical irritation of the nerve elements.

His other experimental, pathological and clinical studies all indicate a clear conception of the relations of scientific enquiries to practical neurology that reflects the influence of his mentor Weir Mitchell. The last production from his pen is the chapter on "Normal and Pathological Physiology of the Spinal Cord," contributed to Prof. Frazier's "Surgery of the Spine and Spinal Cord."

During his visit to England in 1913, he associated himself with R. H. Clark in a preliminary study of the cerebellum and was preparing to enter upon an elaborate study of its anatomy and pathology when the outbreak of the war put an end to the project.

Dr. Allen brought to his professional work a rare combination of capacities that fitted him for an eminent place in practical as well as scientific neurology. He had the unusual combination of an intensely artistic nature with logical and mathematical faculties of a high order. From his early youth, he was a musician; and composed songs, orchestral music and even an opera almost in boyhood. When a young man, he organized and conducted an amateur opera company, the "Savoy Opera Company" that under his direction presented various light operas with marked success. Not the least remarkable circumstance in regard to his musical talent is the fact that though a splendid pianist and a good violinist, he had never had formal instruction in either.

The same capacity for self instruction was shown in his rapid mastery of foreign languages. The writer of this sketch of his life

recalls the facility he showed during a summer's holiday in Europe in the acquisition of a fluent speaking knowledge of German, a knowledge that became extremely useful to him and his country during his military service.

His artistic talent was further illustrated by his ability as a photographer and his knowledge of the illustrator's art. Many of his colleagues availed themselves of his skill in these directions and some of his own contributions were enriched by the excellence of the illustrations made from his own photographs.

Somewhat unusually he combined with a highly developed artistic nature a rare capacity for mathematics and it is perhaps owing to the latter capacity that he entered upon the last phase of his history, the military career that ended in his untimely death. For though he became deeply interested in the war at its inception and keenly felt the necessity of America's participation his decision to qualify himself as a line officer and to abandon the opportunity to serve in his professional capacity was largely due to his interest in the mathematical problems presented in artillery operations and his desire to extend his usefulness in this direction. That he was intensely American in his sentiments is easily accounted for by the study of his ancestry. On the paternal side he was descended from Samuel Allen, who emigrated from near Bristol, England, and landed where Chester, Pa., is now located, in 1681. Through the marriage of the son of this American founder of the family he was also descended from the Waln family, the first American member of which came with William Penn in the "Welcome." On the maternal side, Dr. Allen descended from the DeWolfs of Rhode Island and the Howes, the first of whom, James Howe, came from England in 1637. During upward of two centuries, therefore, his forebears were people of prominence and distinction in Pennsylvania and New England. Little wonder then that their descendant was an ardent American!

When the first Officers' Training Camp was established at Plattsburg, N. Y., he promptly enlisted, returning the next summer (1915) and again in 1916. He was commissioned as first lieutenant after the first Plattsburg training and in October, 1916, raised to the rank of major. Later he served at Camp Meade and Fort Sill and for a time subsequently was director and commandant of the School of Automatic Arms in the Infantry School of Arms of the Seventy-Ninth Division. Finally he went to France as major of the 314th U. S. Infantry, arriving with his regiment in July, 1918. His final career is part of the splendid record of the division and army with

which he served. The testimony of those who were near him in those trying days merely fulfills the expectations of those who knew his character and determination. It was sheer will and high purpose that carried one, who, though no weakling, had had no large physical training, through the arduous days of preparation and the subsequent more trying experiences of an officer in the field.

On January 21, 1904, Dr. Allen married Helen, daughter of E. Burgess and Emma (Bolton) Warren. His wife and two children, Alfred Reginald Allen, Jr., and Helen Warren Allen, twins, born March, 1915, survive him.

Though his early death has deprived American neurology of one of its conspicuous members before the promise of his life was wholly fulfilled, a review of his varied activities reveals a many-sided character unusual in depth as well as scope. Few indeed are they who, though not in the most exalted places, have exhibited such diversified talent and capability. His intimates mourn him as a genial, lovable and staunch friend; his professional associates as a man devoted to the highest standards; and his comrades in arms as an officer who carried to far off France the ideals that brought into the world-conflict the unselfish purpose of the United States of America.

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Alfred Stengel.

Philadelphia.

THOMAS BUZZARD, 1831–1919

The death of Thomas Buzzard on New Year's Day, 1919, brought to a close a life of singular color and individuality. He was born in 1831 and spent his early days at King's College School. At fifteen he left the school to serve an apprenticeship to a physician, and later worked at King's College Hospital, after which he became house surgeon to Sir William Fergusson. 1854 found him in the midst of the cholera epidemic in Soho, and although only twenty-three years of age the distinction gained by his performance there led to his appointment on the British Medical Staff in the Crimea. At Sebastapol, in the expedition to Kertsch, and in the battle of the Tchernia he played an active part. He assisted in the founding of the base hospitals at Trebizonde and Sinope. His efficient services won him numerous medals and honors of war, and laid a foundation for his after-life of scientific enterprise.

Upon his return to London he went into general practice and devoted the next six years to it. A gift for journalism, exercised during his Crimean experience, was developed more fully in these years. During this period of growth as clinician, psychologist and surgeon, his writing served him in good stead, and it was while on the staff of the Lancet, that his "Mirror of Hospital Practice" articles led him to the operating rooms of the National Hospital, thus awakening his interest in neurology, and beginning an association of many years. His friendship with Hughlings Jackson, a source of life-long inspiration, also dates from that time. As consulting physician to the National Hospital he attained the culmination of distinction in the medical profession.

His interest in neurology was clinical in the main, but he never diregarded pathology, and was in fact among the first supporters of the theory of relation between bacteriology and neurological problems. Possibly his chief contribution to medical knowledge

was the discrimination between organic and functional disorders, especially as bearing upon disseminated sclerosis. Buzzard's book, "Simulation of Hysteria by Organic Disease," contains the fruit of his research on these topics.

"A happy combination of head and heart" is the tribute paid him by his friend Sir David Ferrier, a quality especially pronounced in the personal interest which he took in all his work, whether at the clinic or at his home. The breadth of his interests is shown in his constant study of subjects outside his professional domain, in his fondness for contemporary literature, and his special devotion to art. This was his hobby, the diversion of his leisure moments and in this field he made a wide circle of friends. His memoirs of early campaigning days, "With the Turkish Army in the Crimea and Asia Minor," recently published, contain original sketches and notes, which bring the scholar and the artist pleasantly before us.

He was not a profuse writer, but on the other hand no work of his but was of the greatest value. Accuracy in records, punctilious care in examination, and the tireless pursuit of diagnostic symptomatology mark his work especially. He was a frequent contributor to the Lancet, and the British Medical Journal, he furnished several sections of Quain's Dictionary of Medicine, and published work in the Transactions of the Ophthalmological Society, the Section of Neurology, British Medical Association. As president of the Clinical, Neurological and Harveian societies, corresponding member of the Société de Neurologie, Paris, Fellow of King's College, London, vice-president of King's College Hospital and representative of the college on the Senate of the University of London, he was widely known and honored.

SMITH ELY JELLIFFE.

DR. ALFRED GLASCOCK

Alfred Glascock, son of Captain Alfred Glascock, a Confederate Army officer, was born in Leesburg, Va., in 1881. He graduated from the George Washington University in 1902, received his appointment as medical interne at St. Elizabeths, Washington, D. C., in April, 1903, after having served in the Foundling Asylum of that city for a few months. In July, 1904, he became junior assistant physician. 1907 found him at Ellis Island, where he spent six months as acting assistant surgeon. He then returned to St. Elizabeths, where he was soon appointed assistant physician, and in 1912

senior assistant physician. This position he held until he resigned in response to the call to patriotic service.

The outbreak of the war fanned the military traditions of Dr. Glascock's family to the point where it was with utmost difficulty that he refrained from entering active service at once. The hospital was loath to spare him, as the need for his efficient aid was great. But with the entry of America into the war, he responded at once, and in the spring of 1918 received his captain's commission. As special examiner in psychiatry he was assigned to Camp Hancock, Ga., in May, served there during the summer months, and in September left for overseas duty as a member of the staff of a base hospital in France. The prevalent epidemic of influenza and pneumonia made him one of its victims, and he died in France shortly after his arrival there.

Dr. Glascock left behind him a long record of faithful service. He was honored by all who came in contact with him. His interest in his patients at St. Elizabeths, his consideration for his fellowmen, and the value of his steady, faithful work has made an indelible impression on all his contemporaries and associates. No greater tribute can be paid him than to say that he will live ever in the memory of those who knew him. [W. A. W.]

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Original Articles

THE MECHANISTIC CLASSIFICATION OF NEUROSES AND PSYCHOSES PRODUCED BY DISTORTION OF AUTONOMIC-AFFECTIVE FUNCTIONS[1]

By Edward J. Kempf, M.D.

CLINICAL PSYCHIATRIST, ST. ELIZABETH'S HOSPITAL, WASHINGTON, D. C.

The following system is based essentially on the integrative functions of the nervous system of which the psychoses are considered to be symptoms and maintains that the same forces which build up a personality when harmoniously integrated cause its deterioration when unadjustable conflicts occur. It is always necessary for the progress of any science to be willing to abandon an old system and adopt the new when more efficient and adaptable to facts. The old biology died hard in opposition to Darwin's theory of evolution, and many scholarly old physicians found the germ theory of diseases beyond comprehension and utterly intolerable, but in each struggle the more practical and rational theory and system eventually replaced the old. Modern psychiatry is certainly in need of an elastic, adaptable hypothesis, a direct terminology, and simple, comprehensive method of classifying its cases. Should a patient have a typhoid infection and develop nephritis and myocarditis the clinician would add the words nephritis and myocarditis to his diagnosis and again drop them as the different organs recovered. Psychiatry must find a similar method.

The modified Kraepelinian system of classifying personalities and psychoses fails because it is fundamentally based on a static neurology, emphasizing symptoms and prognosis. Symptoms have

[1] Presented at American Psychopathological Society, June, 1919.

been grouped into circumscribed disease entities despite the fact that a large proportion of cases show symptoms which are classifiable into two or three, or even more, groups, such as neurasthenia, manic-depressive types and dementia præcox type; or hypomanic and paranoid. About half the cases are, at one period or other, atypical to the Kraepelinian divisions. Most institutions easily evade this dilemma by dogmatically forcing the most suitable diagnostic term onto the case for statistical purposes. If each important institution could be induced to give, sealed, to a central committee, its actual working system for classifying cases as dementia præcox, manic-depressive, paranoia, hysteria, or neurasthenia, illustrated by cases, the differences would probably be so varied that the whole system would have to be abandoned because the faith in the assumption that symptoms are similarly applied and evaluated throughout psychiatry would be sadly misused. The errors in medical and surgical diagnosis are the result of the failure to discover critical symptoms, or the wrong evaluation of the symptoms found. To this difficulty is added, in psychiatry, the fact that personalities vary greatly in their autonomic activities at different times, under different conditions and under the care of different physicians; and the same environmental conditions may have entirely different influences upon different people, and upon the same person at different times. Hence, the symptoms (as irritability) that are shown under certain environmental conditions may not be noticeable under others, and similar, uncontrollable cravings may constitute a benign difficulty in one case and a pernicious influence in another. Many cases may be influenced to change their attitudes toward uncontrollable cravings so that a pernicious conflict may become quite benign or the reverse; as in autoerotic or perverse cravings—one case may end in suicide and another in a wild orgy, or zealous purification. The strongest argument against the utility of the old system is the manner in which such terms as "manic-depressive" or "dementia præcox" mislead psychiatric curiosity, when there is any. In most institutions the diagnosis "manic-depressive" tacitly means recoverable and "dementia præcox" means incurable, no matter what is done for the case. Hence, when a case, diagnosed "catatonic dementia præcox," recovers the inclination is to reconsider it as a stuporous manic-depressive. The analytical study of large, varied groups of cases show that nothing could be more erroneous or misleading. Remarkable, constructive, healthful readjustments can be made if the autonomic-affective conflict can be corrected.

It seems therefore much more practical to use a system of clas-

sifying psychopaths according to the nature of their autonomic-affective difficulties and their attitudes toward them, because this keeps the dynamic factors directly in psychiatric attention and permits of revision as the cases change. It is adaptable, unevasive, simple and the nomenclature is *directly* applicable to the mechanisms involved. It is also comparatively easy to pick out the differentiating factors. We must not forget that the golden rule in diagnosis is to know what we are looking for because then it is infinitely easier to find it. Hence the essential mechanistic factors that make a case curable or incurable, or determine its course and prognosis, are used for the terminology in the following system. The psychopathologist, therefore, can only diagnose his case in so far as he understands it. Under the old system the diagnosis "dementia præcox" is correct in over half the cases (in obscure cases in medicine and surgery this is fairly good practise). Even if the physician knows little or nothing about a particular case he is reasonably safe in his text-book discussion of the prognosis with the patients' relatives.

The descriptive terms, *acute, chronic* and *periodic* are valuable for medicine and surgery and decidedly so for psychopathology. The term, *acute,* may be reserved to apply to cases of less than one year's duration. *Chronic* may be applied to cases having had more than a year's duration or cases that have had an insidious course for more than a year before the consultation. *Periodic* may be applied to cases that have periodic or intermittent episodes or recurrences, accompanying natural phenomena, such as menstruation, pregnancy, the birth of a grandchild, marriage or death of child, etc.

The most important question to be answered in any clinical case is, "is the disease likely to prove destructive or fatal?" In psychopathology the paramount issue is, "Do we have a *benign* or *pernicious* process at work?" In the vast majority of cases, we may safely hold, as an axiom, that the *benign or pernicious nature* of the autonomic-affective conflict is determined by the *ego's* adaptation to the pathological cravings. Unless the *ego* accept the cravings as a part of the personality we have a pernicious mechanism that is sure to cause an eccentric, if not asocial, development of the *ego.* If the intolerable cravings are inclined to increase in vigor, through natural physiological processes (growth) and exogenous stimulation (as the sexual), we have a malignant process that exerts an incessant pressure to influence an adjustment where natural gratification can be obtained. If the sexual cravings are disowned by the adult *ego* and are conditioned to seek the type of stimuli which were pleasing

in infancy or preadolescence the destructive influence upon the personality will be greater than if the cravings are postadolescent in type or fully matured and the resistance is due to an excessive prudishness.

On the other hand, apparently, no matter what the segmental cravings tend to seek, if the *ego* is inclined to accept them as a part of the personality, due to natural causes, and not due to secret, mystic or unnatural influences, the personal conflict is not so *pernicious,* but is rather *benign* because the autonomic distress is less severe and in turn the compulsion to compensatory striving does not become so eccentric and asocial. Furthermore, the *benign* mechanism is usually accessible to psychoanalysis and constructive readjustment, whereas the *pernicious* mechanism is extremely difficult to influence. Quite frequently, however, patients' attitudes change from *pernicious* adaptations to the segmental cravings to *benign* attitudes. As in the case of an oral erotic, submissive, homosexual soldier who for two years was a typical case of "paranoid dementia præcox" because of his convictions that the cravings were caused by secret, hypnotic influences and were not a part of his personality, causing most eccentric defensive behavior and compensatory, grand, omnipotent, egotistical claims and fancies. Upon the development of a *transfer* to me he asked to have his "mind read" and in due course of time the *ego's fear* of the segmental cravings changed to a frank consideration of them, the mechanism changing from an apparently hopeless *pernicious* type to a fairly encouraging *benign* type. As he learned to allow the repressed dissociated cravings to frankly cause him to be conscious of their needs the wierd, hallucinated sensory images of assault, etc., disappeared and the case changed to a *suppression* (anxiety) neurosis of a benign though serious nature. As his sexual cravings became more heterosexual and normal and the oral eroticism abated the *suppression* neurosis and eccentric compensatory striving decreased so far that he had to be discharged as socially readjusted. Under the old classification he would have to be considered as a case of paranoid dementia præcox that had made a social recovery. Under the following system he would at first have been diagnosed as a *chronic, pernicious dissociation, compensatory neurosis* and upon discharge as a *chronic, benign suppression neurosis with a tendency to eccentric compensatory striving.*

To emphasize, the essential mechanistic difference between a *benign* neurosis and *pernicious* neurosis lies in the *ego's* attitude toward the segmental autonomic cravings. *So long as the patient*

MECHANISTIC CLASSIFICATION OF NEUROSES AND PSYCHOSES—PRODUCED BY DISTORTION OF AUTONOMIC-AFFECTIVE FUNCTIONS

ACUTE OR PERIODIC OR CHRONIC

Diagnostic Classification		Mechanistic Differences	Common Symptoms		Common Causes	Old Diagnostic Terms
BENIGN. (Tendency to accept the personal source of the wishes or cravings which cause the distress or psychosis.)	SUPPRESSION NEUROSES.	Clear to vague consciousness of the nature and effect of the ungratifiable affective cravings.	Distressing hypertensions or hypotensions of autonomic (visceral) segments (mild to severe).	Decrease of power to coördinate, persistent thoughts, preoccupation, unpleasant dreams, insomnia, errors, accidents, scalp pains, headache, dizziness, stiffness or weakness of external muscles of eyes, back of neck, limbs, back, tongue, pharynx, increased or decreased secretion of glands of mouth, stomach; dyspnea, tachycardia, high blood pressure, loss of or freakishness of appetite, hyperchlorhydria, diarrhea, constipation, dysmenorrhea, amenorrhea, sexual impotence, pollakiuria, hyperirritability of diseased structures; decrease of energy, or efficiency, or ability to learn.	Fear of responsibility or liability for having, or seeking the relief of, vigorous cravings. Fear of competition revealing functional or organic inferiorities. Fear of pain, injury, loss of money, honor, freedom. Fear of violating sacred traditions or transfers. Love of unobtainable, unresponsive or perverse object. Hate, shame, disgust for unavoidable object.	Psychasthenia (?). Neurasthenia. Hysteria (?). Anxiety neuroses. Manic-depressive types—mild. Psychoneuroses. Situation and accident neuroses or psychosis. War neuroses.
	REPRESSION NEUROSES.	Vague consciousness to total unconsciousness of the nature and influence of the ungratifiable affective cravings.	The above symptoms plus functional distortions of the projicient apparatus and changes in reactivity to the sense organs.	Amnesias (specific). Anesthesias,—specific, localized, general. Hyperesthesias, paresthesias. Postural tensions—spastic, flaccid. Simulations of postures, functions. Convulsions without loss of consciousness. Eliminations of segments or functions, recurring incoördinations, errors, accidents. Misinterpretations, misrepresentations. Fixed preferences, aversions, phobias, compulsions, obsessions (acceptable to the ego), mannerisms, attitudes, fetiches, symbols, rituals, habits, sexual reactions. Cravings for certain stimuli—esthetic, sexual.	Same as above, but usually occurring under more acute, critical physiological and environmental conditions necessitating immediate relief or forgetting, as unexpected exposure of secret vices, wishes, indulgences, scandals, asocial cravings, failures, inferiorities.	Psychoneuroses, psychasthenia. Hysteria. Compulsions, obsessions, phobias. Epileptoid tendencies. Dementia præcox types—incipient. War neuroses (shell shock). Some types of prison neuroses.
	COMPENSATORY NEUROSES.	Persistent striving to develop potent functions and win social esteem initiated by fear of impotence or loss of control of asocial cravings.	Usually some of the above symptoms plus vigorous compulsions or inspirations to strive directly or indirectly for specific environmental-social conditions and potent functions.	Usually eccentric personal, vocational, professional, religious, artistic, mechanical, commercial, philosophical striving, sexual strivings (pimps, seducers, white slavers). Eccentric penitent acts, reforms, reconstructions, solicitous interests, confessions, hyperconscientiousness, obsessions, divine inspirations, occult powers. Increased muscle tensions, high blood pressure, tachycardia, exophthalmic tensions. Exhibitionistic dress, voice, manners, heedless spending, grand unsubstantiated claims, eccentric modesty, curiosity, etc. Hyperactive glands—thyroid, adrenals, sex, glycohemia, glycosuria.	Fear of loss of sexual potency and domination by perverse cravings, fear of failure, fear of fear, fear of loss of love object, fear of inferiority, censure, ridicule, fear of organic failure. Hyperactive glands—thyroid, adrenals, sex. Glycohemia, glycosuria.	Manic types. Paranoid types, paraphrenia. Compensatory strivings in paresis, alcoholic and drug neuroses, mental defectives. Psychopathic personalities, pathological lying, specific manias, compulsions, obsessions.
PERNICIOUS. (Tendency to oppose or refuse to accept the personal source of the wish or craving, to hate those who would attribute a personal source, to blame an external or impersonal cause.)	REGRESSION NEUROSES.	Failure to compensate but regression to a preceding more comfortable, irresponsible level permitting wish-fulfilling fancies, postures and indulgences.	Distressing visceral tensions rare, but persistent maintenance of characteristic affective attitudes of the prenatal infantile or preadolescent stage.	Evasion of responsibility, general inefficiency, wandering, hoboism, home sickness, indifference, apathy, childish day dreams. Lowered muscle tonus, no capacity to compensate to win esteem, muteness, amotility, indifference to cleanliness, order, system, coöperation or failure; hopeless depression, suicide; preadolescent, infantile, prenatal, attitudes. Indulgence in excretory erotic play, fancies, childish destructiveness.	Infantile love fixations; loss of irreplaceable love-object; permanent, insurmountable obstacles to the love cravings; blotting out of disastrous or shameful experiences, or the adolescent development of perverse cravings, particularly autoerotic.	Depressive types. Involutional melancholia. "Shut-in" personality. Allied dementia præcox types. Epileptoid types.
	DISSOCIATION NEUROSES.	The uncontrollable cravings dominate the personality despite the efforts of the *ego* to prevent it.	Symptoms of distressing visceral tensions, with or without functional distortions, with or without eccentric defenses or compensations, with (see next space).	Sensory derangements, delusions, hallucinations, environmental and social disorientation, uncontrollable preoccupation, confusion, delirium, stupor, anxiety, apprehension, panic at loss of self-control, wild or systematic compensatory striving, bluffing, raging as a defense against the uncontrollable cravings, defensive compulsion to systematize signs, remarks, proofs of exogenous influences, uncontrollable, unacceptable obsessions, phobias, mannerisms, impulses, postures, rituals, (distressing the ego) heedless yielding to excretory erotic cravings, fancies of preadolescent or infantile nature.	Irrepressible, uncontrollable asocial or perverse segmental cravings. Inability to prevent repressed, disguised cravings from breaking through the ego's resistance because of fatigue, discouragement, depressing domination by others, seduction, toxemia, physical shock unsuitable means of sublimating, metabolic dystrophies.	Hallucinations, deliria, due to toxemias, etc. Functional epilepsy (hallucinated). Hysterias and manic-depressives (hallucinated). Dementia præcox (hallucinated)—paranoid, catatonic, hebephrenic, simple, mixed.

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Old Diagnostic Terms
chasthenia (?). ırasthenia. ıteria (?). ietv neuroses. ıic-depressive types— ld. choneuroses. ation and accident uroses or psychosis. : neuroses.
choneuroses, psychas- enia. ıteria. ıpulsions, obsessions, obias. leptoid tendencies. ıentia præcox types— :ipient. · neuroses (shell shock). ıe types of prison uroses.
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retains the tendency to accept the personal source of the wishes or cravings which cause the distress or psychosis we have a benign type; and when the patient develops the tendency to oppose or refuse to accept the personal source of the wish or craving, to hate those who would attribute a personal source for the craving and to evasively blame an external or impersonal cause for the difficulty, we have a pernicious type. Obviously, the benign attitude is capable of being analyzed and corrected whereas the pernicious attitude is most difficult to rectify and influence.

The chart shows that the terms *acute, periodic* or *chronic* are to be prefixed to the terms *benign* or *pernicious* and they in turn prefixed to the type of neurosis.

The neuroses have been differentiated into five distinct types because of the five distinct differences to be found in the autonomic-affective mechanisms. It must be borne in mind, however, that an individual may have one or more mechanisms at one period and none at another, just as he may have erysipelas and nephritis or become healthy.

The *suppression neuroses* are characterized by the *individual being clearly to vaguely conscious of the nature and effect upon himself of his ungratifiable cravings.* Similar autonomic distresses may be caused by the loss of the love-object, through its inaccessibility, as death, indifference, infidelity; or the perverseness that is craved; or through the individual's becoming disgraced and unfit for the love-object, as imprisoned, exiled, ostracised, etc.; or the inability to escape from one cause of fear because of a more dangerous cause, such as the battlefield or courtmartial for desertion. For this reason it is utterly unsatisfactory to use such terms as "situation psychoses," "war neuroses," or "shell shock." They are no more scientific and practical than the diagnosis of "automobile fracture," "fall fracture," "jump dislocation," "elevator sprain," or "railway spine."

The *repression neuroses* are characterized by the *individual trying to prevent the autonomic cravings from causing him to be conscious of their nature or needs and influence upon his personality.* He succeeds in this by maintaining a vigorous, incessant, defensive coördination ("concentration of attention") of his *egoistic* wishes upon a course that compromises, as a resultant of converging forces, with the repressed cravings. In battle the autonomic tensions that produce the distressing afferent sensory stream called *fear* must be relieved. Flight may mean life-long disgrace or court martial and shooting for desertion, but motor disability or localized anesthesia,

as blindness or deafness, results in hospital treatment, hence the "war neurosis" is the symptom of the repressive adaptation to the uncontrollable autonomic reaction. There are certainly two types of "war neuroses." Individuals who know that they are incapacitated by fear, admit they have "lost nerve" but cannot control themselves, and individuals who maintain that a bruise, wrench, fall, or explosion caused the functional distortion that keeps them from the battlefield, insisting, on the other hand, that they are not afraid.

The psychological mechanism of *suppression,* wherein the individual permits the affect to cause him to be aware of its needs, but prevents it from causing overt behavior is decisively different from the adaptation of *repression,* wherein he not only prevents it from dominating his overt movements but does not allow it to make him conscious of its existence or true needs. (Makes himself forget it.)

The results or effects of these two adaptations are distinctly different, the effects being the symptoms. Their types reveal the nature of the adaptation—whether *suppressive* or *repressive.* The symptoms of *suppression neuroses* are mild to severe distressing hypertension or hypotension of some autonomic segment or segments, whereas the *repression neuroses* show similar effects plus distinct functional distortions of the projicient apparatus or sense organs, such as localized spastic or flaccid paralyses, anesthesias, hyperesthesias, amnesias, mannerisms, phobias, compulsions, unchangeable preferences, persistent thoughts, etc. They are more difficult to treat than suppression neuroses because the patient's tendency is to prevent the affect from causing him to become aware of its presence and the treatment essentially requires that he should allow it to assert itself normally and then be assimilated or used for constructive purposes or the cause avoided.

The *compensatory neuroses,* as a division, naturally follow next. When the individual feels that he has cravings that are socially inferior and detrimental, and wishes to win social esteem, the *fear* of losing social esteem, and *fear* of the influence upon his personality of the intolerable cravings initiates a compensatory autonomic reaction which in turn compels a course of behavior that is adapted or designed to acquire some form of protective, comforting social esteem. Obviously, when the asocial cravings cause persistent, intense fear the compensatory striving is likely to be more vigorous, obsessive, eccentric and socially less adaptable, being frequently designed to destroy or defeat the environmental factors that arouse the intolerable cravings as well as those opposing the compensation. Hence the

eccentric compensatory striving is to be regarded as protective, but symptomatic of the fear of a secret functional inferiority.

The *regression neuroses* are quite the opposite in type to the *compensatory neuroses* in that the individual makes no effort or gives up the struggle to win social esteem and biological potency, regressing to a preceding, usually preadolescent or infantile functional level. During this sort of adaptation the asocial cravings are acceptable to the apathetic *ego* and permitted to run a rampant course of indulgences. The symptoms of the *compensatory neuroses* are characterized by striving, egotism, intolerance, grand claims, and usually high tension of the striped muscles, with a general quickening of the autonomic activities, whereas in the *regression neuroses* we have social indifference, lethargy, apathy, slovenliness, irresponsibility, suicidal tendencies and a decided general lowering in autonomic and striped-muscle tonus.

In the *compensatory neuroses* distressing visceral tensions occur almost consistently and may be serious if involving a defective vital organ, whereas in the *regression neuroses* the individual is comfortable. Many suicidal cases are miserable but this is largely due to the resistance to the regressive course.

The *dissociation neuroses,* as the fifth division, follow logically and naturally, covering that enormous group of patients who succeeded in keeping the undesirable cravings repressed until they became dissociated and finally dominated the personality through the increase of their vigor, because of stimulating environmental and metabolic conditions, or the decrease of the vigor of the *ego,* because of depressing and exhausting environmental and metabolic conditions. The dissociated segmental cravings may be fought to a bitter finish, as in the paranoid adaptation, or yielded to in abject fear and despair as in the catatonic, or accepted as coming from a divine source, with disgusting glee and abandon as in the hebephrenic and epileptoid. The adaptations may run a consistent chronic course, or a periodic course, as in the hallucinated, regressive epileptic, who has periods characterized by fair judgment and self-control.

The distinctive symptoms of the *dissociation neuroses* are (1) the *ego* is forced to be conscious of wierd distorted images (hallucinations) of past sensations (experiences) which seem to gratify the dissociated affect although they horrify the *ego;* and (2) the *ego* is dominated by *unacceptable,* mysterious obsessions, phobias, compulsions and inspirations. The dissociation neuroses may or may not be further characterized by severe visceral distress and motor disturbances, localized anesthesias, amnesias, etc.

The distinctive difference between the *benign dissociation neurosis* (hallucinated manic or depressive) and the *pernicious dissociation* neurosis (hallucinated dementia præcox and epileptic) exists in the fact that in the *benign* adaptation the *ego* never quite loses the faculty of knowing that after all that most important influences in the psychosis are the wishes or cravings that are getting satisfaction (physiological neutralization). When the formerly *benign* psychopath begins to lose this faculty a *pernicious* mechanism develops, which, unless rectified, will seriously abort the personality. On the other hand, most serious, pernicious maladaptations may be readjusted to benign mechanisms by training the patient to accept the wish-fulfillment in the psychosis.

It is a common occurrence, under the old system of classification, for so-called manic-depressives to change into dementia præcox types. The reverse course is more uncommon and when it occurs the diagnosis of "dementia præcox" is usually changed to tentative "manic-depressive."

There is often considerable disagreement about the differentiation of paranoid, catatonic and hebephrenic types of dementia præcox, whereas under the mechanistic diagnosis the presence of regressive and compensatory tendencies can easily be covered by the terms used. For example: chronic, pernicious, regression, dissociation, compensation neurosis, covers such cases as an apathetic, anal erotic sailor, who regressed to a preadolescent, irresponsible social attitude, enjoyed the hallucinated sodomistic pleasures and compensated with claims of great inventive powers and omnipotence.

The studies of Clarke and MacCurdy and others, and my cases of epileptoid convulsions show that certain types of epileptics are really biological (erotic) abortions in which the epileptic convulsion has nothing less than the autonomic-affective value of an erotic orgasm. These cases are characterized by regression, dissociation and compensatory mechanisms shown in their infantile irresponsibility, hallucinations and omnipotent fancies. It is generally recognized that under the old classification some cases, classified as dementia præcox, develop epileptoid convulsions and a typical epileptoid personality, hence the difference between many epileptics and dementia præcox types is really symptomatic and not mechanistic. Therefore, it seems quite acceptable to classify the epileptoid mechanism under the type of functional neurosis that covers it; most cases, not showing symptoms of dissociation at first, are rather to be classified as *pernicious repression neuroses.*

In the table under the heading *common symptoms* the generic

group and the more common symptoms are detailed. The *common causes* cannot be fully given except in a semi-generic manner, being as endless as experience. Under *old diagnostic terms* those in most frequent use at present are listed.

The terms *supression, repression, compensation, regression* and *dissociation,* as applied to neuroses, represent levels of deviation from the normal, but one or more terms may be applied to the same case. For example, we may have a *suppression* neurosis with or without the tendency to *compensation* or *regression.* The term *dissociation* implies *repressions* that have finally overcome the ego's power of control, hence *repression* need not be used when *dissociation* is used in the diagnosis. The type of adaptation to the dissociation process may be further designated by the terms paranoid, catatonic, hebephrenic, epileptoid, although "paranoid" is covered by "compensation" and "hebephrenic" by "regression."

When this system is fully developed the biological nature of the cravings that are repressed or dissociated will also be designated, as *repressed love, shame, hate, fear, sorrow.*

In conclusion. The term "psychosis" is not used because after all the sensory phenomena which we are conscious of as thoughts and wishes are the result of integrative, physiological processes and the term "neurosis" is more consistent with the integrative functions of the nervous system.

This system of differentiating and classifying psychiatric cases is to be considered as experimental and suggestive. It is hoped that it will be fully tested and adequately adjusted. I have found it most useful for correlating important, essential attributes of widely scattered and apparently dissimilar cases, which could hardly be possible under the old system of classifying them. It is hardly necessary to remark that terms designating the hyperactive condition of some gland of internal secretion or the presence of a toxin or drug can be covered by adding "with" hyperthyroidism, typhoid or morphine intoxication, etc.

THE TREATMENT AND STUDY OF TWELVE NON-PARETIC NEUROSYPHILITICS TREATED BY INTRAVENTRICULAR INJECTIONS OF SALVARSANIZED SERUM

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OUTLINE

I. Introduction

This paper deals with a selected group of patients treated for neurosyphilis by the intracranial method, and observations minutely made over the period of three months.

Twelve cases of non-paretic cerebral and cerebrospinal syphilis were selected from the neurological clinic of the Kansas City General Hospital. Both acute and chronic forms were represented, and all were well advanced. In fact, some of the patients faced an extremely bad prognosis. Treatment consisted in repeated intraventricular injections of serum salvarsanized in vivo. The changes in the clinical and laboratory findings are detailed in the matter below. The details of technique are also given, since they are at slight variance with those of certain other contemporary workers. The treatments continued over a period of some two months.

Observations were continued for a month following. Further treatment and observations were interrupted by the exigencies of the war; and it was felt advisable to present the data obtained thus far with the incomplete though rather startling conclusions to be drawn therefrom.

II. Technique

1. *Preparation of the Serum.*—The serum was prepared, as follows: On the day preceding the injections, certain patients were given intravenous injections of diarsenol or arseno-benzol-billon or the Metz salvarsan, in large doses (usually 0.6 G.). Forty to 60 minutes thereafter these patients were bled into sterile bottles and approximately 300 to 500 c.c. of blood secured from each. This blood was allowed to stand at room temperature over night.

In the morning the clear supernatant serum was pipetted off and pooled in sterile containers. If any hemoglobin or redblood cells were present in the serum, decantation was not attempted, but the serum was roughly poured off and centrifuged. The clear serum so obtained was placed in sterile glass bottles and immersed in an inactivating bath or thermostatic chamber. It should be inactivated at from 56 to 57° C. for 40 minutes. It may then be kept at room temperature until used. Serum prepared and kept on ice is still fit for use as long as a week following its preparation. No ill effects from its use were noted. However we made it our practice to prepare the serum fresh for each day of treatments.

The serum should be clear and a distinct yellow or greenish yellow in color. An orange cast is indicative of hemoglobin contamination and while it does not disqualify the serum, it certainly depreciates it. A heavy cloudiness causing opacity is usually due to fat; if there is any doubt a stained smear will rule out the only dangerous possibility, namely bacterial contamination.

2. *Trephining.*—The introduction of fluid into the ventricle presupposes a skull trephine. This is undoubtedly a major operation, but may well be done under local anesthesia in the majority of cases. In our own cases, it was nearly always so performed. The majority of patients claimed to have suffered no pain whatever. None suffered any considerable amount of pain.

The localization of the point for trephining is in a sense the most difficult procedure of all. Various points have been selected and named by their demonstrators. We personally are not in favor of any of the frontal lobe punctures. This includes both Kocher's point

and the other para-median points which are not only more difficult to perform but are more disfiguring to the patient and require deeper penetration by the puncturing needle. Moreover, the frontal region, it would seem to us, should at least be given the best possible care rather than suffer the trauma of a puncture, particularly when there are so many opportunities to use silent areas of the brain. The ventricular area penetrated has no practical significance. The communications between anterior, posterior, and middle horns are extremely free, so that fluid injected into any one is promptly found in all. Likewise, fluid as a rule quickly circulates from either side to the other. The pathology of some of the cases considered allows for a certain amount of ventricular dilatation—a mild chronic internal hydrocephalus.

One of us (A. L. S.), in private work and work other than the present, has used a point in the parietal region determined as follows: A line 5 cm. posterior to and parallel with the Rolandic area line (*i. e.*, 1 cm. posterior to the point half way from the nasion to the inion) is continued down over the parietal region to a point 10 cm. from the midline (approximately a handsbreadth). This point requires that the puncturing needle be directed slightly downward and slightly anterior.

The other of us (K. A. M.) has devised a slightly different point for purposes of simplicity and prefers to use it, as was done in most of the cited cases. This point is near that of Keen, which was 3 cm. above the external auditory meatus. We prefer, instead, to use the point 5 cm. above and 5 cm. posterior. Our reasons for preferring this are that it brings the trephine opening away from the region of the auricle which is always dubiously cleaned; it makes the application of sterile operating cloths more facile; and it lessens the chance of nicking an eccentrically winding lateral sinus. In addition, it penetrates the bone at a point where it is much thinner and more easily trephined. The needle should be directed practically straight inward, perpendicular to the tables of the temporal bone; sometimes slightly down and forward.

We localize the point, mark it with sterile methylene blue on the shaved and scrubbed head, and inject the local anesthetic. Five c.c. of a 1 per cent. solution of aposthesine was found to be efficient and sufficient. A vertically placed elongated wheal is made. Through this, the subperiosteal tissues are reached and infiltrated. A few minutes later, one straight 3 cm. incision is made through the skin, and to, or through, the galea or muscles. The superficial vessels are clamped. The muscles are smoothly divided, the periosteum

exposed. The periosteum is cleanly divided and the edges separated from the bone. The bone is carefully drilled through with a small trephine or hand drill. The patient usually experiences no pain whatever, although at this point he may be somewhat annoyed by the boring. The button of bone may be removed with a small forceps. The dura is thus exposed. It should be inspected for large visible vessels; the oozing should be controlled with gauze and the application of bone wax.

3. *The Removal of the Cerebral Fluid.*—The needle may then be introduced into the ventricle. The angulation and depth of penetration will depend upon the site for trephining, the age of the patient, and the degree of dilatation of the ventricles.

We have used a special needle of the lumbar puncture type with a blunt point. The Luer attachment base is desirable. This may be connected by means of a short rubber tube and interposed glass window to the injection syringe. The cerebral fluid usually flows out at about the same rate and pressure as spinal fluid; similarly, occasional cases of increased or decreased pressure may be seen. In the latter it is sometimes necessary to use the suction of the syringe, very gently and cautiously applied, to remove sufficient fluid to permit of the injection of an appreciable amount of serum. In the main, however, we prefer to remove no more cerebral fluid than flows out spontaneously, even though this process occupy so much as 15 minutes. Sometimes straining, speaking, or coughing, on the part of the patient, will greatly accelerate the rate of flow and diminish the waiting time.

If the syringe method be used, the procedure may be carried out more nearly perfectly by leaving the glass barrel and plunger smeared with bland paraffin oil before being placed in the autoclave. This variety of oil has no deleterious effect upon the serum and permits the plunger to operate with almost no friction.

4. *The Injection of the Serum.*—After sufficient fluid has been removed and collected in appropriate retainers for later examination, the serum is injected either by gravity or the syringe method. If care be taken in the injection and a minimum of pressure used, we prefer the syringe method. The injection should be made slowly. This is particularly requisite in some cases where pain is complained of as the serum is introduced, especially if somewhat too rapidly.

As to the quantity of serum to be injected; there is, of course, no set rule. We have arbitrarily followed the plan of reinjecting about two thirds as much serum as cerebral fluid withdrawn. In some cases we have injected an equal amount. Of course this de-

pends largely on the degree of hydrocephalus and the variations in intracerebral pressure. It is likely that in all cases a not inconsiderable quantity of the injected serum leaks out through the punctured hole in the dura.

In our own cases, summarized below, the following figures summarize the injections quantitatively.

The average quantity of cerebral fluid withdrawn was 35 c.c.

The maximum quantity was 60 c.c.; this was not an isolated case, as practically 2 ounces were withdrawn from several cases at different times.

The minimum quantity of fluid withdrawn in a successful attempt (*i. e.*, disregarding one or two unsuccessful attempts at retaining the needle in the ventricle, due to unruly patients or imperfect technique), 10 c.c.

The average quantity of serum reinjected was 20 c.c.

The maximum quantity (*e. g.*, that reinjected in the case of the maximum withdrawals above mentioned) was 35 c.c.

The minimum quantity of serum reinjected was 7 c.c.

III. Reactions to Treatment

The immediate reactions of the patients to the injections varied considerably in nature and degree, apparently dependent upon several different factors.

OUTLINE

Temperature Pulse Respiration	of	First injection Subsequent injections
Clinical observations	of	Clear serum Fatty serum Hemoglobin in serum
Spinal fluid	of	Large doses Small doses

1. General. 2. Modifications. 3. Exceptional. 4. Summary.

In general, the reactions were not severe. There was usually a rise of temperature, averaging 100.8° F. for the first injection and with a maximum of 102° F. in the ordinary cases. One man had a febrile reaction reaching 103.6° F. thirty-six hours after injection, which did not return to normal until after the fifth day. This was quite exceptional however. The maximum temperatures were usually reached from eight to twenty hours after the operation, averaging twelve hours. The return to normal took place within from twenty to forty hours from the time of the injection, the average being some thirty hours.

The pulse was not markedly accelerated except in two cases; both of which gave evidence of chronic myocarditis and reacted poorly to the treatments (one dying without improvement, and discussed below). In these the maximum of 104° F. was reached. In general the rate rose slightly with the temperature, being usually in the neighborhood of 100° F. It is noteworthy that in the exceptional case of high febrile reaction above referred to, the pulse never went above 90° F.

The respiratory rate did not show any noteworthy fluctuations. The possibility of the interference with the respiratory center as a result of the manipulations of intracerebral pressure was not lost sight of, but no effect whatever was detected.

Injections subsequent to the first one, that is, the one given at the time the trephine opening was made, might certainly be supposed to give less reaction. As a matter of fact, the difference in the degree of reaction in the subsequent injections was on the whole negligible. The reaction is apparently due chiefly to the absorption of, or reaction to, the serum; and not to the operative manipulation. In those cases in which superficial infection occurred, there was no corresponding temperature reaction. The temperature, pulse and respiration responses for the second, third, fourth, etc., injections were, then, essentially similar to those given above for the first injection. As we did not make a trephine opening in any case without an accompanying injection, we have no data to show the reaction which might be allowed for the trauma of the operation.

The subjective symptoms presented by the patients following the injections and accompanying the febrile reactions were not varied. The average cases had no immediate sensations—a few hours, or even less, after the injection, headache would be the prominent symptom. This was in some cases occipital, in some frontal, in others general. The pain from the incision was not complained of at any time. Some cases complained before the completion of the treatment of certain unpleasant symptoms; *e. g.*, sharp pain in the supraorbital region, booming headache, a feeling of pressure, or dizziness. Subsequently, these cases took various courses, some developing severe headaches which lasted from one to four days with more or less prostration, and others having little more than the usual brief headache which was gone upon awaking the next morning. These headaches were at times of great intensity, even to the point of being excruciating. In the case of high temperature reaction above mentioned, there was a constant and

severe headache throughout the first five days, accompanying the fever.

In certain cases nausea was common; and in a few, vomiting occurred. Not a few of the patients complained of vague pains in the back, in the nuchal region and in the sacral region. One, the control tabetic, invariably had an exacerbation of the lancinating limb pains which were apparently quite severe and lasted several days. Tabetics as a rule are unusually susceptible to a host of various intoxications. The lightning pains are often increased in various toxic states. We have frequently noted an increase in the pains following a full dose of arsphenamine. Several of the hemiplegic cases mentioned the feeling of cramping or burning pain or involuntary twitching in the paralyzed limb, but these symptoms were at no time very prominent.

It was observed that there was a certain relation between the intensity of the subjective symptoms and the size of the dose given. The more severe reactions and the distinctly unpleasant ones were more apt to occur following the larger doses; *i. e.*, 30 to 40 c.c. One series of seven injections was made by using less than 20 c.c. each time; and no severe headache and only two complaints of pain in the limbs was observed following. It might be added that the temperature reactions following these small injections are likewise reduced, but as they are never severe, are less conspicuous.

Again it was noted that the hemoglobin content of the serum has a certain cumulative effect in the production of unpleasant symptoms. We can give no data on this, inasmuch as we always took great pains to avoid any contamination of the serum with red blood corpuscles: but in one instance where several cases were injected with a serum which had an orange tinge, the severity of the reactions was not strikingly greater.

The reactions did not seem to be dependent upon the amount of cerebral fluid withdrawn. This is deduced from two facts. First, certain cases were tapped and not injected because of some fault of technique, etc., and these cases did not usually have any reaction at all. Secondly there did not seem to be any noticeable difference in the cases where widely varying amounts were drained and very similar amounts of serum injected. For example, a case where 60 c.c. of fluid were removed and 35 c.c. were given had a reaction comparable with that where 30 c.c. were withdrawn and 20 c.c. were given. It is possible that the relative amounts drawn and reinjected are of importance.

The presence of large amounts of fat in the blood serum, which

not infrequently occurs, particularly if the serum be obtained too soon after the ingestion of food, was found to be without any noticeable effect whatever. Hence while less attractive in appearance than the clear sparkling sera, the cloudy fat-laden sera are probably no more irritant. If there be any doubt, however, as to the nature of the cloudiness, a stained smear should be examined microscopically. This was done as a routine on all our sera to guard against the possibility of unsuspected bacterial contamination.

In a considerable number of instances, the spinal fluid was obtained upon the day following the injection. While in the majority of cases, nothing extraordinary was found; not a few fluids gave evidence of an acute inflammatory process, probably an irritative (toxic) meningitis. To illustrate this, data are presented in the following table. On two cases, data showing the daily changes for the first four days after injection are also presented:

Case	Hrs. P. O.	Turbidity	Globulin	Cells	Differential
Case A (severe headache).	16	+++	+++	10,000	90 % neutrophiles
Case I (no symptoms)....	24	++	+	200	100 % neutrophiles
Case A–2	24	++	++	2,400	Nearly 100 % neutrophiles
Case G (feeling O. K.) ...	5 days	+	+	1,000	10 % neutrophiles 90 % L.
Case E (feeling O. K.) ...	1 day	++	++	4,000	PMN = 2% L.
	2 days	+	+	320	4%
	3 days	O. sl.	+	600	6%
	4 days	+	+	420	3%
Case M (feeling O. K.)...	1 day	+	+++	120	1%
	2 days	O. sl.	+++	128	2%
	3 days	O. sl.	+++	98	4%
	4 days	O. sl.	+++	43	2%

These cases clearly show that while it is probably not the typical or usual response, there occurs in not a few cases a toxic or irritative aseptic meningitis following the intracerebral injections, which extends to the cord coverings. It is not improbable that the headaches following the injections are dependent upon this fact. It is noteworthy that in those cases where its presence has been shown, it invariably outlasts the clinical manifestations. None of the three cases whose fluids were turbid on the fourth or fifth day were in bed or were in any subjective discomfort.

To summarize, then, the immediate reactions, we find that there is usually a constant but slight febrile reaction, accompanied by inconsequential pulse acceleration, and negligible respiratory rate change;

That this was accompanied by more or less subjective symptoms of headache, pains in the neck, back, and limbs, nausea and vomiting: but that rarely were any of these alarming or considerable with the exception of the headache which was sometimes intense and chronic, though at other times entirely absent;

That these symptoms were accompanied in some cases by no spinal fluid changes, and in some by evidences of an aseptic meningitis, which always outlasted in laboratory findings the clinical manifestations;

That the intensity of the reaction depended to a considerable degree upon the size of the dose, slightly upon the amount of hemoglobin in the serum and the priority of the injection, and probably none whatever upon the fat contained in the serum or the amount of cerebral fluid withdrawn.

IV. Case Histories

There follows a resumé of each of the cases in the series treated and here reported. The essential features are given, with the histories of the present illnesses in as much detail as could be secured in most of the cases. The laboratory findings in each case are not repeated, as they appear in the section immediately following this and may be referred to there. The diagnoses made are not held to be either absolute or indisputable: they are the opinions held by the writers and those who were called to see certain cases in consultation. The statements of response to improvement are conservatively stated, perhaps too much so. We believe, however, that more harm has resulted from exaggeration than from ultra-conservatism in the reporting of improvement from a new form of therapy. Moreover, in certain few of the following cases the improvement needs no exaggeration to render it striking if not remarkable; in others, it was so slight that it may as well be called none at all; and this has indeed been done. The patients are arranged chronologically.

Case A.—Male of 47 with history of syphilis dating back eighteen years; seizures, ataxia, altered reflexes, confirmatory laboratory findings. Diagnosis: probably tabo-paresis. Three treatments. Slight improvement; so much subjective improvement that patient refused to remain for more treatment.

Male, 47, white, single, laborer, born U. S. A.

C. C. (chief complaint): "Bladder and heart trouble."

P. I. (present illness): for past year had been troubled with painful,

scant, and frequent urination and the persistence of a gonorrhea (chronic) acquired 12 years previously. Admits on questioning that he is subject to headaches; that he has had several seizures in which he fell unconscious and remained so from ten to fifteen minutes; the first one many months ago and the last three weeks since. Complains also of dyspnea, attacks of cyanosis, edema of the legs, precordial pain and orthopnea over a period of three years. Had been diagnosed in a medical school hospital as "syphilitic heart disease."

P. H. (past history): Generally well; had skull fracture eight years ago, with right subtemporal decompression. Acquired syphilis eighteen years ago and gives complete history of primary, buboes, rash, sore throat, fever, etc.

Physical Examination.—Negative except for enlarged cardiac area, 3 cm. to right and 2 cm. to left of normal limits. Knee-jerks much exaggerated, Romberg slightly positive, coördination poor, speech defect prominent, typical bilateral Argyll-Robertson pupils. Fundi normal. Mental symptoms of slight confusion and marked euphoria were noted.

Diagnosis.—Spinal fluid and blood confirm clinical diagnosis of cerebrospinal syphilis, probably tabo-paresis (plus visceral lesions).

Treatment.—This patient was given intravenous diarsenol: he was given three intraventricular injections of salvarsanized serum at two-week intervals. At one of these treatments 60 c.c. cerebral fluid was removed without difficulty or disaster and 35 c.c. injected. Probably it would have been safe and beneficial to have injected a larger amount in view of the evident hydrocephalus. His reactions were not severe; although he complained of headache somewhat longer than did most of the patients.

Response.—The patient was very much improved from his own standpoint; and in fact it was this that caused treatments to be discontinued, as he was able to leave his bed and accept work in the hospital kitchen after the first treatment; and subsequently insisted upon leaving the hospital for outside work,—"because I am so much better; I am all well." No opportunity to check symptoms. His ataxia was apparently decreased.

Case B.—Female of 27, with acute maniacal psychosis and neurosyphilitic laboratory findings. Diagnosis of Unclassified Neurosyphilis. Two treatments. No material improvement.

Female, 27, white, married, housework. Born U. S. A.

F. H.: Negative.

Marital.—Married five years; husband well; denies syphilis. Is not alcoholic. Of four pregnancies, one was miscarriage, and one child died of intestinal trouble.

P. H.: Never in good health; always complaining of aches here and there. Never confined to bed. Eight years ago, patient is supposed to have had a somewhat similar psychotic attack lasting only a few days.

Since then, she has shown occasional mental signs such as foolish remarks, causeless laughter, memory lapses, and somnambulism.

P. I.: Began five weeks prior to entry. She became agitated over a trivial remark of her child, and cried much, refusing comfort. For a week she would refer to nothing else in her conversation. Began to insist that the neighbors be punished for teaching the child such things. Ran away from home, but was found and brought back by her husband. Ran away the next day again and was brought by the police to her home. Ran into the street one night in her night clothes, screaming. She was taken to the country for recuperation, but without benefit; hence was brought to the hospital. Diagnosis: Neurosyphilis, unclassified.

Physical Examination.—Patient presents fairly nourished and developed woman with thick, long hair. Maniacal part of the time, schizophrenic, irritable, negativistic, resistive, denudative, excited.

Diagnosis.—Diagnosis was modified by finding blood and spinal fluid Wassermann's positive and other spinal fluid signs, including thirty cells. Katatonic dementia præcox, manic depressive mania, and meningeal cerebrospinal syphilis were suggested.

Treatment.—Acting upon the possibility of the latter, she was given intravenous salvarsan and lumbar puncture with some benefit. Subsequently, she was given one intraventricular and one subdural intracranial injection of serum; but further treatment was interrupted by the development of variola in the patient, for which she was transferred to the infectious hospital.

Response.—Slight symptomatic improvement followed. The patient was very much quieter, reacted mildly, recognized the nurses and doctors and called them by their names. She did not recover her lucidity during the time she was seen by us.

Case C.—Male of 58 entering with psychôtic symptoms and history of syphilis. Neurologically not markedly abnormal. Laboratory signs indicative. Diagnosis of cerebrospinal syphilis, probably tabo-paresis. Three treatments. Slight improvement. Patient refused further treatment, believing himself absolutely well.

Male, 58, white, divorced, bricklayer. Born Germany.

P. I.: This patient was psychotic upon entrance to the hospital, presenting delusions, hallucinations, disorientation, confusion, euphoria, and marked restlessness. He became quiet and accessible by the end of the week and denied the possibility that he had delirium tremens. He insisted that he was a well man and should not be treated. He admitted failing sight, but dated its onset ten years back. Admitted chancre twenty-years previously and a rash subsequent thereto.

P. E.: Physical and neurological examinations were negative except for a slightly positive Romberg; and pupils which reacted sluggishly to light and normally to convergence and accommodation. His vision tests showed 20/200 and 20/50, correctable to 20/30 with plus (2 and 2.5) lenses. The fundi were normal.

Diagnosis.—Cerebrospinal syphilis; probably tabo-paresis.

Treatment.—This man was given three intraventricular injections of serum.

Response.—He refused further treatment because he could not be persuaded that he was not perfectly well.

Case D.—Woman of 45 with numerous signs of systemic and nervous syphilis. Diagnosis of visceral syphilis plus unclassified neurosyphilis. Two treatments. Reacted severely to both, dying in an acute reaction following the second.

Unfortunately the clinical data on this case was lost and cannot be replaced from the hospital records. The following general summary is a report from memory of the essential features.

The woman was a large, flabby and obese, middle-aged woman, who had been under treatment in the hospital many times for divers afflictions. For the six months preceding treatment, she had been shifted about from one service to another because of a general lack of interest in the case, combined with an uncertainty of diagnosis. That she was syphilitic was known, and she presented manifold leg ulcers, hepatic cirrhosis, a chronic pyemia, probably tabes dorsalis, and certain mental symptoms which in conjunction with her syphilitic infection may well have been paresis. She was exceedingly voluble, jocular, and euphoric; her insight was slight indeed. She was not grandiose and was approximately oriented. She showed some conduct disorder in her hospital manners, but was at no time dangerous or threatening. She was very difficult to examine physically on account of her obesity and general helplessness; and the syphilis service had given up treatment because of the apparent impossibility of entering a vein and her refusal to have intramuscular injections.

Diagnosis.—Our diagnosis prior to treatment was unclassified neurosyphilis.

Treatment.—She received two intraventricular injections at an interval of eighteen days. She showed at both times considerable intracerebral pressure, yielding 50 c.c. of cerebral fluid at the first injection, and a smaller quantity at the second. Forty c.c of serum were reinjected at the first treatment, 25 the second.

Response.—Following the first injection, she had quite a severe reaction, being delirious for a part of the time, and increasingly voluble; and sustaining a prolonged but not very severe febrile reaction.

At the end of two weeks she was apparently in as good condition as prior to the first treatment: it was thought by several of the examining physicians and some of the patient's relatives that she was brighter and more nearly normal mentally. Consequently, a few days later she was given the second treatment.

The injection took place at 10 a.m. and was not attended by any immediate untoward symptoms. Four hours post-operative, her temperature was 99° and her pulse 112. Her pulse fell to below 100 by 6 p.m.

The night nurse has recorded on the chart: "Slept well all night." At 2 p.m. the next day her temperature has risen to 103°, pulse to 138, and respirations 24. At 6 p.m. they were the same. She was quiet all day; said she felt all right, did not seem to be delirious, but was apparently weaker physically. She was considerably troubled by one of the abscess formations to which she was subject, which was draining profusely. At 9 p.m., her temperature was 104.4°, her pulse 148, respirations 36. The next morning the pulse had increased to 164, she was unconscious at times, evidences of myocarditis appeared (cyanosis, weak pulse, cardiac arrhythmia). At 10 a.m. the pulse was still 160 and the temperature had risen to 105.6. Two hours later the pulse was 100, the temperature 106.4. At 1 p.m. the temperature reached 107°, and at 1:45 p.m. the patient died.

The very marked and terminal disturbance of the heat center plus the fact that death occurred rather too soon for an infectious etiology, make a direct reaction to the intracerebral injection in an already weakened and failing individual the probable cause of death. This is the only case of death directly attributable to the treatment in our series; and is, we believe, one of very few on record.

Case E.—Male of 41, with intense headaches and confirmatory laboratory signs of neurosyphilis. Four treatments. Slight improvement; very marked in patient's opinion.

Male, white, 41, laborer. Born in Missouri.

P. I.: Six months previously patient had pneumonia and blood was tested as routine and reported positive. Patient denies recollection of any possible primary rash, or period of sore throats; but admits having had a bubo twenty years ago.

For nearly a year prior to the detection of his syphilis six months ago, he had had severe headaches and occasional pains and aches in his sides, but no other symptoms. Since the diagnosis he had had twelve intravenous injections of diarsenol in doses of 0.3 to 0.5 G. His symptoms had apparently been exaggerated. Intense headaches developed, which almost incapacitated him at times.

His wife had also been receiving treatments. Of eight pregnancies, four had resulted in miscarriages, one child was known to be syphilitic, and three children were living and well, with negative serum Wassermann reactions.

F. H.: Negative.

P. H.: Negative.

P. E.: Patient was particularly well developed and nourished. Pupils were typical Argyll-Robertson. The fundi were negative. The left patellar reflex was absent, the right normal. There was a left-sided Babinski. The Romberg and other tests were negative. The general physical examination was negative, except as stated.

Diagnosis.—Unclassified neurosyphilis.

Treatment.—He was given four injections at weekly intervals.

Response.—This patient received treatment very enthusiastically. He went out between treatments and went on with his work, but was very anxious to have them continued, as he ascribed the greatest subjective improvement to them. He suggested that he go with one of the writers as a living testimony to the efficacy of the treatment. He stated that his headaches and backaches ceased entirely after the first two treatments. It was impossible to get in touch with him prior to completing this data, as he had returned to work in a new location and could not be reached.

Case F.—Female of 49, with beginning optic atrophy and evidence of systemic syphilis. Diagnosis of unclassified neurosyphilis. Four treatments. No marked improvement.

Female, 49, white, single, housewife.

C. C.: Blindness in one eye.

P. I.: Fifteen months previously began to lose sight in right eye, developed a corneal ulcer and apparently an extensive keratitis, and eventually lost vision from the corneal opacities resulting. About the same time, developed large suppurative masses under jaws, which were incised, but which remained enlarged indurated masses of uncertain character. The patient did not complain of neurological symptoms.

F. H.: Negative.

P. H.: Negative; except that patient had never been sick in any way.

P. E.: A poorly developed and nourished woman, with the above described lesions of eye and jaws. General examination negative, except for absent knee jerks, a slight Babinski on the right, impaired coordination of lower extremities, slightly positive Romberg, and by ophthalmoscopic examination, a low grade optic neuritis in the left eye. "Evidently beginning atrophy, extremely chronic."

Diagnosis.—Neurosyphilis—unclassified.

Treatment.—This patient was given four injection at two-weekly intervals. She reacted poorly to them in point of febrile disturbances, but was apparently none the worse after the subsidence of the fever and tachycardia. There was no very apparent improvement either in her general conditions, or in her vision (?).

Response.—No improvement.

Case G.—Male of 60, with indefinite clinical and laboratory signs; pointing on the whole, however, to tabes dorsalis. Two treatments. Slight improvement.

Male, age uncertain, about 60; white, laborer.

C. C.: "Hot spells," and pain under the arms.

P. I.: For three months has been having attacks of "hot flashes," which occur several times daily and last one or more hours. They are accompanied by profuse sweating, headache, and throbbing pains under the arms. He associates no other symptoms and no etiology whatever with them. Paresthesia (formication) in left leg upon reclining. Restless and troubled with insomnia.

Two months ago decided he had syphilis, recalling a chancre of fifteen years previous; and took six intravenous injections of diarsenol, in doses of 0.3 to 0.4 G. There was no distinct benefit from this. From the last few injections he had very severe reactions of the neuralgic type, involving the sciatic nerves.

F. H.: Negative.

P. H.: Negative.

P. H.: A tall, well-developed and nourished man. Pupils slightly irregular, but react normally. Romberg present. Right-sided Babinski. Coördination of upper extremities impaired; of lower, fairly good. Slight speech impairment. Examination otherwise negative.

Diagnosis.—(See laboratory findings.) Cerebrospinal syphilis, possibly tabes dorsalis, beginning rather high up in the cord.

Treatment.—This patient was given one treatment and reacted very severely, with a high temperature and protracted headache (severe). Subsequently, he developed a low grade superficial infection which prevented treatment for a month. At the end of this time, he claimed to feel better than ever in his life, to be completely free from the "hot spells," paresthesia, and headaches, and to have gained some weight. He took one additional treatment. His reflexes remained as at first examination. His fundi likewise remained unchanged (normal).

Response.—Slight improvement.

Case H.—Congenital syphilitic idiot, boy of 11, with negative laboratory signs. Remarkable change from state of almost absolute amentia to state of recognition of doctors and nurses, feeding self, walking, smiling, etc. Four treatments. Marked improvement.

He presented the typical features of a congenital idiot; sat about, and little was known of him save he had been an idiot from birth. He was about the size and stature of a normal child of 4.

He presented the typical facial expression of an idiot; sat about the ward all day long, uttering inarticulate sounds or no sound at all, usually the latter; and constantly thrashing his arms and hands about in a purposeless manner. He was not destructive, but took little interest in anything except his food which had to be fed to him by his nurse always. He was never known to speak. He could stand or even walk with assistance, but did not choose to do so; sitting all day in the bed with bowed head and ever active arms.

His blood Wassermann was positive; and once negative. Although his spinal fluid was negative, it was assumed that he was a congenital syphilitic. His general physical examination was suggestive but not conclusive on this point.

Diagnosis.—The child was probably a congenital syphilitic, and certainly an idiot. It was presumed that he had a congenital cerebral syphilis. Treatment was based on this assumption.

Treatment.—He was given four intracerebral injections of salvarsanized serum. It was necessary to etherize him on account of his

struggles for the trephining, but subsequent injections were accomplished without the anesthesia. About 15 c.c. were removed each time and from 7 to 15 reinjected.

Response.—The response of this patient to treatment was quite spectacular; and for a time he was the subject of wide comment locally. He began to take some interest in his environment; showed comprehension of the nurse's commands to come, to go, to eat, etc.; and began to feed himself with utensils and drink from a cup unassisted; evidenced a certain development of memory in taking great fright when the lumbar puncture tray was prepared, or when one of us approached him to feel his head or to examine the incision; the restless and constant beating of his arms was very much decreased; and for long periods of time he would sit in a quasi-normal position. He took to smiling at times, when pleasantly addressed by certain of the nurses, and would embrace her in a rather stiff but perfectly definite and indicative manner, when the suggestion to do so was made and the occasion permitted. His change in conduct was even noted by some of the older children in the ward; and his improvement was unqualifiedly insisted upon by all the nurses in attendance upon the ward.

Case I.—Male of 48 with hemiplegia of syphilitic etiology, three years' standing. Diagnosis of vascular, cerebral syphilis. Five treatments. Pronounced improvement. Recovered ability to walk alone and lost certain subjective symptoms. Reflexes altered toward the normal.

Male, 48, white, clerk.

C. C.: Hemiplegia, left.

P. I.: Four years ago, first noticed numbness of arm and leg, requiring massage before normal use returned, lasting about fifteen minutes at a time and recurring nightly. Sight of left eye failed rapidly; and the doctor consulted told him that the "optic nerve was affected."

Two attacks of temporary unconsciousness occurred. A year later, he had trouble with his leg while attending a meeting; and upon rising, found it necessary to drag the leg after him. Walked a few blocks thus and then lost control of it completely and fell repeatedly. He was picked up by an ambulance and taken home, where he was unconscious for three hours. This was three years ago.

He remained in bed for two months, having a complete paralysis, which gradually improved, and a concomitant speech difficulty and dysphagia, which likewise improved. He got so that he could hobble about the house, but could not leave it or attempt work. In this status he remained for two years. Then he became worse, in spite of massage, strychnine, KI, arsenic, etc. He entered this hospital a year ago, immovable, constantly confined to bed, left arm and leg practically useless.

P. H.: Negative. No recollection of syphilitic infection.

F. H.: Negative. Wife had no children, but at least one miscarriage.

P. E.: The Wassermann of both blood and spinal fluid have been negative; later positive (q. v.). An X-ray of the head showed no abnormalities and no evidence of a suspected cyst.

Examination of the patient showed an excellently developed and nourished man lying quietly in bed. Skin pale, pasty, fat, soft.

Paralyses: Left arm, lower half of left side of face, complete. Left side in general and left thigh and leg, partial.

Special senses: O. D. 20/30 corrected by plus 0.25 to 20/20. O. S. ibid. Ophthalmoscopic: O. D. slight pallor of temporal half of disc. O. S. optic atrophy. Hearing slightly impaired. Sexual libido unimpaired. Anesthesias none. Paresthesias formication about hips. Hyperesthesias about trochanters and spine. Headache constant and occasionally severe; usually mild; chiefly occipital.

Sphincters: Rectal, always controlled. Vesical, rarely lost control of.

Vasomotor: Left side is cool and sweats with a clammy perspiration.

Reflexes: Pupils react slightly; otherwise normal. Patellar reflex exaggerated on left, absent on right; constant. Patellar and ankle clonuses marked on left; absent on right. Babinski on left constantly; once on right, but usually absent. Otherwise normal.

Diagnosis.—With the aid of the laboratory findings, a diagnosis of cerebral syphilis, vascular type, with hemiplegia, was made.

Treatment.—This patient was given five injections. He always yielded a considerable amount of cerebral fluid (up to 50 c.c.) without symptoms; and did not have severe reactions, although considerable quantities of serum were reinjected (usually 25 c.c.; once 35 c.c.).

Response.—This case showed perhaps the most spectacular improvement of any in our series. After the first injection, the headaches ceased entirely and permanently. After the fourth injection, the patient made successful attempts at walking and managed to get about the ward walking alone for the first time in three years. The hyperesthesias were diminished, the paresthesia disappeared. The use of the left arm was partially recovered, but remained spastic.

Reflexes.—The right patellar reflex returned. The left remained hyperactive. The Babinski on the left was still present, but less prominently so. The ankle clonus disappeared and the patellar clonus (on the left) was very much diminished and at times could not be obtained.

There was involuntary escape of urine after the first injection, but this did not recur. The patient was very much gratified and encouraged, and loud in his praise. Personal communication states that he "continues to walk about the room daily and to improve in every way."

Case J.—Male of 35 with syphilitic hemiplegia of thirty months' standing. Four treatments. No improvement.

Male, 35, white, carpenter.

C. C.: Paraplegia.

P. I.: Three years ago came home from work feeling as well as usual. Dizziness developed after supper, and some nausea. He vom-

ited once, and felt better. Took a nap on the sofa, and when awakened by his wife found that he was unable to rise. At that time the right side was found to be paralyzed. The next morning the left side was found to be similarly paralyzed. He had difficulty in speaking and in swallowing.

After six weeks there was some improvement, which continued for several months. He went to a local hospital, and a diagnosis of syphilis was made. He was given two injections of "606" and one intraspinous injection of serum. No improvement followed.

Thence to the present hospital where he had more intravenous and Swift-Ellis treatments, all without apparent effect. Saturated solution of KI was taken constantly throughout.

P. H.: Negative, except for a questionable chancre eleven years ago of a few days' duration and not accompanied by adenopathy or other symptoms. No skin eruption followed, but about a year later had a very sore mouth and throat.

F. H.: Negative.

P. E.: Present a very well developed, but poorly nourished man, lying quite helplessly propped up in bed.

Eyes.—Right pupil irregular and completely fixed. Ophthalmoscopic shows clearly optic atrophy. Visual acuity is 20/40, correctable by plus 0.25 by 90 degrees to practically 20/20. Left cornea opaque.

Reflexes.—Both patellar reflexes absent. Oppenheim on right. Hyperactive plantar reflexes both sides, questionable Babinski. No clonuses.

Sensory.—No paresthesia, anesthesia, or hyperesthesia.

Sexual power lost since onset of P. I.

Sphincters.—Rectal incontinence for first year, but now under control. Constipated. Urine occasionally escapes involuntarily.

Paralysis.—Complete left hemiplegia, except face. Partial right hemiplegia, except face. Can move arm only with visual aid. Toes, ankle and knees movable, but not hip muscles.

Speech.—Marked defect.

General Physical Examination not important except for general emaciation and muscular atrophy.

F. H.: Negative.

Marital.—Married eight years ago. Wife living, well. One child; no miscarriages.

Treatment.—This patient received, with the others, regular intracerebral injections, four in number, at one- and two-week intervals. He also received some intravenous injections.

Response.—At the end of the period there had been no marked improvement. The other patients thought that his speech was much more distinct. He himself believed that if anything his paralyses were worse, in that his right knee was now stiff and immovable. He was inclined to think that his rectal sphincteric power was improved. The

patient was optimistic and fair-minded, and his subjective opinions are worth consideration because of his comparative good common sense. He concluded, on the whole, that he had not received any benefit from his treatment.

Case K.—Male of 50, for three years aphasic, incontinent, incoördinated, helpless. Marked dementia. Died after one injection, probably not as a direct result.

Male, age uncertain, near 50; white.

C. C.: Hemiplegia, aphasia.

P. I.: This patient had entered nearly three years previously. He presented a completely aphasic, more or less incontinent, incoördinated, helpless old man, who giggled much, wore spectacles assiduously, but never attempted to use them; was unable to write or indicate his identity or history. His systolic blood pressure was 150, he was well developed and preserved, presenting a pitiable spectacle of well-nourished helpless humanity.

P. E.: The knee jerks were both present. Babinski, positive on left; plantar reflex absent on right. Ophthalmoscopic: The O. D. showed marked optic atrophy; the left was practically normal. General physical examination was negative.

Diagnosis.—Cerebral syphilis; vascular type.

Treatment.—This patient was given but one injection. He was somewhat improved, it was thought at first. About two weeks after the injection he apparently had another hemorrhage and was no longer able to sit up or feed himself. Subsequently he failed rapidly and died.

Autopsy.—Autopsy revealed greatly thickened and adherent meninges with strikingly variable blood vessels as to caliber and thickness. The left side of the cerebrum was greatly atrophied. In many areas the convolutions had completely disappeared, especially along the Rolandic fissure. There were many areas of softening. The anatomical diagnosis was: Left cerebral softening and atrophy.

Note.—Whether or not the death of this patient was directly or more likely indirectly the result of the treatment, it is at least certain that no improvement can be ascribed to the treatment in this case.

Case L.—Male of 43, hemiplegia, syphilitic laboratory findings. Received four injections. Distinct improvement.

Male, aged 43, white, formerly a cook.

C. C.: Right hemiplegia.

P. I.: About a year prior to admission, the patient is said to have fallen to the floor, and when picked up had the right hemiplegia which persists. He has improved slightly since, but has been confined constantly to the hospital; can sit up but cannot stand. Bowels and urine incontinent, speech defective and greatly diminished in quantity. It is difficult to get him to talk loudly or sufficiently to get a coherent story. Cerebrates slowly; is only partially oriented for time, correctly for space

and personality. He is too inaccessible and uncommunicative to furnish satisfactory data for mental examination.

P. E.: Well developed and nourished white-headed man, who looks more nearly 73 than 43. His general physical examination was negative. The pupils were both fixed; both fundi showed optic atrophy, especially temporal. There was a marked Babinski on the right; on the left, it was questionable. The blood pressure was 150–80. Knee jerks absent.

Diagnosis.—Cerebral syphilis, vascular type.

Treatment.—Patient was given four treatments at one- and two-week intervals.

Response.—At first he seemed depressed by the injections; later he picked up and began to speak more loudly and quickly than before. He got so that he could sit up in a chair alone, which was a new experience for him. He began to ask for the bed pan at times, instead of continuing his former incontinence. Reflexes remained unchanged.

Case M.—Male of 50, typical tabes dorsalis, fairly well advanced. Four treatments. Slight improvement, especially in control of sphincters and muscular coördination.

Male, white, 50, formerly a cook.

C. C.: Entered a year prior to history on account of incoördination of legs. Could scarcely walk. Outside diagnosis "rheumatism."

P. I.: The affliction began about a year ago with pains in the legs, especially in the calves. Typical lancinating pains described. This was followed by loss of control and inability to walk in the dark. Rapid loss of sight followed (it is interesting to note below that this is not, as would ordinarily be presumed, an optic atrophy). No hint of visceral crises obtained. Got rapidly worse. Came to hospital, incontinent of urine. Was given three intravenous injections of "606" and one Swift-Ellis treatment. This was followed by marked improvement, but neglect of treatment was again followed by decline.

F. H.: Negative. Not married.

P. H.: Entirely negative. No history of chancre.

P. E.: Well developed, fairly nourished, old man lying in bed; completely unable to walk or stand, on account of incoördination of legs. No paralyses, paresthesias, anesthesias, or hyperesthesias. Sexual desire almost entirely lost. Rectal sphincter normal; urinary incontinence daily. Fixed Argyll-Robertson pupils, with normal fundi upon ophthalmoscopic examination. Vision of 20/200 in each eye, correctable to 20/30 by plus 2.00 lenses in both. Knee jerks absent. All other reflexes normal. Coördination of legs very poor; of arms, less impaired.

Diagnosis.—This was a frank case of tabes dorsalis, advanced stage. It was included as a good control case.

Treatment.—Received four injections at one- and two-week intervals.

Response.—The patient maintained stoutly that he was improved.

At times he suffered severely after the treatment from the lancinating pains, but his conviction that he was improved by the treatment was so strong that he always insisted that he be treated again. He had slightly less incoördination of the arms. His vesical sphincteric control was certainly improved, so that he rarely wet the bed as before, and it was no longer necessary to catheterize him as had been the case quite frequently. He was sure he could manipulate his legs better, but he could not stand alone. He could, however, sit up alone much better than before. His reflexes remained unchanged.

Summary of Clinical Data

The clinical data listed above may be summarized in semi-tabular form, as follows. The terms "slight" and "marked" improvement are uniformly adopted and are of course arbitrary and comparative only.

Diagnoses.

Tabo-paresis, 2.
Tabes dorsalis, 2.
Cerebral syphilis (vascular), 4.
Idiot, 1.
Unclassified neurosyphilis, 3.

Response to treatment, by diagnoses.

Tabo-paresis.
2 showed slight improvement.
0 showed no improvement, or became worse.

Tabes dorsalis.
2 showed slight improvement.
0 showed no improvement, or became worse.

Cerebral syphilis.
1 showed marked improvement.
1 showed slight improvement.
1 showed no improvement.
1 died.

Idiot.
1 showed marked improvement.

Unclassified neurosyphilis.
1 showed slight improvement.
1 showed no improvement.
1 died.

Responses to treatment, by degree of improvement.

Marked improvement, 2.
1 cerebral syphilis.
1 idiot.

Slight improvement, 6.
2 tabo-paresis.
2 tabes dorsalis.
1 cerebral syphilis.
1 unclassified.
No improvement, 2.
1 cerebral syphilis.
1 unclassified.
Worse (but not dead), 0.
None.
Dead, 2.
1 cerebral syphilis.
1 unclassified.

V. Laboratory Data

The spinal fluid, cerebral fluid, and blood serum of all patients was examined at frequent intervals during the course of treatment. The examination of the cerebral fluid was made a routine procedure and led to the securing of results totally different from those given by the spinal fluid. This has been previously pointed out by Southard and Solomon,[1] Solomon and Wells,[2] and others. We have found that a patient whose spinal fluid gives a typical paretic gold sol curve may yield a cerebral fluid the gold sol of which shows a tabetic or even a negative reaction.

In the following tables, a word should be said as to the symbols used. The pressure of the spinal fluid was rarely measured by the manometer because of lack of equipment; and the degrees 1, 2, and 3 above N are purely arbitrary, relative, and inaccurate indices. A pressure of 3 would be one in which the fluid was ejected forcibly from the spinal canal; so that it fell in a parabolic curve of some several decimeters radius.

For globulin, the Noguchi butyric acid test was used for the most part; although results were occasionally checked by the Ross-Jones test. A distinct turbidity upon standing is referred to as 1; a marked turbidity followed by a flocculent precipitate of small amount, as 2; and a heavy turbidity with later an abundant flocculent precipitation, by 3.

The cell counts were unfortunately made with the ordinary Thoma-Zeiss blood counting chambers, instead of Fuchs-Rosenthal. Ten cells or below are recorded simply by N (normal). Above 10 the exact number is stated. The Wassermann tests were run

[1] Neurosyphilis, W. M. Leonard Co.
[2] Boston Medical and Surgical Journal, CLXXII, 17.

by the Kansas City General Hospital pathologist (also the City Laboratory); and have been shown by checking with other tests to be unusually accurate.

The gold sol reactions were run for the most part by the writers, using solutions prepared by ourselves. Only solutions of first quality were used to avoid aberrant results; the usual technique being followed in preparation and use.

In the following pages, the laboratory reaction before the instigation of treatment, and then following each treatment, are tabulated. In some instances the data were unfortunately not obtained, or are considered unreliable and hence discarded. The spinal fluid specimens were usually obtained after the reactions from the injections had subsided.

CASE A: Cerebrospinal Syphilis, Possibly Tabo-Paresis

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin		Wassermann		Pressure	Globulin		Wassermann		
			Cells		Gold		Turbidity		Cells		Gold
Preliminary	+					2	1	1	30	+	0
1st		1	0	+	0113322110						
2d		0	0	0	1123210000	1	3	3	10,000		(toxic meningitis)
3d		2	0		1235544210	1	2	2	many		
(Final)											

CASE B: Neurosyphilis, Unclassified

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin		Wassermann		Pressure	Globulin		Wassermann		
			Cells		Gold		Turbidity		Cells		Gold
Preliminary	+					2	0	1	30	+	0233100000
Final	+										

CASE C: Cerebrospinal Syphilis, Probably Tabo-Paresis

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin		Wassermann		Pressure	Globulin		Wassermann		
			Cells		Gold		Turbidity		Cells		Gold
Preliminary	+					1	0	1	20	+	0
1st		2	0	+	0012332100						
2d		0	0	0	2331000000	0	0	0	0	+	
3d		1	0	0	0014554421	1	2	2	2,000		
(Final)											

CASE D: Cerebrospinal Syphilis, Unclassified

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin	Cells		Wassermann Gold	Pressure	Globulin Turbidity		Cells		Wassermann Gold
Preliminary	+	0	0	0	2320000000	3	0	2	n	+	0024430000
1st		Death									
(Final)											

CASE E: Cerebrospinal Syphilis, Unclassified

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin	Cells		Wassermann Gold	Pressure	Globulin Turbidity		Cells		Wassermann Gold
Preliminary	+					1	0	2	20	+	1123332200
1st		0	50	0	4430000000	1	0	2	20	+	Same
2d		0	0	0	2233100000	1	1	1	400		
4th		0	0	0	1222000000						
Final	0										

CASE F: Cerebrospinal Syphilis, Unclassified

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin	Cells		Wassermann Gold	Pressure	Globulin Turbidity		Cells		Wassermann Gold
Preliminary	+					0	1	0	20	+	
1st		0	0	+	neg.						
2d		0	0	0	2331000000						
4th	+	Bloody				0	0	1	20	0	0011100000
Final	+										

CASE G: Cerebrospinal Syphilis, Probably Tabes

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin	Cells		Wassermann Gold	Pressure	Globulin Turbidity		Cells		Wassermann Gold
Preliminary	0					1	0	2	30	+	0011211000
1st		0	0	0	0	0	1	2	1,000		
2d		Bloody						2	n	0	
Final	0					0	0				0

CASE H: Cerebrospinal Syphilis, Idiot

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin	Cells	Wassermann	Gold	Pressure	Globulin Turbidity	Globulin	Cells	Wassermann	Gold
Preliminary	+					0	0	0	0	0	0012333000
1st		0	0	0	0						
Final	0					0	0	1	0	0	0

CASE I: Cerebral Syphilis, Vascular Type

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin	Cells	Wassermann	Gold	Pressure	Globulin Turbidity	Globulin	Cells	Wassermann	Gold
Preliminary	+			+		0	0	0	n	+	3444100000
1st		0	20	0	2344430000						
3d		1	2		2355321000	1	2	1	200		
4th		0	0	0							
5th		0	5	0	0003221000						
Final	+					0	0	3	n	+	0003221000

CASE J: Cerebral Syphilis, Vascular Type

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin	Cells	Wassermann	Gold	Pressure	Globulin Turbidity	Globulin	Cells	Wassermann	Gold
Preliminary	+					1	0	1	20	+	3344000000
1st		0	0	0	2231000000						
3d		1	0	0	5544300000						
4th		0	0	0							
Final	0					0	0	2	30	0	0013300000

CASE K: Cerebral Syphilis, Vascular Type

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin	Cells	Wassermann	Gold	Pressure	Globulin Turbidity	Globulin	Cells	Wassermann	Gold
Preliminary	0					3	0	2	50	+	neg.
1st		0	0	0	0	0	0	3	n	0	0123333100
Final		Death									

CASE L: Cerebral Syphilis, Vascular Type

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wasserman	Globulin		Wasserman		Pressure	Globulin		Wassermann		
		Cells		Gold			Turbidity		Cells		Gold
Preliminary	+					2	0	2	30	+	0014543100
1st	+	2	0	+	0113432000	2	0	2	30	+	Neg.
2d						0	0	3	n	+	0012453100
3d		0	0	0							
4th		2	50	0	0014322000						
Final	0					0	0	3	n	+	0014322000

CASE M: Tabes Dorsalis

Treatment	Blood	Cerebral Fluid				Spinal Fluid					
	Wassermann	Globulin		Wassermann		Pressure	Globulin		Wassermann		
		Cells		Gold			Turbidity		Cells		Gold
Preliminary	+					0	0	0	20	+	0013330000
1st		0	0	+	0	0	1	3	100		
2d		3	0	+	00001120000						
4th		1	100(?)	+	0013221000						
Final	0					0	0	2	n	+	0013221000

DEDUCTIONS

The following are the conspicuous deductions from the laboratory data previously tabulated:

1. A study of the blood serum Wassermanns on the cases treated shows that 0 cases were changed from positive to negative by one injection; 5 cases were changed from positive to negative by a course of injections; 4 cases, probably more, remained positive even after the course of injections; 1 case, originally negative, remained so after the course; 2 cases have incomplete data (death); in general the changes in blood serum Wassermann reactions agreed with those of the spinal fluids.

2. The gold sol reaction of the cerebral fluid was not uniformly modified by treatment. In some cases its intensity was diminished, in others augmented; while in others, its form was modified.

3. The Wassermann on the cerebral fluid was in five cases altered from positive to negative by the first treatment; and so remained. In one case, repeated treatments did not change it from positive; and in four cases in which it was negative, it so remained throughout the treatments. Two cases have incomplete data.

4. A globulin decrease was observed in the cerebral fluids of a few cases. As a rule, the globulin was very scant.

5. Practically all specimens of cerebral fluid were found to contain no cells; corresponding with the findings of other workers.

6. The gold sol reaction of the spinal fluid was markedly diminished by treatments in four cases; in two cases, it was left unchanged; and in three cases, a positive reaction was brought out in a case which had previously been found negative, one of them three different times.

7. The Wassermann on the spinal fluid was changed from positive to negative in four cases, remained unchanged positive in four known cases, and remained unchanged negative in one case. In no case was it altered from negative to positive by treatment (cf. Gold reaction).

8. Aside from the reaction of transitory toxic meningitis, the globulin and cell counts in the spinal fluid remained essentially unchanged. In none of the cases selected was there a high cell count.

9. Striking differences between spinal and cerebral fluid exist in cases of neurosyphilis. Whatever the conditions in health may be, there is no doubt that under the abnormal conditions of a syphilitic infection of the central nervous system, there is an interference with the communication between the ventricles of the brain and the sub-pial spaces of the cord. Thus, in the cases allowing of comparison of the spinal and cerebral fluids, the Wassermann reaction was at variance in 6 cases, agreed in 6 cases. The globulin was dissimilar in 7 cases, similar in 5 cases. The cells were always dissimilar (12 cases). The gold reactions were dissimilar in 8 cases, similar in 4 cases. Of these variances the positive evidence in the case of the Wassermann was uniformly with the spinal fluid; in the case of the gold sol reaction, it was in three of the eight instances with the cerebral fluid, four times with the spinal fluid; and once the nature of the two curves was entirely at variance. Some of these cases are of striking interest in the light of that information. For example, Case C; with a negative gold reaction on the spinal fluid and a practically negligible globulin content, the pathology was well certified to by the gold reaction of the cerebral fluid and its globulin content.

10. The laboratory data set in tabular form may be summarized generally, as follows: (Here, as before, the terms "slight improvement" and "marked improvement" are adopted for the sake of uniformity and are intended as comparative only).

On the basis of diagnosis:

Tabo-paresis.

2 not improved.

Tabes dorsalis.
1 slightly improved.
1 not improved.
Cerebral syphilis, vascular.
1 markedly improved.
2 slightly improved.
Idiot.
1 slightly improved.
Unclassified neurosyphilis.
1 markedly improved.
1 slightly improved.
On the basis of response to treatment:
Markedly improved, 2.
1 cerebral syphilis.
1 unclassified.
Slightly improved, 5.
1 tabes dorsalis.
1 idiot.
1 unclassified.
2 cerebral syphilis.
Not improved, 3.
2 tabo-paresis.
1 tabes dorsalis.
Worse, 0.
None.

VI. Comparison of Clinical and Laboratory Data

A comparison of the data relative to the response to treatment as registered by changes in clinical and laboratory findings forms an interesting study. The following tables made by correlating the tabular summaries of results obtained given above present the chief features of interest in comparison:

	Clinically.	Laboratory Findings.
Marked improvement	2	2
Slight improvement	6	5
No improvement	2	3
Worse	0	0
Dead	2	–

This numerical comparison, however, is quite illusory in its apparent coincidence. This becomes apparent upon study of the following table:

	(Improvement) Clinically.	Laboratory Findings.
Case A	Slight	None
Case C	Slight	None
Case E	Slight	Marked
Case F	None	Slight
Case G	Slight	Slight
Case H	Marked	Slight
Case I	Marked	Slight
Case J	None	Marked
Case L	Slight	Slight
Case M	Slight	None

(Case B, insufficient data; Cases D and K, dead.)

This table shows: Agreement precisely, 2 cases (20 per cent.)
Agreement except in degrees, 3 cases
Utter disagreement, 5 cases (50 per cent.)

VII. Conclusions

1. Twelve cases of non-paretic neurosyphilis were treated intensively by the intracerebral injection of salvarsanized serum.

2. The *Technique* of the method of treatment used is described in detail. Serum salvarsanized in vivo was exclusively used. Local anesthesia is utilized for trephining; and the parietal area is selected.

3. The *Reactions* to treatment were as a rule not severe: but occasionally became quite alarming and even fatal (vide supra). The symptoms consist usually in slight febrile reaction, more or less headache, and variously located pains sometimes accompanied by a toxic meningitis of short duration.

4. The twelve cases presented embrace 4 cases diagnosed vascular type of cerebral syphilis, 2 tabes dorsalis, 1 idiot, and 5 cases of unclassified neurosyphilis, 2 of which may be tabo-paresis.

5. The clinical results of treatment showed marked improvement in 2 cases, slight improvement in 6, none at all in 2, and fatality in 2 cases. The improvement showed no tendency to follow diagnostic classes.

6. The laboratory returns showed as a result of the treatments:

(*a*) Wassermann changed in—
blood serum in 50 per cent. cases.
spinal fluid in 50 per cent. cases.
cerebral fluid in 80 per cent. cases.

(*b*) Gold sol in reaction (spinal fluid).
diminished in 40 per cent.
intensified in 30 per cent.
(Irregular in cerebral fluids.)

(*c*) Globulin in cell counts of spinal fluid not markedly altered.

7. The laboratory data indicated marked improvement in 2 cases, slight improvement in 5; none at all in 3.

8. The clinical and laboratory data in point of response to treatment would appear similar numerically: but a study of individual cases shows that they agree precisely on only 20 per cent. of cases; and differ completely in 50 per cent., showing a tendency to be reciprocal.

9. It is apparent from the differences in the spinal and cerebral fluids that at least in certain pathological conditions, such as those presented, there is an interference in the communication channels between the ventricles and the fluid spaces of the spinal cord.

10. Two cases died: one probably as a direct result of the treatment; the other possibly as an indirect result.

11. On the whole, the brief but intensive treatment appears to have given encouraging results, which possibly would have been much more gratifying had it been longer continued. The improvements were moderate rather than extreme, but no cases were made worse save the two who succumbed, either from the laboratory or clinical standpoint. Two cases with rather remarkable improvements are included. One gratifying feature is the enthusiasm with which most of the patients coöperate in and appreciate the treatments. This is in one way a drawback, as they are apt to consider themselves so much improved that further treatment is unnecessary.

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K. A. Menninger, Topeka, Kansas.

THE CENTRAL NERVOUS SYSTEM IN PURPURA HEMORRHAGICA[1]

By Alfred Gordon, M.D.

of Philadelphia

In purpura hemorrhagica the chief characteristic symptom is the bleeding from the mucous membranes, although the skin may also be the seat of bleeding. In some cases, however, the cutaneous hemorrhages are more extensive than those of the mucous membranes, so that the skin looks as if spattered with a paint-brush, and large ecchymoses may cover the limbs and the trunk. There are therefore two forms of purpura hemorrhagica: one with and the other without skin symptoms. In both forms, all authors agree, epistaxis is the most frequent occurrence of the disease (50 per cent.). The gums are the next frequent seat of hemorrhage (20 per cent.).

Hemorrhage may occur from other places—intestines, stomach, uterus, urinary apparatus and rarely from the lungs. Hemorrhage in the brain has not been reported in cases of purpura hemorrhagica.

A few cases of cerebral hemorrhage have been observed in hemophilia. In the latter affection hemorrhage may take place after the least trauma from the skin, mucous membranes, in inner organs including the brain. Spontaneous cerebral hemorrhage may occur in hemophilia, as the cases of Hauck[2] testify. Here layers of blood were observed on the surface of the dura, beneath the dura and in the ventricles, but the brain substance itself, apart from being white, was found to be normal.

The involvement of the nervous system in general has been observed by a few writers. Armand-Delille[3] reports a segmental distribution of the purpuric outbreak similar to that in herpes zoster. Pressure from a surgical dressing producing a purpuric eruption over an area supplied by certain cutaneous nerves was observed by Gougerot et Salin.[4] The symmetrical distribution of the eruption seen in purpura is regarded as an indication of some relation between the nervous system and purpuric outbreak. Lumbar punc-

[1] Read and specimens presented at the meeting of the Philadelphia Neurological Society, March 28, 1919.

[2] Münch. mediz. Wochenschr., 1913, p. 1147.

[3] Rev. Neurol., 1905, XIII, p. 775.

[4] Arch. des maladies du cœur, 1911, LV, p. 86.

ture has sometimes shown a meningeal reaction, viz., lymphocytosis and considerable albumen.

No record appears to be in existence as to the intimate histological state of the nervous tissue in cases of purpura hemorrhagica. In the anatomic-clinical case described below no hemorrhage was found on the surface of the brain or in the cerebral cavities as in the hemophylic cases, but, on the contrary, profound changes were seen in the tissue of the brain and spinal cord and everywhere confined exclusively to the gray matter. If in anemic conditions the lesion is confined to the white matter, viz., nerve fibers, here in purpura hemorrhagica the lesion affects exclusively the cells of the gray matter throughout the entire central nervous system. The lesion consisted of destruction of cells and formation of vacuoles. The case is as follows:

Child O. M., male, five years of age, suddenly commenced bleeding from the gums and mucous membrane of the mouth. The child was poorly nourished. The mouth and mucous membrane were pale, chest and lungs were normal. The heart sounds were weak. Abdomen normal. Extremities normal. The knee-jerks were markedly diminished and obtained with difficulty. There was no other abnormal reflex. The temperature was subnormal (97 per cent.).

The blood presented the following peculiarities: The platelets were diminished; the coagulation time was normal but the clot remained noncontractile, all circumstances distinguishing the condition from hemophilia. The little patient was treated with transfusion of human blood, but without effect. A subcutaneous injection of thrombo-plastin also remained ineffectual. The patient soon died. Autopsy was performed 12 hours later: The abdominal and thoracic viscera were found normal. The central nervous system presented macro- and microscopically the following interesting features:

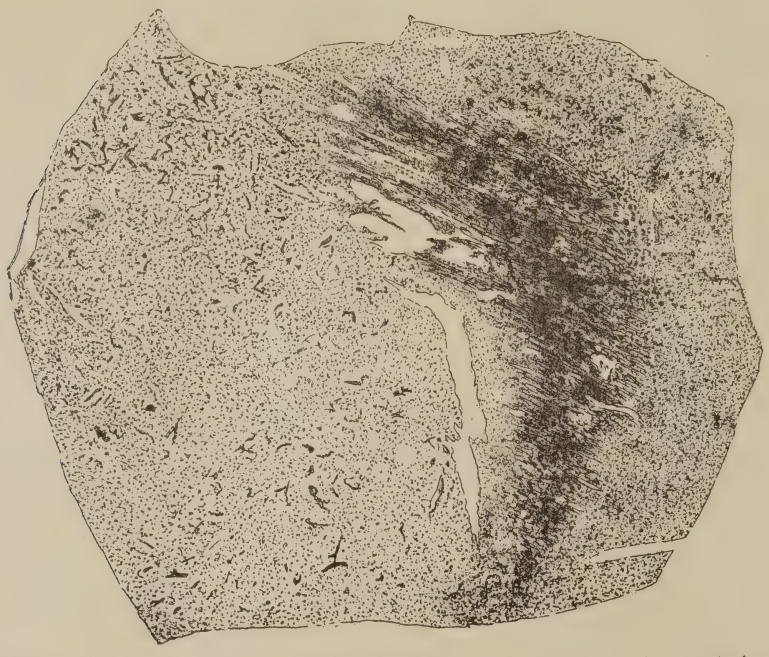
The brain and spinal cord on gross appearance were extremely pale. This pallor was evident also at the base of the brain and on cross sections. The tissue was very soft and appeared flattened as if in a state of collapse. Nowhere could be seen a single vessel showing the presence of blood in it. The circle of Willis merely presented a series of white bands which were flattened because of absence of blood in the vessels. Large sections of the brain revealed the same unusual pallor over entire sectioned surfaces. Histological examination presented the following condition:

Brain.—Sections of the cerebral cortex shows diffuse vacuolation. A very large number of cells are destroyed. Empty round spaces filled or not with blood clots or with round cells are seen over extensive areas. In some places empty spaces of the shape of blood vessels on one side

of which a row of round cells is seen. The majority of the spaces are round, but of unequal size.

Identical condition was found over the entire cortex but much more pronounced in the motor area than in any other portion. The occipital lobe was the least affected. No vacuolation was observed in the layers of the cerebellar cortex.

Sections of the brain substance showed a similar condition in the basal ganglia. Vacuolation with destruction of cells, round spaces with clots of blood occupying only the cerebral portion of the latter are seen



Section of the motor cortex showing destruction of the cells and vacuolation.

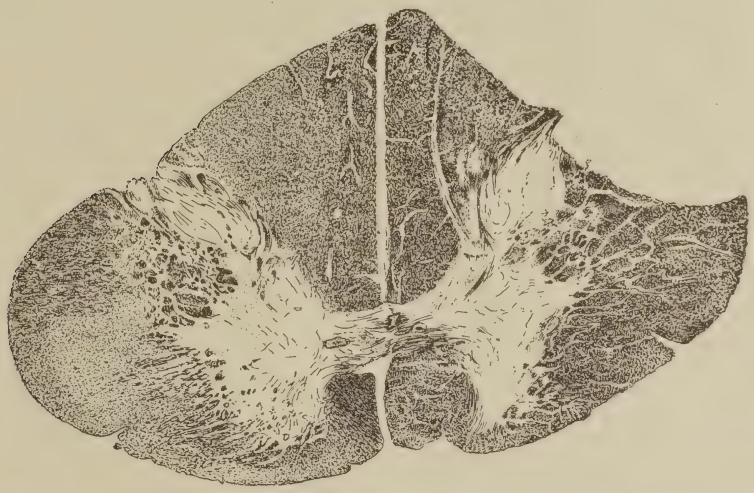
exclusively in the gray matter, irregularly distributed more in one hemisphere than in the other. The condition was totally absent in the white substance of the brain. No vacuolation, no empty spaces with or without clots of blood or cells could be traced within or along any of the tracts.

The midbrain and medulla presented an identical picture. Wherever there was gray matter, viz., in various nuclei, the above-mentioned empty spaces with or without blood clots were observed. The crura, the tracts in the pons, the pyramids were totally intact.

In the spinal cord the pathological state was precisely the same. The posterior cornua are very much less involved than the anterior ones, and

one side more than the other. On some sections the entire cornua appeared as an empty space with very rare cells here and there. On other sections some cells were preserved and the vacuolation was less pronounced. All degrees of destruction of gray matter were seen. The cervical portion was more affected than the thoracic and lumbar.

To sum up, throughout the entire central nervous system, with the exception of the cerebellum, the pathological process was confined exclusively to the gray matter whether it was the cortex or



Section of spinal cord showing destruction of the cells of the gray matter and extensive vacuolation.

within the cerebrum, medulla and spinal cord. The lesion consisted chiefly of vacuoles situated between the cells, thus destroying the cells in the vicinity. Some blood vessels are also found empty or else filled with clots of blood.

Multiple hemorrhages evidently took place simultaneously in many segments of the nervous axis. The vacuolated spaces indicate complete absorption and disappearance of the cells destroyed by the hemorrhages.

In analyzing the origin of the disorder a question naturally arises: why such an extensive destruction of gray matter throughout the entire central nervous system? A reply to this query may be found in the distribution of the blood vessels. First of all, the blood supply of the gray substance is very abundant and considerably more so than in the white matter. In the next place, the central branches are of a terminal variety, that is, their capillaries do not anastomose with those of other branches.

The latter circumstance particularly is apt to explain not only the extent of the destruction, but also its rapidity and the absence of tendency for repair: the tissue being supplied by a terminal vessel, which does not possess anastomotic branches, is bound to succumb beyond repair when that vessel is ruptured.

While this anatomical fact may give some explanation of the intensity of the lesion, it neverthless fails to present an adequate understanding of another problem, namely, that of its confinement to the gray matter exclusively. Finally, why is it that in severe anemias the white substance is invariably involved, and the gray tissue remains intact or rarely impinged upon? Why this difference should exist is problematical.

Perhaps improvement in laboratory technique with regard to the vascular supply of gray and white substance will enable us to solve these interesting problems.

Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

THREE HUNDRED AND SEVENTY-FIRST REGULAR MEETING,
HELD AT THE ACADEMY OF MEDICINE,
TUESDAY, MARCH 4, 1919

The President, DR. WALTER TIMME, in the Chair

PRESENTATION OF CLINICAL MATERIAL

BILATERAL FRONTAL HEMORRHAGE WITH MENTAL AND PHYSICAL SIGNS PRECEDING AND ACCOMPANYING THE HEMORRHAGE[1]

Dr. Frederick J. Farnell, of Providence, R. I., presented the report of this case, a woman 49 years of age, whose make-up, as far as could be ascertained, had always been considered normal. With a clear history of no previous attacks or upsets she developed a mental state not unlike the manic form of manic-depressive insanity, which settled, after several months, into a hypomanic condition. Physically there was hypertension; blood pressure 210 systolic and albumin in the urine. Approximately twelve months after the onset of the so-called functional psychosis, she had a cerebral hemorrhage with clinical signs suggesting the intraventricular type. This was followed by a complete change in the mental picture. From a functional psychosis with thought (thinking) disorder, she settled into an organic psychosis with an obstructive disorder, or an intellectual loss. The physical state then improved and she was soon up and about, but there was no change whatever mentally. In five or six weeks signs of cerebral compression developed and ultimately contributed towards her death.

The interesting feature might be grouped as (*a*) mental, (*b*) physical, in an individual who developed two psychoses. Her first aberration was characterized by emotional elevation, acuity of emotional response and quick recognition of logical judgment and even, at times, critical judgment. Following hemorrhage this emotional state changed entirely into an actual loss with those accompanying behavioristic traits which so characterize the personality of organic brain disease; deterioration in

[1] Will appear in full in this JOURNAL.

feeling, instinct, conduct, etc. Then, too, such organic functions as intelligence, judgment, insight, etc., which in her primary psychosis were only interfered with to the extent of thought disorder, too many thoughts coming at once, were practically completely destroyed in her second psychosis. The initial physical disorder was limited to hypertension and albumin in the urine which later cleared up. The second physical disorder was considered as a symptom-complex related to the ventricles. The third physical complex was a syndrome indicating cerebral compression. Pathologically the brain (which was exhibited) showed bilateral mid-frontal hemorrhage with organization, secondary necrosis and softening of the brain tissue itself.

These facts were offered for consideration, especially so to those whose interest lay in the field of psychopathology with special reference to personality and psychosis, and in addition, to the histo-pathologist to whom interest would be manifest in the fact that the lesion was bilateral and the vascular sclerosis localized in the cerebral vessel system.

Dr. Smith Ely Jelliffe, of New York, asked if Dr. Farnell might have something to say about the hypertension states with increased blood pressure and the relationship of their emotional causes to cerebral hemorrhage. In one of the discussions on psychanalysis held before the Neurological Society recently, the speaker presented the situation of a case of autonomic responses to unconscious emotional stimuli, and spoke of the tendency of these cases to develop these cerebral hemorrhages. He said that the psychotherapeutic mode of approach could be very successfully pushed with the hope of reducing the hypertensive state by getting at the emotional causes for it. He had taken occasion at that time to discuss rather briefly what some of the problems were and related the partial history of a patient who had a blood pressure of 235 systolic, with almost *petit mal* lapses, who was correctly diagnosed by an internist as a nephritic and given six months to live. What it was that lay behind the clinical picture was not discovered nor even sought for by the internist who made this diagnosis, the dynamic reasons for the hypertension nephritis. When the dreams were investigated the cause for the distress of the patient was quite apparent; the unconscious was engaged in a sadistic attempt to destroy everything about her and the result was that she was destroying herself. If it had kept up, she might have died, if not of nephritis, of a cerebral hemorrhage as had Dr. Farnell's case. The psychanalytic mode of approach offered a dynamic pathology which was not in the usual ken of the internist and proved its value in these nephritides with their disturbed emotional undercurrent as the real dynamics of the situation.

Dr. I. Abrahamson, of New York, said he would like to know more about the behavior of the reflexes. That all reflexes were absent after the bilateral hemorrhage in both ventricles he knew, but it was not clear to him whether they returned after the condition cleared up and, if so, the order of their return.

Dr. Clarence O. Cheney, of New York, questioned whether the hemorrhage was of the intraventricular type, for the specimen did not seem to show evidence of a breaking of the ventricular wall; it looked rather as if the ventricles had been compressed by the hemorrhage. The absence of blood in the ventricles would have accounted for the absence of blood in the spinal fluid. He recalled one case autopsied several years ago which showed intraventricular hemorrhage causing sudden death and believed that if a hemorrhage of the size demonstrated in Dr. Farnell's specimen had entered the ventricles immediate death would have resulted. The distribution of the hemorrhage suggested that it had originated from one of the anterior cerebral arteries.

Dr. Farnell, in answering the discussion, replied to Dr. Jelliffe's question regarding the hypertension that although the patient had a blood pressure of 210 systolic with albumin in the urine on admission to the hospital, the albumin soon disappeared. The hypertension continued until after the hemorrhage, and from that time until death the blood pressure was below 160 most of the time. With reference to the emotional factor and its responsibility for hypertension and nephritis, it was impossible to do an analysis of the patient, for even when she settled into the hypomanic condition she was beyond reach of questions and psychic control. Answering Dr. Abrahamson's question as to the reflexes, they returned and became exaggerated, that is, all deep reflexes became exaggerated. The superficial reflexes returned and even when she was up and about she had exaggeration of reflexes, double ankle clonus and double dorsal extension of the great toes. Ten days before death she was again minus all reflexes. She was in a deep stupor with signs of cerebral pressure. Muscular flaccidity with abolition of reflexes was again marked, and the condition then and at the time of the hemorrhage was noted by all the men who examined her. The physiology could not be explained beyond its being a question of first hemorrhage and pressure and second organization and pressure. The clinical diagnosis made at the time she had the hemorrhage was bilateral ventricular hemorrhage, at least, the symptom-complex suggested that, though there was no blood in the cerebrospinal fluid. That might seem impossible, but for two years the speaker had been examining the spinal fluid of cases of cerebrospinal meningitis and it was not uncommon for this syndrome to give intraventricular symptoms from accumulation in the ventricles of fluid or obstruction to the flow, and several cases at autopsies had shown that pressure in the ventricles had points of gravity downward. In addition, however, the bases of these brains were bathed with hemorrhagic arachnoiditis. Those cases resembled this one very much symptomatically. In one case only last week repeated tapping of the canal at various levels gave no fluid. Injection of horse serum was given and in ten hours there was produced an acute sterile meningitis and then antimeningitic serum was given. The patient showed a change immediately in the so-called ventricular syndrome.

THE TONUS OF AUTONOMIC SEGMENTS AS THE CAUSE OF ABNORMAL BEHAVIOR

Dr. Edward J. Kempf, of St. Elizabeth's Hospital, Washington, D. C. (by invitation), delivered this address, in which he traced the causes of abnormal behavior to physiological facts. The evolution of man from the lower biological types was sufficient reason for giving the primitive autonomic apparatus the greatest emphasis in formulating a conception of the personality. The lowest biological organisms have a highly developed autonomic apparatus, but a poorly developed projicient apparatus as the instrument by which the autonomic apparatus masters its environment. The old assumption that "the brain is the organ of the mind" is entirely unsatisfactory for localizing or explaining the dynamic forces that make up the personality.

The autonomic apparatus, as herein conceived, is constituted of the digestive, circulatory, respiratory and urinary system, the glands of internal and external secretion and their ganglionis nervous systems, *i. e.*, the ganglionic nervous systems lying outside of the brain and spinal cord and those ganglionic types of centers imbedded in the brain stem and spinal cord. It is obvious that this is the apparatus that regulates the accumulation and assimilation of energic products from the environment, regulates their transformation, distribution and use, and the elimination of the waste products. It might be said that these processes constitute about all the fundamental functions of living, and that the striped muscle apparatus and its cerebrospinal nervous system had been developed in order to obtain the necessary means from the environment.

The physiological researches of Cannon and Carlson on the peripheral origin, in the stomach, of the craving for food, as a typical acquisitive-assimilative compulsion, and Mosso's and Pellacini's experiments on the postural tonus of the bladder, show that when the grip of the bladder wall on the inert contents raises the pressure to over eighteen cubic centimeters, a type of localized itching is aroused which constitutes the desire or craving to urinate, and which, as it becomes vigorous, compels the organism to behave so as to relieve the hypertension of this segment. This may be considered to be a very typical emissive-avertive type of compulsion. All compulsions to act are either acquisitive or avertive in relation to the environment.

Freud's suggestion, that all emotions and sentiments are really cravings, is further borne out by the studies of Cannon and others on the physiological changes that occur when the individual feels "fear" or is said to be "afraid." Since certain types of gastric contractions cause the intragastric itching felt as hunger, it is consistent to consider that other changes in the gastric functions, such as diminution of peristaltic functions and the maintenance of spastic tensions, when the individual is exposed to some type of actually injurious or potentially injurious stimulus, arouse an afferent stream that is more or less painful and dis-

agreeable; that is to say, fearful. 'It is obvious that only those primeval animals or rather autonomic systems that felt distressing, fearful tensions, sought to protect themselves and so, by surviving in the struggle for life, have transmitted this fundamental attribute or function to man.

Wertheimer's experiments on the unconscious anesthetized dog, in which he injured the sciatic nerve in a manner that would surely cause pain in a conscious animal, shows that gastric changes occur which are very similar to the fear producing tensions, without the faculty of perception, to arouse the emotion, being present. This shows that at least certain cerebral integrative activities which enable peripheral activities to coalesce into perceptual images (or thoughts) are not necessary to cause many of those definite, important, autonomic tensions which, if the animal were conscious, would certainly cause it to be aware of very disagreeable (fearful) visceral feelings.

Like *fear* the other primary affective cravings, such as *anger, love, shame, disgust* and *sorrow* have their origin in characteristic peripheral disturbances in various visceral segments, and these peripheral disturbances are constituted of changes in the muscular activities, particularly the tensions of the viscera, stimulating the local sense organs. This means that it is of the utmost importance to recognize that our affections are symptoms of autonomic tensions and activities and we must practice visualizing these activities behind the symptoms that we see or hear complained of.

These autonomic-affective tensions set up afferent streams of nerve impulses which, as the autonomic component (Langelaan), contribute greatly to regulating and sustaining the postural tension of the striped muscle apparatus, and the tension of the striped muscles in turn stimulate the proprioceptors imbedded in the muscles and tendons and about the joints, setting up converging kinesthetic streams which coalesce into images and concepts, *i. e.,* the mental pictures constituting most of the content of consciousness. In a sense we think with our muscles.

The present controversy between Langelaan, de Boer, von Rinjberk and J. G. Duesser de Barenne as to the exact manner and through what channels this influence is exerted is not so important for psychology and psychiatry as the fact that it does occur in some *quick, intimate* manner and follows the law of the autonomic-affective apparatus striving to maintain a state of comfortable tension with the greatest economy of extent and duration of effort. This law may be formulated as follows:

As the autonomic-affective apparatus is forced into a state of unrest, either through metabolism or endogenous or exogenous stimuli, it compels the projicient apparatus to adjust the receptors in the environment so as to acquire stimuli that have the capacity to produce comfortable postural readjustments in the autonomic apparatus. For example, when the autonomic apparatus of a child assumes fearful tensions because of the barking of a dog the affect from these tensions compels the child to

run to its mother who, as a soothing stimulus, readjusts the tensions. So too the business man takes out insurance as the soothing stimulus, the fearful sinner goes to church, the savage and the modern speculator wear charms and fetiches, in order to counteract the fearful stimulus existing in his expectation of a disastrous fire, storm or coincidence.

Von Bechterew has shown that various autonomic segments and even the simple striped muscle reflexes become conditioned by experience to react to certain stimuli. This occurs by the reflex being aroused by the primary stimulus while it is associated concomitantly with other stimuli which ordinarily have no effect, but which, after repeated simultaneous association with the primary stimulus, come to have the same influence upon the reflex that the primary stimulus had. For example, when a child going barefooted for the first time in the grass steps upon a bee which stings its foot, the child, for some time after this experience, has strong autonomic fear reactions which prevent it from walking on the grass while barefoot. Here then the grass, formerly a pleasant stimulus to the bare feet, by being associated with the bee sting comes to have the capacity to arouse strong autonomic fear reactions. It becomes a painful stimulus while to other children it is a pleasant stimulus. We can readily see how, by experience, the individual segments of the autonomic apparatus of an individual becomes conditioned to react to stimuli that have little or no effect upon other people and determines most of our eccentric or individualistic preferences and prejudices, our "taste," hobbies, phobias, obsessions, compulsions, vocational pursuits, etc. No doubt all our selections and aversions for simple things and for complicated things, that are immediately present or that may arise in the future, are greatly determined by our autonomic-affective cravings having been conditioned by previous painful or pleasant experiences to seek or avoid the future possibility.

Since all the autonomic segments must obtain their stimuli through the proper exposure of the favorite receptors, for which they have become conditioned, there is an incessant convergence upon and striving for control of the final common motor paths, and our complicated stream of thought and overt behavior must be seen as the resultant of these converging forces. When any particular autonomic segment becomes hyperactive and tends to dominate the autonomic union and obtain control of the striped muscle apparatus the individual becomes conscious of a definite stream of thought which is symptomatic of the activity (as gastric itching, hunger, thoughts and acts about when, where and how to get food; cystic itching, craving to urinate; reversed gastric and esophageal peristalsis and feelings of nausea with avertive compulsions for a particular odor, vision, taste, person, or suggestion).

It follows logically that if one autonomic segment becomes thoroughly conditioned to react in a distressing manner to certain stimuli, and other autonomic segments become thoroughly conditional to react in a pleasant

manner to certain stimuli, whenever the individual happens to meet these two groups of stimuli associated together in a situation, he will feel a confusion of tensions with compulsions to seek the advantages of the situation as well as compulsions to avoid it. For example, a young married man complained that although he was fond of his wife and desired to be loyal and faithful to her, that "such assinine things" as the hair on her legs caused him to lose his sexual excitement (depression of the tonus of an autonomic segment) which irritated him exceedingly. Many of the attributes of his wife, such as her wit, sense of humor, facial expression and coyness, as stimuli had a decidedly invigorating effect, but when he made further approaches he met with a stimulus that had quite the opposite effect. He finally compelled his wife to shave her legs in order to remove the distressing stimulus. We see here how the autonomic apparatus—looking at it in a biological sense—compels the love object to remove or avoid stimuli that jeopardizes its potency as well as seek stimuli that tone up the autonomic segment.

At birth we have a perfectly organized but unconditioned autonomic apparatus with a very poorly coördinated projicient apparatus. The autonomic apparatus begins immediately to organize the projicient apparatus to suit its cravings in their struggle with the environment, and we see this process continuing throughout life as the individual develops his education, vocation or profession. For a considerable period after birth the infant indulges *heedlessly* in its segmental pleasure, such as nursing, urinating, defecating, cooing and screaming, without regard to the interests of other people. But these indulgences soon become an imposition upon many of the autonomic interests of its parents and its social group and they in turn are compelled to exert an incessant pressure upon the infant which eventually conditions and more or less conventionalizes its methods for acquiring gratification for its segmental pleasures. Thus the infant gradually becomes conditioned to avoid the loss of favor and esteem of its parents and playmates because, when in disfavor, it is subject to many distresses, such as physical punishment, humiliation, lack of petting, feeding, etc. On the other hand, by behaving in a manner that wins favor and esteem from its associates, many of its segmental cravings are more easily gratified, such as cravings to be petted, played with, fed, given preferences. Gradually we see the infant changing from heedlessly enjoying its segmental pleasures to secretly doing so, such as nocturnal bed wetting. Then as the *ego* develops, the coördinations to control them entirely, in order to prevent the loss of esteem, become apparent. That is, the segments of the autonomic apparatus which are similarly conditioned gradually become integrated into a unity to prevent any hyperactive segments from jeopardizing them. This process of integrating into a unity is a *compensatory* reaction to prevent getting into the *fear, shame, sorrow* or *anger* state; autonomic compensation being one of the most fundamental attributes of living tissue.

The development of the *ego* begins as soon as the infant begins to fear to lose the favor and esteem of its comforters and protectors by becoming inferior (organically or functionally) to a competitor, or by self-indulgently yielding to oral, anal, urethral, etc., pleasures, by sucking, defecating, urinating, screaming, stealing, lying, etc., without regard for the feeling of others.

Any form of fear or pain no matter how mild or indirect the cause, initiates more or less of an autonomic compensatory reaction; hence, the individual's incessant compensatory striving to learn to help and improve itself is really *the autonomic apparatus striving to avoid getting into the malnutritional fear, shame, or sorrow state.* In due time this incessant striving, to avoid the stream of incessant interrelated fear-causes that confront the child during the day, becomes knitted or integrated into a complicated unity that eventually comes to regard itself as "I," or the *ego* and its various segments (teeth, eyes, stomach, etc.) as "mine." Now the perversely conditioned segments that jeopardize the *ego* become outlawed as "not mine," or sinful, evil, the devil, "hypnotic influences," "secret forces," etc.

Serious and fatal interautonomic conflicts occur when most of the apparatus is conditioned to strive for biologically and socially estimable things and one or more vigorous segments becomes intolerably or *perversely* conditioned. This is the foundation of the anxiety neuroses, the benign and pernicious psychoses and many forms of criminal or asocial adjustments. This constitutes the conflict between the *ego* and the *not-ego,* that is, the struggle between the autonomic apparatus, coordinated into an egoistic unity or personality, striving to win social esteem, and the self indulgent segmental cravings that only crave for the counter stimulation that neutralizes or gratifies their tensions; as in masturbation, sex perversions, envy, gluttony, slothfulness, etc.

The *ego* can only control the jeopardizing segment by preventing it, more or less, from using the final-common-motor-path or striped muscle apparatus to acquire what it needs. When the jeopardizing craving is permitted to cause the *ego* to be conscious of its needs but is not allowed to act, it is *suppressed,* and when it is also prevented from causing consciousness of its needs, it is *repressed.* The suppressed and repressed hypertense segments, like compressed springs, exert an incessant, severe pressure to break through the resistance and obtain gratifying stimuli. This is shown in sudden changes of purpose, selections, obsessive thoughts, errors, accidents, misinterpretations, dreams, delusions, hallucinations, mannerisms, old memories, deliria, etc. By a *summation* of the repressed cravings, or the fatigue or weakening of the repressing *ego,* a dissociation of the autonomic apparatus or personality occurs and the ego is forced to struggle with all sorts of compulsions, delusions, hallucinations, etc.

Here then lies the psychopathic struggle. The fear of the loss of

social esteem initiates the compensatory striving, which, because of the vigor of the fear of the influences of the repressed, tense, autonomic segment, becomes progressively eccentric, finally causing the loss of the confidence and esteem of the social group. Now a vicious affective circle is established which tends to eventually destroy the socializing capacities of the personality. Gradually, as the *ego* becomes more and more asocial the erotic segment obtains complete control of the personality.

A photograph of the perpetual motion machine of a paranoid negro was shown to illustrate how fear of the loss of sexual potency and of becoming an oral erotic homosexual initiated the eccentric, compensatory, divine inspiration (a truly biological compensation) to build a "perpetual motion machine" which would make him a great prophet, allow him to found a faith, have many wives, etc. This perpetual motion machine is called the "first church" "where the blood of the world is mixed," and is a simple copulation fetish.

Photographs of so-called hebephrenic dementia præcox cases showed the women squatting like apes and the incessant attention and frequency with which their hands counterirritated the urethral, anal and vaginal zones showed how, as biological types, the anal and genital autonomic segments had destroyed the ego and dominated the autonomic apparatus.

Another photograph was shown of a soldier who carried his foot over his anus. He had passed through an anal erotic homosexual panic in which his delusions and hallucinations of being assaulted were caused by the anal erotic cravings (like gastric cravings and thoughts of food) seeking appropriate stimuli and his defense against the compulsion was a violent functional distortion compelled by the autonomic apparatus, as a compensation, in order to protect itself from going into the fearful state. He anxiously protested that he would go "mad" if the leg was straightened out.

This paper, with illustrations, will appear in an early number of the Journal of Nervous and Mental Disease.

Dr. Smith Ely Jelliffe said that the point of view presented by Dr. Kempf struck a responsive chord in his own thoughts, and he had certainly performed a signal service in that he had bridged successfully two parallel lines of interpretation which were found throughout the medical community. There were those who held that mental causes and somatic causes ought to be considered as separate types of activity. Not only through this presentation but through Dr. Kempf's work on The Autonomic Factors in Personality these two parallel trends had been made to merge and a synthesis was presented whereby one could understand the individual working as a unit. What Dr. Jelliffe had to say he would confine to a few points, one of which interested him a great deal because it so frequently came up as a point of issue between these apparently parallel types, the question of infections, autointoxica-

tions and focal infections. Perhaps some of those present would recall an illustration of this, a patient who having suffered from a severe compulsion of washing the hands came for treatment at the age of fifty-two, the compulsion having existed since she was eighteen or nineteen years of age. In the early days of the compulsion the washing of the hands was associated with certain prayers for purity, cleanliness and holiness and she got along very well, the personality adjusting itself. At the age of twenty-three, however, she had an attack of influenza and immediately the depressing effect of the influenza toxin broke down the adjustment of the hand washing and the prayers and she developed two new symptoms, diarrhea and auditory hallucinations in which obscene voices made vulgar references to defecation. If one conceived of an individual having 65 per cent. efficiency and a loss of 35 per cent. in a range of 100, the handwashing and prayers took up the 35 per cent. of the loss under ordinary circumstances, but the minute the influenza toxin came along, 10 per cent. more load was drawn on the autonomic segment adjustment, the diarrhea representing 5 per cent. and the hallucinatory projection representing 5 per cent. As a result of the strain she made a suicidal attempt. Ten years later another attack of influenza produced a similar result with diarrhea and hallucinatory voices which took on a more erotic form. Later, at the age of fifty-two, a partial analysis enabled the patient to partially understand the compulsions as anal-erotic components in the personality. In an attack of influenza following the analysis she developed a diarrhea but did not hear the voices and made no more attempts at suicide. At fifty-two, she was much better able to handle her autonomic segment maladjustment thrown out of gear by reason of the toxin of influenza.

It was not influenza toxins, nor poisons from the intestines, nor infected tonsils that produced these situations in so many, but they should be considered as partly accessory in the breaking down of the combination. The real difficulty was the personality difficulty and the infection or toxemia was an additional factor to that difficulty. Furthermore, Dr. Jelliffe said that he thought that the original personality difficulty, if it could be anadyzed out into its original roots, would afford a clue as to reasons why the infection or the toxemia could localize its effects in certain autonomic segments. Such autonomic segment neural pathways were under constant tonal maladjustment; they were overactive in the attempt to effect healthy functioning in the segment in spite of the instinct distortions, due to the conditioned segment stimulus to early emotional stimuli. After many years of such faulty strain in the reciprocal activity of the two components in the vegetative arc, the resistance of the tissues under the neural innervation in this arc were so seriously undermined as to permit of localization of an infecting or toxic agent in that arc. This was a local anaphylactic sensitization. Thus the localization of disease in a badly functioning autonomic segment.

Dr. Jelliffe spoke of the influence of faulty anal erotic stimuli under constant repression, and the possible determination of rectal crises in tabes, localizing themselves as rectal rather than other types of crises because of this autonomic struggle. An illustration was cited in which a partial uncovering of a passive pederastic unconscious repression in a tabetic with rectal crises possibly precipitated an intense delirium with fecal content. The speaker said he was simply following the clue which Potzl, Adler and others had offered in their attempt to answer important questions concerning why one or another organ or special parts of an organ were involved in a disease process.

Dr. Adolph Stern considered Dr. Kempf's presentation especially interesting from the point of view that, as suggested by Dr. Jelliffe, it served to bridge over two apparently conflicting conceptions of mental (emotional) processes, namely, the physical and psychological, by giving the physiology of the emotions. This conception of Dr. Kempf, explained in concrete form, gave the physical basis for various (neurotic and psychotic) symptoms, which were, in a measure, understood by psychoanalysts and explained by them as physical manifestations of thought processes. These now had a physiological explanation as well.

It was also very instructive to find that the laboratory experiments on animals by Cannon, Crile, Sherrington and others served to establish on a firm foundation the concept of the unconscious or autonomic system as presented by Dr. Kempf. Cannon especially has demonstrated the bodily changes that accompany the strong emotions and the instinctive cravings. Judging from the sensations as described by patients suffering from neurotic symptoms in the form of bodily sensations, *i. e.*, various paresthesiæ, etc., it was now known that such sensations were not at all "imaginary" but that they had a definite physical, physiological basis consisting in a change, in the region in which the sensations were felt, from the normal tonus maintained by the autonomic system, the change being one determined by the emotions present at the moment.

Referring to the "condition reflex" and its bearing on psychoanalysis, a certain patient bore for many years a more or less conscious hatred for his father. He was always very irritable and easily incensed at any attempt to give him an order, even though he complied readily enough. He was very ambitious, the ambition being in a great measure a desire to be superior to his associates. Failure in any ambition was always accompanied by anger at the successful individual, whose ability he depreciated. This patient was aware of a general sense of tension of all muscles of the body, especially the arms and face. He frequently, without any conscious cause, doubled his fist and smote the palm of his other hand. On analysis he disclosed the peculiarities noted were determined (conditioned) by the unconscious attitude he bore toward his father to whom he attributed motives present in his own mind. Qualities present in people recalling to the patient those he saw in his own

father determined the attitude of the patient toward these people. This state of affairs extended over many years and the emotional state was of similar duration. Applying to this what Dr. Kempf taught, this patient's autonomic system would seem to be "conditioned" by attributes he saw in people suggesting unconsciously those possessed by his father, causing a change in the normal muscle tonus sufficient to bring about muscular discharge, *i. e.*, striking of palm with fist. This change of tension was the "feeling," in the present instance, of anger felt by the patient as a disagreeable sensation, the origin of which was unconscious to him. This gave a physiological explanation for that which Freud empirically designated as an "unconscious wish." To him it was a psychological phenomena, and it was gratifying to substantiate his clinical findings by means of physiological data. In the case just cited, the more or less unconscious hatred for his father, his pathologically motivated ambition, his rebellion to authority, all were accompanied by an unconscious wish to remove a rival, *i. e.*, the irritating stimulus. This was the unconscious wish.

Dr. Foster Kennedy, of New York, thought that it might be of interest to some of the members of the Neurological Society in this connection to hear of two soldiers who were under his care last year and who exhibited in a very astonishing manner a cöoperation of endocrinological disturbance and emotional disturbance. These men were admitted to hospital with complete emotional collapse after having been blown up without physical injury. They were in identical conditions, almost mute, almost inaccessible; it was difficult to make them eat and emotionally they were given over entirely to the phenomenon of fear. In both cases the hair was standing erect on their heads and remained so for nine days. The hair of both these men was long and stood on end like that of a Zulu. After a few days' rest in bed they recovered their usual mental and emotional balance and were able to state in each instance that their hair previously was normally tractable and flat.

Dr. Bernard Glueck thought that everyone should become familiar with Dr. Kempf's monograph on the Autonomic System and Its Relation to Personality because of the very helpful synthesis he had accomplished of the various physiological and psychological researches into human conduct. He had occasion recently in teaching psychopathology to his students at the School for Social Service to use this monograph very effectively, and found it very helpful in approaching this subject from the physiological standpoint as outlined therein. It made very much more acceptable to the average mind the central theme in the Freudian theory of conduct, namely, the wish. Dr. Kempf's discussion of the place for the craving of social esteem in human conduct was particularly illuminating, as it frequently was found to be the most prominent factor in problems of social maladjustments.

Dr. S. Rothenberg, of Brooklyn, thought that everyone present was

indebted to Dr. Kempf for his splendid presentation and he personally appreciated it particularly because of having done some work in attempting to interpret the so-called mismating complex from a psychosexual point of view. This work was done at the National Desertion Bureau here in New York. He found there were decided and peculiar condition reflexes in many of these people who could not adjust themselves to the marriage state, which would explain the underlying difficulties better than in any other way. Many interesting instances of that kind had been noted.

Dr. Kempf, in closing the discussion, expressed his gratitude for the kind appreciation given him. He thought that the hallucinations in Dr. Jelliffe's case could be interprpeted as an auditory hallucination caused by the anal segment, which had become dissociated, trying to obtain the necessary stimulus for gratification. He had been forced to the conclusion that one could not get a psychosis from an organic or toxic cause in which the primary autonomic affective cravings had not been previously repressed. The study of paretics, deliria and arteriosclerotics showed that strong autonomic compulsions, which had been repressed or were perversely conditioned, had become dissociated and caused the hallucinations, etc.

Dr. Jelliffe's point about the localization of diseased processes in repressed segments might be explained by the fact that an autonomic segment which was more or less anemic or hyperemic, due to the vasoconstriction or vasodilation in this segment which existed because of its repression, disease, or over-tension, became a more fertile soil for bacteria.

As far as therapeutic principles were concerned, there were two schools; one believed in building up the health, confidence, self control and integrity of the ego, and the other in getting a *transfer* from the ego so that it would no longer be afraid of allowing the repressed craving to cause awareness of its efforts. With the transfer, the patient became conscious of what his personality craved and by learning to analyze and know himself, he became able to make much more comfortable practical adjustments, without becoming fascinated by bizarre, asocial, or perverse stimuli.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

Regular Meeting, January 17, 1919

Dr. Charles G. Dewey, Presiding

PESSIMISTS, PSYCHOPATHIC AND NON-PSYCHOPATHIC, SIGMUND FREUD, PESSIMIST: REVIEW OF "WAR AND DEATH"

Dr. E. E. Southard gave his interpretation of Freud's recent book translated by Dr. A. A. Brill and Mr. A. B. Kuttner in which he believes the theme to be that "those who are not selfish and cruel are hypocrites. Selfishness and cruelty are the indispensable elements in man to which, repressed by civilization, we regress under the influence of war." He believes that the author's pessimistic philosophy is revealed in this and other statements in which Dr. Southard interprets the spirit of the book.

He classifies a number of the men of history as optimists or pessimists or both according to which way they are taken and follows this with a history of pessimism in which he speaks of the philosophy and psychopathic traits of the great philosophers. He compares this little work of Freud with Rousseau, who maintained that culture had made man bad and advocated man's return to nature. Freud claims that man is naturally bad and can only achieve a little good by sublimation. Freud's attitude toward the war Dr. Southard believes to be essentially pessimistic. He asks that the American people shall realize that such pessimism rather than militarism, or devil worship, or soldier worship is the philosophy and religion of Germany. He makes a comparative table of points of likeness and difference between Eddyism and Freudism,

Eddyism	*Freudism*
Idealistic	Materialistic
Indeterministic	Deterministic
Optimistic	Pessimistic
Evil, illusory	Good, illusory
Forget	Recall
Spiritual and absent treatment	"Catharsis," intimate reëducation
Disease a delusion	Disease a flight from reality

THE ARTERIAL TENSION IN MENTAL DISEASE

Dr. C. Enebuske called attention to the fact that pulse tension was observed by Chinese physicians as early even as 2500 B.C. and pulse frequency along with temperature have for thousands of years been considered indicative of disease. In mental disease arterial tension should be given as much consideration as pulse frequency and temperature.

In recent literature normal pressure is designated in a range from 91 to 160 mm. of mercury according to the technic used. In the observations of the past fourteen years manic and depressive symptoms disappeared when the radialis arterial tension became spontaneously stabilized at 150 mm. of mercury. This had been discovered by 953 measurements of the arterial tension in 28 cases of manic-depressive insanity. In 5,046 measurements of the maximum radialis arterial tension in 130 cases of dementia præcox spontaneously stabilized tension at 150 mm. was accompanied by absence of evidences of præcox in acute or subacute state. No active tuberculosis was present in 85 cases of pulmonary tuberculosis when the maximum tension of the radialis was stabilized at 150 mm. Such readings were made in all the major groups of mental disease. The values in the feebleminded approximate those of the normal. The spontaneously stable arterial tension of 150 mm. of mercury at the radial artery is the normal tension. Only occasionally does a case of dementia præcox recover spontaneously a normal tension. The return in the manic depressive is much like the return to a normal temperature after an infectious illness.

FATIGUE

Dr. S. A. Lord read a paper warning physicians to pay more attention to the subject of fatigue, signs and warnings of which are almost too common to have received proper consideration. It is engendered constantly by the affairs of the daily life.

The term is used clinically for widely differing degrees and referring to widely different causes. Dr. Lord would define it as a normal state of diminished activity as due to overactivity. Exhaustion denotes overfatigue, that is that which has not been corrected by rest and recuperation at the proper time.

He quotes McKenrick to the effect that qualitative changes in the cell can be produced quantitatively, that is too prolonged, too often repeated or too hard physical stimuli can produce pathologic change. All stimuli act primarily only as exciting or depressing agents on the normal processes of life and prolonged stimulation produces phenomena foreign to the normal vital phenomena of the cell. Pathologic states therefore can be derived from normal conditions through mere increase in quantity. This occurs by a gradual increase which is imperceptible.

Fatigue effects are constantly dissipated, the rapidity varying in different individuals.

In local fatigue the products may be so distributed by the circulation that a general or distant reaction may result. Dr. Lord asserted that the more one studies fatigue the more one realizes its wide effect in producing variations of function. The types of fatigue are mental, moral or physical. Definite nerve cell changes are produced by experimental

overstimulation which is manifest in their shrinkage, smaller nuclei and ability to take on acid stains more readily than normal, etc. Basic as well as acid results are responsible for fatigue phenomena.

Fatigue should be given a first place, the speaker believed, in the clinician's consideration of disease and determination of over-use, overmuch, over-long, over-quick must be made. The products of fatigue are poisonous only in a restricted sense. Normal fatigue is an ellusive thing and depends on a point of view. It should be a pleasurable warning to rest. Feelings of weariness, impaired capacity, gross physical fatigue and altered behavior are special signs which call for attention. Fluctuations of attention, gradual loss of efficiency and capacity, distractibility, loss of discrimination, poor recollection and impoverished imagination are preliminary signs and give place to uncomfortable sensations and reduced functions which in turn lead to pain and discomfort. The vegetative system also takes part in the reaction. Respirations become shallow, there are external and visceral manifestations, the cardiac accelerator mechanism is irritable, there is tachycardia, the "irritable heart" and neuro-muscular asthenia as seen in the war, etc. These phenomena do not constitute a true neurosis, which requires careful study and treatment and unlike all fatigue cases, the speaker stated, requires gradually increasing exercises.

Fatigue is produced in school children by the high standard of accomplishment set and the problem of fatigue is not sufficiently considered. Classes should be divided according to schemes for testing efficiency.

Fatigue is responsible for many conduct anomalies, the morbid state engendered pointing toward the formation of conflicts. Laboratory tests, except for cardiac and muscular fatigue, are not usually practical and therefore painstaking examination must be utilized to discover amounts of fatigue.

Treatment must vary, some persons requiring complete recovery every twenty-four hours. Accumulative effects may prevent recovery. Activity should be regulated, intensity of work, speed with which it is done, etc. Feelings and sensations may not be true guides in illness as in health. Insomnia may be an evidence of abnormal fatigue.

PHILADELPHIA NEUROLOGICAL SOCIETY

Regular Meeting, January 22, 1919

Dr. Max Bochroch, Presiding

HYPNAGOGIC HALLUCINATIONS IN A RESTORED EPILEPTIC

Dr. N. S. Yawger described the hypnagogic hallucinations of a patient whom he had hoped to present. This was the fourth instance of such hallucinations which Dr. Yawger had met with, twice in normal persons, which he has reported in the Journal of Abnormal Psychology, June, 1918, and twice in epileptics.

This patient had come under his observation two years previously at the age of 13, having epileptic attacks once or twice a week and occasionally as many as six in one night. Her attacks occurred usually while asleep. The epilepsy had first manifested itself at the age of 3½. The child was said to have been slightly subnormal mentally always. She was placed at 13 in the Oakbourne Epileptic Colony. Here she received 3 grains of chloretone daily for the first few weeks and then 6 grains for many months. The seizures had entirely disappeared since September, 1917.

For years the patient had been experiencing optical manifestations such as some persons observe when objects or scenes pass before their eyes in the transitional stage between waking and sleep. These are known as hypnagogic hallucinations. With this girl they just precede sleep after the eyes are closed and have sometimes such a distressing character that they interfere with sleep. They could be induced by blindfolding but the child struggled against the procedure because of the distaste for the experience.

During one experiment she said, "There is a little dog." and groped toward it. When reminded of the remark after the eyes were uncovered she went into the next room to find the dog and expressed surprise that he had gone: "Well, he is gone, but he was a nice dog anyway." Sometimes the child rubs her eyes after the experiment as though waking from sleep.

Dr. S. L. Immerman reported a patient who had dementia and other signs of paresis. When he closed his eyes he saw women in front of him, whom he could describe although he realized they were imaginary. At the same time he would have auditory hallucinations which he did not recognize as such. Dr. Immerman recalled that Goethe could call up some kind of visual hallucinations at will, with eyes opened or closed. These seemed like hypnagogic hallucinations.

A CASE OF NERVE SYPHILIS WITH ACUTE INVOLVEMENT OF THE AUDITORY NERVES AND COMPLETE DEAFNESS

Dr. J. H. Lloyd reported a patient of 30 years of age, a large robust negro, a ship's cook, who had always had good health. In June, 1917, he was treated in the Philadelphia Hospital for a chancre and secondary eruption and had at this time one treatment with arsphenamin. Later he was treated in an eye ward for syphilitic iritis. He manifested no nervous symptoms. After working for about two months he was taken on shipboard with a severe frontal headache worse at night. This time he was taken to the nervous ward.

He sought relief from the headache. On examination the right pupil was found to be dilated and rigid as a result of the iritis and the eye showed some congestion. The reaction of the left pupil to light was sluggish. There was no Romberg sign or ataxia and no deafness. Except for the diminished knee-jerks and Achilles jerks, other examination for sensation or gait was negative. So was test upon the cranial nerves.

The blood and cerebrospinal fluid were positive with a very high lymphocytosis. The cell count was later much reduced and the blood became negative although the fluid remained positive. The patient was treated with mercurial inunctions and several doses of arsenobenzol.

In November the hearing first showed impairment but the drum membranes remained normal. The headache and the iritis had entirely disappeared while the man remained under observation, though the affected eye still showed a rigid pupil and clouded media. He ran away from the hospital and returned after some weeks in which he had become rapidly deaf. Examination discovered mixed deafness in the right ear, the involvement of the receptive apparatus being confined to the labyrinth. In the left ear the more extensive nature of the involvement of the receptive apparatus seemed to indicate a lesion in the course of the nerve or central. Active treatment has had no effect upon the deafness.

Dr. Lloyd calls attention to the view of Dr. G. W. Mackenzie that syphilis may affect the inner ear alone, the eighth nerve alone or both together. The cochlear or the vestibular nerve or both may be involved. It is more often bilateral than monolateral. Other nerves, especially the second, fifth and seventh, may be involved in a polyneuritis. Politzer has seen this infection as early as the seventh day after the primary infection. Randall reports a case of a physician in whom deafness followed in four weeks after infection from a needle wound. The deafness may become incurable unless heroic treatment is resorted to. This is also the cause of deafness in congenital or hereditary syphilis. Mackenzie criticizes very carefully the alleged claim that this affection is due to the use of arsphenamin. He believes rather that these are cases of neurorecidivus in which treatment has not been active enough.

It appears that the infection of the nerve may be either primary or secondary to the membranes. The mode and order of invasion are still questions for investigation. The labyrinth may be involved and in congenital cases the bone also has shown involvement.

Dr. W. G. Spiller said that the possible explanation of paralysis of both acoustic nerves or of both facial nerves without involvement of other nerves lay in their anatomic relation. As the patient lies on his back the syphilitic poison may tend to settle in the depression in the angle of the medulla oblongata, pons and cerebellum, where these nerves are situated. The isolated paralysis of cranial nerves he believed to be rare in syphilis. He had seen such paralysis of both facial nerves and of the trifacial alone. The acoustic nerve would be likely to be affected in cerebral syphilis since it is frequently so in tabes, yet isolated paralysis of this nerve is rare, while that of the oculomotor nerve is frequent.

The greater intensity of syphilitic meningo-myelitis in the posterior part of the thoracic cord over that in the anterior cord may also be accounted for by the greater exposure to the poisoned cerebrospinal fluid as the patient lies on his back.

Dr. C. S. Potts said that he had previously reported a case in which bilateral disease of the eighth nerve and also of the optic nerves was the only evidence of syphilis. This patient had left the hospital apparently perfectly well after rather intensive treatment with arsphenamin and mercury.

REMARKS ON BRAIN TUMORS IN PSYCHOPATHIC SUBJECTS

Dr. S. L. Immerman mentioned three cases of brain tumor which he discovered at necropsy, this number out of 75 necropsies extending over three and one-half years on patients from his wards at the Philadelphia Hospital for the Insane.

In the first patient necropsy brought to light a right-sided parietal glioma which had come to impinge on the cortex by expansion from hemorrhage. He had been in the hospital for fourteen years. He was admitted at the age of 43 because of dementia. His death occurred from acute hemiplegia without previous localizing symptoms. Old phthisis bulbi made it impossible to examine his eye-grounds.

Necropsy revealed in the second case a sarcoma, cerebello-pontine. The patient had been in the institution three years on account of dementia. He manifested optic neuritis with hemorrhage, diffuse signs of central nervous disturbance and had a positive Wassermann blood and fluid reaction.

In the third patient a left frontal lobe tumor was revealed by necropsy, an endothelioma. It had also involved part of the corpus callosum and right frontal lobe.

Dr. Immerman calls attention to certain conclusions to be reiterated from these findings:

1. A mistaken diagnosis of paresis, epilepsy or chronic dementia in patients sent to psychopathic hospitals may cover a brain tumor.

2. Certain kinds of mental symptoms are suggestive of brain tumor.

3. Even if definite localizing signs are absent, these mental symptoms should lead to examination for brain tumor.

Dr. S. T. Orton had studied one of the tumors which Dr. Immerman had mentioned. He thought it belonged to the endothelioma family but was of a low grade. By special tissue stains he was able to rule out the spindle cell type so that it must be either sarcoma or endothelioma. The nuclei were smaller and less vesicular than in a typical endothelioma. The tumor cells were small. There was a certain amount of fibrillation of the cytoplasm, which ruled out cellular glioma and probably sarcoma. There was no whorl formation nor tendency to flatten out over the surface of connective tissue strands or over the vascular structures. The tumor was a slow growing one and since it had reached a considerable size must have been growing for a long time. Considerable hemorrhage was evident. Dr. Whitney reported a tumor the history of which had been traced over about twelve years. It had reached the size of a lemon. The patient had been in the Worcester Hospital to which it had been necessary to admit him only six months before. This slowgrowing endothelioma had produced pressure symptoms, its only malignant manifestation. Paralysis had occurred late probably through secondary softening rather than from direct pressure upon motor areas.

LUMINAL IN EPILEPSY AND IN DISTURBED AND EXCITED STATES. SPECIAL COMMUNICATION

Dr. F. X. Dercum made a report of his experience with luminal and luminal sodium following Dr. Richard Eager's report on the use of luminal in disturbed and excited states, which was given in the Journal of Mental Science, July, 1914. Dr. Dercum tried the drug in epilepsy giving it at first three times daily. This he found produced slight heaviness through the day and sometimes dizziness. Therefore he reduced the drug to one dose at bedtime, a dose of 1½ grain of luminal or 2 grains of luminal sodium, which had an increased rather than diminished effect without the unpleasant symptoms. Rarely the dose had to be 3 grains. The effect upon the seizures was remarkable even in confirmed cases. The seizures were usually promptly inhibited and in a number of instances there had been abolition of these seizures for months or several years. In some cases the drug seemed to be virtually a specific. There was at no time any ill effect. The efficacy of the drug proved itself especially in the "essential" or "morphologic" epi-

lepsies. The drug produces no habit or craving since there are no pleasurable or disagreeable effects attending its use. It has no effect upon respiration, circulation or temperature.

Dr. Dercum attested Dr. Fager's results with disturbed and excited states. In a case of chorea insaniens almost immediate results were obtained by 3-grain doses of luminal sodium given hypodermically every four hours. In twenty minutes after the first injection the violent and incessant movements grew strikingly less and after a few doses ceased altogether. The patient had developed chorea after the birth of her child, which had occurred four weeks before her admission to Jefferson Hospital. She was exhausted, sleepless and had become actively hallucinatory and confused. After becoming quiet she began to sleep and take nourishment and made a safe recovery. The drug was used in other cases with disturbance and excitement with equally satisfactory results.

Luminal sodium must of course be used cautiously and tentatively but its hypodermic administration manifests no local irritation or unpleasant after effects. It is very soluble.

Luminal is one of the series of adalin, veronal and medinal but the supply of it in this country is practically exhausted at present.

THE CHICAGO NEUROLOGICAL SOCIETY

JOINT MEETING WITH CHICAGO MEDICAL SOCIETY, JANUARY 22, 1919

DR. H. C. STEVENS, Vice-President, in the Chair

WAR NEUROSES

DR. H. T. PATRICK deplored the misleading and obscure term "shell shock" for neuroses which differ from those of peace only in their greater number and in the high proportion of severe cases and of anxiety states. The soldier like the civilian has difficulty in adjusting to the demands of life and this becomes more manifest in the face of the added difficulties and uncertainties of life at camp and the front. The soldier cannot leave his post. An impulse to do so answers to deeplaid human instinct, but honor, ideals and military discipline make any such refuge impossible. Only a neurosis is therefore left as an escape, which forms a "psychological dugout" into which the soldier can creep. He is not in this a deliberate malingerer but his instincts have overcome his intellectual and self-controlling ideals.

SOME LESSONS IN PSYCHIATRY TAUGHT BY THE WAR

1. The Size and Importance of the Problem of Mental Health

Dr. H. D. Singer pointed out first the need for psychiatric training for physicians, which the war disclosed. Here as in the civil community mental and nervous disability proved themselves most serious factors in inefficiency. The primary elimination of individuals showing these was not properly carried out because of lack of physicians with psychiatric training and also trained psychiatrists were difficult to secure for army practice.

2. Types of Breakdown in the Army

An actual comparison of the frequency psychoneuroses in the army with those of civil life cannot be made, as there are no statistics for the latter. In the Army there was a probable striking increase of psychoneuroses with probably a decrease of frank insanities. This is due in part to the early elimination of the less resistant but also it emphasizes the importance of environmental factors as well as points to the fact that even a man of fairly good constitution may develop a psychoneurosis.

3. The Effects of War Conditions on the Civilian Population

Statistics seem to show, Dr. Singer stated, that better social organization, with improvement in conditions in connection with labor, and also possibly the closer regulation of alcohol, all of which prevailed in England, especially, during the war, tended to reduce markedy the number of commitments for insanity. Crime also diminished except that for a period, when there was insufficient supervision and control, juvenile delinquency increased. Commitments for insanity in England and decreased by 3,278 from 1914 to 1915, by 3,159 from 1915 to 1916. The number of insane in military hospitals was not sufficient to warrant attributing this decrease to the passing of possible candidates for commitment from the civil to the military population. The result of lack of organization is evident in Russia, where the number of commitments increased. In New York also there was an increase the forty-four months since the beginning of the war, showing an increase of 3,995 over the number in the same period preceding.

REPORT OF NEUROSES IN SOLDIERS WITH PRESENTATION OF CASES

Dr. P. Bassoe reports the condition of a soldier twenty-seven years old who was unconscious for five days following the explosion of a shell and then from March to June, 1918, was unable to move the left arm or leg and was entirely devoid of sensation on the left side. He was also

unable to use the left eye or ear. He was only very slightly wounded. By August he had improved sufficiently to walk well and lift the left arm horizontally but was unable to grip anything in the hand. The explosion of a gas stove near him in September produced a severe uncontrollable nervousness and has been followed ever since by complete inability to move the upper left arm. When first seen by Dr. Bassoe in December he was walking well but the arm was completely flaccid and immovable.

The sensory condition was that of a complete hemianesthesia extending to all forms of sensation. This was very distinctly limited at the median line. The eye and ear were quite unable to function though neither revealed lesions upon examination. The tendon and superficial reflexes were normal and the paralyzed muscles showed a normal reaction to faradism and galvanism. But a strong faradic current applied to the tongue, though it produced muscular reaction, aroused no sensation. So far faradic treatment had produced no change in the patient's condition.

The second case, a member of the engineering corps, 37 years old, worked at some distance from the firing line but was thrown out of bed one night while on furlough by the force of a bomb dropped from an enemy airplane. He was not injured but thirteen days afterward, falling from a train, he was stunned and frightened though again not injured. He at once developed a tremor of the whole body, which gradually limited itself to the right leg, and was unable to feed himself or speak above a whisper. Dr. Bassoe found only this limited tremor when he first saw him four months after the first accident. In January he felt improved enough to return to his former occupation as switchman. But he was able to work but three days when such nervousness and finally excitement developed that he was unable to walk from his work. There are no organic evidences of disturbance.

Another soldier in whom organic evidences were quite absent manifested a coarse tremor of the right leg while in camp in this country. There was also moderate tremor of both hands. Sensation was undisturbed and the reflexes normal. This patient is the son of a nervous mother.

Another patient evinced coarse tremor of both hands and was apprehensive and nervous when seen by Dr. Bassoe. He was a telephone operator before enlistment and was said to have suffered sunstroke in the Army. He had suffered from nervous attacks accompanied by palpitation and trembling and had been discharged from the Army in December, 1917, as suffering from multiple sclerosis. Dr. Bassoe could find no evidence of organic disease.

Several cases are reported in which hysterical phenomena seem to be superimposed upon slight trauma. One of these was a Polish Jew of 23 who had suffered a fracture of the foot by a fall from an army

wagon. A year later, though this had healed, he could barely step on the foot and there was pain with all foot movements and the movements were very weak. An orthopedic surgeon was unable to find any physical cause for the abnormality except a little atrophy of the leg muscles. The reflexes were normal. There was anesthesia of the foot and of the lower half of the leg. The patient died of a later contracted influenza.

Another patient, a Roumanian Jew of 24 years, suffered pain in the right arm for two months after a fall on the ice while still in this country. The hand was cyanotic and the arm upon examination very weak and completely anesthetic with pseudocontractures of the wrist and fingers. Reflexes normal, as were also electric reactions.

The next case revealed the mental attitude, Dr. Bassoe said, which is behind these affections in many cases also in civil life. This was in a bitter complaining letter he wrote after his return home in regard to the government's relation to his breaking down in service. He had sprained his shoulder in camp after which the shoulder drooped until the back became curved and he presented the appearance of so-called camptocormia.

The next case is that of a soldier of 23 who had served with the British and been twice wounded, once in the left side of the neck, once above the left eye. A month after removal of some shrapnel and bone from the forehead he began complaining of attacks in which he fell and remained unconscious for a little while. The attacks were ushered in by the sensation of a ball passing from the injured side of the neck and entering the throat. Examination at the Presbyterian hospital about three years after his injuries revealed various hysterical factors rather than evidences of epilepsy. He claimed to have had no vision in the left eye since the accident to this region but he saw fingers well with this eye and the fields showed only limited narrowing. The fundi were normal. All reflexes were normal. Report of sensation about the scars was inconsistent, at one time the patient reacting markedly to the application of cotton, at another feeling not even a pinprick. X-ray of the head revealed nothing abnormal. There were several attacks of unconsciousness in the hospital and some in which the patient was merely dazed and irrational. He responded by a queer sensation and vomiting to the seeing of a stomach aspirated. One attack which was ushered in with the choking sensation was marked also by pain, which returned after awaking from a period of unconsciousness in a hilarious mood. A good deal of albumin and granular and epithelial casts were present in the urine but there was no edema. The heart showed no abnormality. He was later admitted to the Psychopathic Hospital where he died apparently from uremia. No brain injury was revealed at necropsy but there were evidences of a chronic nephritis with ascites and edema.

MENTAL CASES

The first case reported is that of a man stationed in the tropics at Panama. Before enlisting he had parted from a girl with whom he was planning marriage, she having become pregnant. As he had looked back he had seen tears on her left cheek. He had gone into the army without any further communication with her and six months later began to have visions of this girl with tears on her cheek and hear her sobbing when some woman was behind him. He would always realize his mistake but only, a number of times, after he had turned and addressed the woman. On return to his home the vision came to him as he left the train. He went to the military post and asked for help for insomnia and that he might turn in his pistol for safety's sake. His insight was good and he showed no other symptoms. He later reported that he believed he would overcome his difficulty and attributed the prevalence of insanity among the troops in the tropics to the lack of diversion and pleasure for them. At the time of report he had stopped seeking the first woman and married some one else and was returning to service.

The last case reported, Dr. Bassoe thinks, may have exhibited a feature of a compulsion neurosis or an early indication of dementia præcox. The patient, 24 years old, of a good family and well educated and exemplary habits, was complained of by a number of women to whom on different occasions he had suddenly exposed his genitals and then walked on. When he was arrested he admitted his conduct without hesitation, but could give no reason for his action. His only mental abnormality seemed to be a lack of realization of the consequences he might bring upon himself by such action. He was quite ready to take a serious view of the action. He had had no sexual intercourse previously—only admitted some masturbation.

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

McGuigan, H., and Hyatt, E. G. Primary Depression and Secondary Rise in Blood Pressure Caused by Epinephrine. [Jour. Pharm. and Exp. Therap., Sept., 1918.]

The authors, experimenting upon dogs, find that adequate doses of epinephrine in the form of adrenaline given intravenously (0.5 to one c.c. of 1:10,000) cause a quick rise of blood pressure followed by a rapid fall and secondary rise. The primary rise is thought to be due to peripheral action and the secondary to a central action which operates through the sympathetic ganglia. Pithing of brain or removal of head prevents this action, while section of the vagi does not, nor does atropine. Paralyzing the ganglia with nicotine prevents it. Changing the intracranial pressure with a water manometer through a trephine hole in the skull modifies the blood pressure to give a typical secondary rise, while a greater increase in the pressure may again prevent the secondary rise. Changes within the cerebro-spinal fluid also modify the blood pressure tracing of epinephrine. [J.]

Mougeot, A., and Colombe, J. The Oculo-Cardiac Reflex in Pleurisies. [Annales de Méd., 1918, V, p. 345.]

The authors have studied the oculo-cardiac reflex in fifty cases of pleural affections of various kinds, 37 of sero-fibrinous pleurisy, 5 of sero-hemorrhagic or hemorrhagic, 5 cases of hemothorax due to chest wound, 5 of old cured pleurisy, and 2 of pleurisy with mediastinal lesions. They find that the reflex is often abnormal, commonly abolished or inverted, rarely exaggerated. This anomaly, which is independent of the presence, nature, or abundance of an effusion, has but a contingent and accessory value as a sign, without diagnostic importance, in the inflammatory lesions. In traumatic lesions its presence, in the absence of shock or pseudo-shock, possibly points to a hemothorax. It remains rather steady in the same patient, and is modified suddenly by thoracentesis. It frequently coincides with inequality of pupils. It seems to show, in the course of the pleurisies, a rupture of vago-sympathetic equilibrium, most often a functional deficiency of the vagus or hypo-vagotonic state which is liable to lead to grave complications. In

exceptional cases there is an inhibition or paralysis of the sympathetic. [Leonard J. Kidd, London, England.]

Carpenter, F. W. Nerve Endings of Sensory Type in the Muscular Coat of the Stomach and Small Intestine. [Jour. Comp. Neurol., Oct., 1918, 29, No. 5.]

In the longitudinal muscle coat of the cardiac stomach of the cat, and a few in the serous coat, are found skein-like and net-like structures composed of fine fibrils with numerous varicosities. Unmyelinated varicose nerve fibers of undetermined source connect with these endings. In the longitudinal muscle coat of the small intestine of the dog are found terminal structures composed of exceedingly delicate fibrils. The nerve fibers in which these tufts terminate have been traced ventrally to the mesenteric plexus, and are structurally analogous to sensory rather than to motor nerves. Results of recent experimentation on the sensibility of the alimentary canal are corroborated in the finding of these structures in the muscular coat, but not in the mucosa or submucosa. [J.]

Ramond, F. Pain in Dyspeptics. [Paris Medicale, Aug. 31, 1918.]

Ramond thinks most dyspeptics experience gastric pain at some time or other, and classifies pain among dyspeptics into two major groups—the radiating pains and the nonradiating or purely gastric pains. The former may be either anterior, lateral, or posterior. As a group, they are not precise in their indications, merely directing the physician's attention to the stomach, or even occurring in the absence of gastric disease. The nonradiating pains are sometimes largely dependent upon irritation of the solar plexus, which increases the sensitiveness of the stomach, or may be due to diminished secretion of the protecting gastric mucus or to precipitation of this mucus by excess hydrochloric acidity. The main factor of nonradiating pain, however, is inflammation of the mucous membrane. The condition ranges from a prolongation of the normal hyperemia of the submucous capillaries during digestion to an actual acute or chronic gastritis. Whether merely congested or inflamed, the mucous membrane is sensitive to the least irritation by the acid and pepsin of the gastric juice. Nonradiating pains are subdivided into those that are induced by palpation and those that are spontaneous. The former occur at the most easily palpable points of the stomach—in recumbency—viz., below the ensiform, below the left costal margin, along the external margin of the left rectus muscle, two fingerbreadths above the umbilicus, at Chaurard's choledochopancreatic point, and below the left costal margin. The first three of these points relate to the upper or peptic portion of the stomach and the last two to the lower or mucous portion. Tenderness at the former points indicates gastritis chiefly of the upper portion; at the latter, of the lower portion. Among

the spontaneous pains or burning sensations, the site of the pain varies in different periods of the process of digestion, according to the location of the food in the stomach at the time and, consequently, the section of the mucosa exposed to irritation by the gastric juice.

de Almeida, M. O. Pneumogastric Regulation of Respiratory Movements and The Question of the Automatism of the Respiratory Centers. [Arch. da escola sup. d. agric. e Med. Vet., Piheiro, Brazil, 1917, 1, 21–34, 169–180.]

Neither normal breathing nor respiratory movements are regulated by the vagi. While they constitute the afferent paths in some reflexes, only occasionally are such reflexes produced by obstacles in the air passages. Apnea is determined by want of external stimuli and is a proof that the respiratory center is not automatic. The blood is the medium in which normally external stimuli are carried to, and regulate, this center. Sensory nerves are not an essential factor in the regulatory mechanism, although some, particularly the vagi, may sometimes intervene. [J.]

M. Maurice Vernet. Paralysis of the Pneumogastric and Respiratory Disturbances. [Bull. et Mém. de la Soc. de Méd. des Hôp., Dec. 31, 1917.]

Disturbances in a certain number of functions, such as salivation, respiration, and sensibility, are connected with pneumogastric paralysis.

The general heading of respiratory disturbances includes altogether true respiratory disturbances, and pulmonary, vascular, or trophic disorders.

(*A*) Pneumogastric irritation impels fits of coughing similar to fits of whooping-cough. This is quite characteristic of all mediastinal diseases.

(*B*) The true respiratory disturbances are constituted either by pseudo-asthma, or some type of dyspnea particularly marked after physical strains.

This dyspnea exists in cases of pneumogastric trauma. It consists sometimes in hardly audible tachypnea, but is invariably most marked after a rapid walk. The pseudo-asthma type follows traumatic pneumogastric lesions. It is often combined with an increased rate of the pulse because of the concomitant destruction of the moderating cardio-vascular fibers of the spinal. Clinically this pseudo-asthma is the most frequent type of disturbance. It is sometimes difficult to detect. The sound nerve existing in the uninjured side seems to be sufficient for the respiratory functions. The patients generally complain of a disagreeable feeling, especially at night; some are obliged to sit up in their beds when this respiratory distress becomes very marked; others wake suddenly with a painful sensation, especially if they have been lying on the

sound side of their chest. These sensations must be considered as genuine reflexes; the pneumogastric being the sensory, and the spinal the motary nerve of the lungs. In some cases injuries of the pneumogastric are also responsible for pulmonary and vascular disturbances.

Allis, J. A. Nocturnal Enuresis in Adults. [N. Y. M. J., Feb. 22, 1919.]

Sixteen soldiers here reported on by the author varied in ages from 19 to 31 years. They all wet their beds from one to three times a night. The treatment was by local application of nitrate of silver solution 1 to 5 per cent., at times deep instillations of 2 or 3 drops of the same solution, or irrigations of the anterior part of the urethra with silver solution one to 3,000 or 5,000. These irrigations were given at intervals of about four or five days. Belladonna and ergot were also administered with little effect. No mention is made of the possible psychogenic factors, nor of psychotherapy.

Diestro, J. G. Asthma in Children. [Archives Españoles de Pediatria, Oct., 1918.]

Asthma in children should be separated from these attacks of suffocation due to the exudative diathesis and to spasmophilia. Four case histories are given illustrating what he terms true asthma. One occurred in a child of eight months of age, another in one nine years old. Two others in siblings occurred at the age of six. The mother had similar attacks. Typical crystals were present in the sputum. Dyspnea and cyanosis were marked. In all the attacks grew less severe; the tendency seemed to be outgrown in from two to four years. In one asthma and enlarged tuberculous glonds in the mediastinum were present. Exudative attacks may resemble attacks of asthma. The acute asthma may alternate with skin manifestations. In one eczema and the asthma alternated. In a 4 months old infant there was an enlarged thymus.

2. ENDOCRINOPATHIES.

Rogoff, J. M. Preparation of a Soluble Concentrated Product of the Thyroid Gland. [Journal of Pharmacology and Experimental Therapeutics, Oct., 1918.]

Rogoff began with the product "A" obtained by alkaline hydrolysis of normal hog thyroids according to Kendall's method. This product was subjected to further hydrolysis in water acidified with hydrochloric acid, and the resulting solution filtered through a Chamberland filter. Hydrated ammonium silicate was added to the clear filtrate and the mixture shaken and filtered through paper. After washing, the absorbed product was separated by slow percolation with a dilute solution of ammonia in water until the percolate came through colorless. The am-

monia being then driven off, a reddish brown aqueous solution was obtained which on evaporation yielded an amorphous powder containing 13.44 milligrams of iodine per gram of but slightly less than the product A, which contained sixteen milligrams. The aqueous product, given to tadpoles in doses of 0.5 to one milligram every other day, caused extreme emaciation and differentiation—typical thyroid effects.

Turner, D. Radium Treatment of Exophthalmic Goiter. [Edinb. M. J., Feb., 1919.]

In an experience of upwards of 50 cases Turner has found radium to be most useful in the treatment of this condition. Only one patient did badly, a woman of 22 years of age, who died with toxic signs within two weeks of the beginning of the treatment. Turner treats each lobe, the isthmus, and the thymus. Two hundred to 400 milligram hours, properly screened, is the dose. The patient may then be sent home for three months, when another series of treatments may be given. The skin is very sensitive and must be carefully protected.

Rogoff, J. M. Liberation of the Internal Secretion of the Thyroid Gland into the Blood. [Journal of Pharmacology and Experimental Therapeutics, Oct., 1918.]

The author made an attempt to detect in the blood coming from the thyroid glands of three dogs a physiologically active secretion by feeding the dried blood to tadpoles. One dog, whose thyroid glands were rich in colloid and had a good iodine content, yielded evidence of an active secretion into the blood collected from the glands during massage and during stimulation of the cervical sympathetic nerve. This result supplied no evidence of the existence of secretory nerves to the thyroid, for it was not possible to know the rate of liberation of the secretion and an increased concentration of the secretion in the thyroid blood alone can not be taken as evidence of increased liberation. Two dogs with hyperplastic thyroid glands containing no detectable iodine yielded negative results.

Uhlenhuth, E. A Tetany-Producing Substance in the Thymus. [Jour. Gen. Physiol., 1918, 1, 33–36.]

"The effect of the thymus gland in producing tetany is due to a specific toxin produced by it," is the conclusion of Uhlenhuth in a series of experiments in salamander larvæ fed upon the thymus. As there is a marked reduction in the volume of the thyroid (and parathyroid) from thymus feeding, Uhlenhuth's experiments may rather serve to uphold the hypoparathyroid conception of tetany rather than supporting his idea of a specific toxin. [J.]

Uhlenhuth, E. The Antagonism between Thyroid (Thymus?) and Parathyroid Glands. [Jour. Gen. Physiol., 1918, 1, 23–32.]

Feeding the larvæ of certain amphibia (*Amblystoma*) with the thymus of mammals results in tetany. The effect does not follow while the thymus of the larvæ is undeveloped, but when the secretion of the thymus begins the tetany supervenes. In another species of *Amblystoma* there was no tetany. Resistance to this action of the thymus appears to be correlated with the time of the development of the parathyroids. [See previous abstract.]

Howland, J., and Marriott, W. McKim. Calcium Content of the Blood in Infantile Tetany and the Effect of Treatment by Calcium. [Quarterly Journal of Medicine, July, 1918.]

Various factors have been suggested to account for the pathogenesis of infantile tetany, such as disease of the parathyroid glands, improper diet, absence of breast milk, excessive quantity of cows' milk, deficiency of an essential substance or "vitamine," intoxication by calcium, intoxication by guanidin or methylguanidin, and a lack of calcium. The rôle of calcium in the production of infantile tetany has received much attention, and it is from the standpoint of the calcium content of the serum that the subject is approached by Howland and Marriott. The normal calcium content of the serum, as determined by taking the average for sixteen healthy individuals, is 10 to 11 mg. per 100 c.c. of blood. A study of the blood in twenty-one cases of rickets was made to ascertain whether any changes in the calcium of the serum result from rickets alone. A moderate reduction (to 8 mg.) was noted in some cases, while a number of the apparently active cases showed a normal amount of calcium. On the other hand, in tetany, during the active symptoms, the calcium content of the serum is invariably reduced, falling in one instance as low as 3.5 mg. per 100 c.c. In eighteen cases of tetany, the average calcium content of the serum was 5.6 mg. The constancy of the reduction of the calcium content of the serum supplies a method of differentiating tetany from other convulsive disorders of infancy, as the authors found no reduction in cases of convulsions due to petit mal, epilepsy, etc. The cause of the decreased calcium content of the serum in tetany remains an open question. Howland and Marriott's conception of the disease is that some unknown factor causes the reduction in the calcium content of the blood, and that many of the symptoms are directly referable to this, and that they may be prevented or made to disappear by repeated doses of calcium. The magnesium content of the serum was normal in active cases of tetany. The inorganic phosphates of the serum were not significantly increased. The "alkalosis" of Wilson, Stearns, and Thurlow was studied, but no evidence was adduced that this is a factor in the production of infantile tetany. Cathodal hyperexcitability was invariably accompanied by a marked reduction in the

calcium of the serum, and anodal hyperexcitability usually by a slight decrease. Calcium administration has a very prompt effect in preventing all the symptoms of active tetany. Calcium chloride, given by mouth, causes an increase in the calcium of the serum and cessation of symptoms.

Hutinel, V. Endocrinous Glands and Bone Metabolism. [Archives de Médecine des Enfants, Paris, December, 1918, J. A. M. A.]

In this concluding portion of Hutinel's study of "endocrine glands and bone dystrophies" he discusses the therapeutic indications which emerge from this long study of the general pathology of children. He says that organotherapy does not seem to have fulfilled its promises but he thinks that this is because we have been asking too much of it. We cannot expect it to cure incurable infirmities and deformities. If we distinguish the cases in which it will prove actually useful and reliable, and we are content to wait for the benefit to become apparent and not expect it immediately, effectual and durable results can be counted on with it. It must be confessed, he adds, that notwithstanding the abundant literature on the subject, we are still in the tentative stage. It is only by pursuing the investigations, keeping up observations over years, and supplementing them by animal experimentation, that the profession can hope to obtain a decisive judgment on this great question of the organotherapy of dystrophies.

Out of door life, hygiene, dieting, tonics, etc., are indispensable adjuvants to organotherapy and as there are usually more than one endocrine gland involved, it is important to determine which ones. Tentative treatment and occasional failures are inevitable but experience will gradually clear away the uncertainty. It is wise to begin with small doses, as exaggerated susceptibility is not infrequent. Rachitis in infants develops under the influence of defective feeding and digestive disturbance with superposed damage from acute or chronic infections. All of the organs may have suffered more or less in their development, including the endocrinous glands, and their functional upset may add to the clinical picture. An organ extract might help but again it might not. The main reliance is on diet, cod liver oil, phosphorus, etc. But with rachitis in adolescents, supplementary to general hygiene, a trip to the seashore or mountains, rest for body and mind, with ample regulated exercise, thyroid, pituitary, ovary, testicle, even suprarenal extract may have a decidedly favorable influence. We must bear in mind, however, that rachitis at this age is transient and subsides spontaneously; this is another reason for combating it so that it need not leave deforming traces. In osteomalacia the most brilliant results have been realized with suprarenal treatment, sometimes associated with pituitary and thyroid treatment. In two such cases the inherited syphilis had beforehand been given prolonged intramuscular mercurial treatment with the benzoate. In chronic rheumatism, organ therapy gives the best results when the lesions are of recent

development. Thyroid, supplemented with epinephrin or suprarenal capsule or pituitary is generally ordered; ovarian treatment for older girls. In adults there is not much encouragement for organ therapy of chronic rheumatism, except possibly with thyroid and ovarian extract for women, given early. Later, they are only possibly useful adjuvants. To be effectual they must be begun at the start and be long kept up.

When a child keeps small, backward in developing, infantile, and there is reason to assume deficient thyroid functioning, thyroid treatment is absolutely indicated. It should be with large doses, long kept up. It may sometimes be useful to add ovary, testicle, pituitary or suprarenal treatment in addition to the cod liver oil, iron, arsenic or other measures that may be needed. With giant growth and acromegaly there are usually several glands involved, and pituitary treatment is generally futile as the lesions are irreparable. In the obese, and with deformed bones, thyroid treatment is the chief indication at first, and later, pituitary. Ovarian or testicle treatment should be added if the genital organs are backward in developing, plus calcium and iron, and hygienic environment. It is wise to weigh frequently and not to try to reduce the weight too fast. In children that are thin and look as if they had consumption, with trophic disturbances in bones and skin, suprarenal capsule, associated sometimes with pituitary and always with general hygiene, has given encouraging results, undoubtedly because there is a certain degree of suprarenal insufficiency.

Glaesner, K. The Influence of the Thymus Gland on Regeneration of Bone After Traumata. [Berl. klin. Woch., Nov. 25, 1918.]

Young rabbits were trephined on the tibia. Some were then fed on thymus, the others serving as controls. The evolution of the bone trauma was controlled by radiographic study. Glaesner concludes that the administration of thymus hastens regeneration of bone.

Olkon, D. M. Effect of Thymus Gland Injection on Growth and Behavior of Guinea Pig. [Archives of Internal Medicine, Chicago, Dec. 15, 1918.]

Intraperitoneal injection of thymus gland caused a reduction of weight in the male guinea pig. After large doses some of the animals died. In the others occurred muscle spasm, dyspnea, and convulsion. Muscular spasms occurring after injection of thymus appeared more severe and of longer duration than those of guinea pigs injected with tenth-normal sodium chlorid. Grave metabolic disturbances, emaciation, with dryness and roughness of their fur characterized the animals injected with thymus.

Monrad-Krohn, G. H. Myasthenia Gravis. [Saertryk av Norsk Mag. f. Laegev., No. 5, 1918.]

The author describes the clinical picture of myasthenia gravis illustrated by two cases. He discusses the etiology, diagnosis and especially

the treatment. He points out how the result of the electrical examination—the myasthenic reaction—should be given its practical application in the treatment and particularly in the feeding of the patient. A nurse should always be present and see that *when the patient has swallowed one mouthful of food a sufficient interval* (2 to 4 minutes according to the gravity of the case) *is allowed to pass before the next mouthful is given,* thus giving the muscles concerned in chewing and swallowing an opportunity to recover their strength after each effort. As long as the food is not so hard that mastication becomes an effort, it does not matter so much whether the food be solid or fluid. The patient should always be spoon fed. To let a myasthenia gravis patient drink out of a cup or a glass is mala praxis; it necessitates a series of deglutition reflexes following close one upon another. This is bound to cause overwhelming fatigue with choking and bronchopneumonia as the most likely results. This very often also leads to attacks of dyspnea, which are of such ominous importance in myasthenia and which also seem to arise apparently spontaneously—particularly after a bad night. In these attacks of dyspnea the treatment is prolonged artificial respiration by means of Sylvester's or similar method (electrical stimulation of the phrenic nerves is worse than useless—cf. the myasthenic reaction). The passive movement of the muscles of respiration during this does not seem to interfere with the recuperation of the abnormally tired muscles and one will find that the patient, after perhaps half an hour, perhaps one or two hours, will be capable of carrying on the respiration himself.

In face of the fact that a causal treatment cannot yet be established and that the patient,—provided that his state of nutrition is kept up and that he does not succumb to an attack of dyspnea,—very often recovers by rest only, the above-mentioned symptomatic measures are of great importance and the author feels convinced that the strict observation of above rules for feeding and above treatment of dyspneic attacks have saved the life of more than one patient.

In the treatment there are two things to be warned against, tube feeding and strychnine. As regards tube feeding one of two things may happen: either the pharyngeal reflexes are present and then the introduction of the tube exhausts the patient unduly, or the muscles cannot effect a pharyngeal reflex; then the tube only too readily goes down—in the trachea perhaps! Oppenheim is not the only one who has seen a fatal result from tube feeding in myasthenia. If the feeding per os as described above appears insufficient, rectal feeding will generally help sufficiently. As regards strychnine it seems obvious that in a disease where rest—absolute rest—is of supreme importance, a drug that will cause an increase in the reflectory stimuli to the muscles is absolutely contraindicated. It is therefore astonishing to find strychnin mentioned in the text-books among the remedies to be tried in myasthenia. It can not be seen that it has ever had any good effect; the same may be said of

most of the drugs which have been tried. In addition to this the author mentions the fact that the disease was observed at the University Hospital in Christiania ["Rikshospitalet"] and here recognized as a new clinical entity as early as 1887—the same year that Oppenheim sent out his first publication on the disease and 8 years after Erb described the "new probably bulbar group of symptoms." It has to be borne in mind that it was not till Oppenheim's first publication had appeared that the nature of the disease began to dawn on the profession—and that the disease could not be said to be fully recognized as an affection of the muscles till Jolly had published his research on the myasthenic reaction in 1895. [Author's Abstract.]

II. SENSORI-MOTOR NEUROLOGY

1. PERIPHERAL NERVES.

Mouchet, A. Treatment of Causalgia of the Median Nerve. [Presse medicale, October 24, 1918.]

Mouchet advocates Lortat-Jacob's procedure, viz., moderately tight ligation of the nerve with catgut above the lesion, in painful and severe paralytic conditions of the median nerve causalgic in type. The operation is very simple and quickly executed, and can be done under local anesthesia. The procedure allays the pain immediately and permanently. The author recommends its use in causalgia of the median where the condition has proven refractory to medical treatment, where the symptoms indicate total interruption of nerve function persisting after several months of observation, and where the electric reactions indicate a persisting nerve degeneration.

Jones, A. Rocyn. Tendon Fixation in Musculospiral Paralysis. [Journal of Orthopedic Surgery, March, 1919.]

Jones presents a plan for the fixation of joints by converting paralyzed tendons into ligaments. He gives a résumé of the history of the evolution of this form of treatment from the time of Tilanus, who first attempted the procedure in Amsterdam, in 1898. He uses this method principally for paralytic deformities of the foot. Gallie in 1912 reported a series of over one hundred cases of satisfactory fixation for deformities. He incised the periosteum and if an epiphysis was present the perichondrium also. These were then raised on either side and a trough made in the bone and cartilage. The foot was placed in the correct position and the tautly drawn tendon placed in the groove and a kangaroo tendon suture united the cartilage and tendon. The periosteal edges were brought together with a catgut suture and the rest of the tendon buried in the groove. In partial paralysis with persistent deformity he fixed half of the tendon and left the rest to functionate normally. Formerly the operation of tendon fixation has been confined

to the lower limbs owing to the frequency of their involvement of poliomyelitis. However, it has a special value when used in drop wrist from an injury to the musculospiral nerve, when the nerve is beyond repair. The hands and fingers have a feeble grasping power.

Shim, H. S. Beri-beri in Korea, Associated with Mental Disorders. [Korea Medical Society Journal, Aug. 28, 1917.]

During five years there were admitted to the wards of the Government Hospital in Seoul 253 patients with mental disorders. Of this number, 70 suffered also from beri-beri and 28 died (40 per cent.). The mortality was greater among the Koreans than Japanese, 75 per cent. as compared with 25 per cent. The physical condition of the Koreans was probably worse on admission than that of the Japanese owing to the Korean custom of neglecting those who are mentally unbalanced: but the fact that practically all those who developed beri-beri, did so after entering the hospital is worthy of note. The symptoms appeared within a month in 7 cases, within 6 months in 38, under 2½ years in 7, and a longer time still in 18 cases. Every month of the year was represented by the development of symptoms but the cases were most frequent in June, and next in May and July. The greatest death rate was one month later after each outbreak. The explanation of the outbreak is ascribed to the inability of the patients to take their food properly and their disinclination to take the medicines offered. Dementia affected 40 per cent. of the 70 patients; epilepsy, 12; paralytic dementia, 8; iodism, 2; and the rest were scattered maladies. The majority of the patients were between the ages of 20 and 30.

Riddell, J. D., and Igaravidez, P. G. Beri-beri. [Journal A. M. A., Feb. 22, 1919.]

Cases of polyneuritis appearing shortly after a serious epidemic of influenza in Camp Las Casas, Porto Rico, were soon recognized as beriberi, though this had never before been reported from the island. The disease appeared among the soldiers of the 373d Rgiment, and a study of their diet showed that polished rice was a staple article. Most of the soldiers did not eat their meat ration, and those that did partook of it only sparingly. Laboratory investigation was made, with examinations of blood, urine, feces, throat swabs and spinal fluid. The details of postmortem of one fatal case are reported. More than 90 per cent. of the examinations revealed hookworm also. The symptoms were characteristic, beginning with numbness over the legs, progressing upward from the shins; and in some cases affecting the arms. Pain was noticed in every case in the calf muscles, and in nearly every case this was previous to any other place. The peroneal group were next in order, and then the quadriceps and then the upper thigh muscles. Pain was intense on pressure there but did not follow the large nerve trunks; but only

reached the arms in about a third of the cases. There the pain was slight. Some degree of edema was noticed in thirty-four cases, with various degrees of partial anesthesia. Hyperesthesia was observed in nine cases. Fever and gastric disturbance were not very prominent or lasting, only eleven patients showing temporary rise of temperature at the beginning. Other conditions noticed in a limited number of cases were tachycardia, absence of patellar reflex, slight incoördination and in two, who died, dyspnea. All the patients began to improve on a high protein diet and practically no medication was employed. The surgical management of the cases consisted in relieving tension on muscles where there was the least evidence of paralysis, using light plaster casts in six cases where there was a marked degree of equinovalgus, removing it as soon as the drop symptoms disappeared. Thirty-two of the sixty patients were still under treatment at the time of the report.

Voegtlin, C., and Lake, G. C. Experimental Mammalian Polyneuritis. [Am. J. Physiol., Jan.. 1919, J. A. M. A.]

The investigation reported on by Voegtlin and Lake aimed primarily at the production of deficiency polyneuritis in animals which were closely related to man and which could be used to better advantage in studies on experimental polyneuritis and the physiologic function of the antineuritic vitamin. Experiments were carried out on dogs, cats and albino rats. Cats seemed to respond to a deficient diet with the greatest regularity and for this reason most of the work dealt with this species. The authors succeeded in producing polyneuritis in cats and dogs as the result of an exclusive dietary of lean beef which was heated for three hours at 120° C. in the presence of alkali (sodium carbonate). Proof of this statement is furnished by the symptomatology, treatment and pathology of the disease noted, which are essentially those characteristic of beri-beri. The authors are convinced that the disease is due to a deficiency of the diet in antineuritic substance and not to a deficiency in the other essential dietary components (amino acids, fat soluble vitamin, etc.). Exposure of the beef for three hours to a temperature of 120° C., without the previous addition of alkali, does not completely destroy the antineuritic power of this food. It is, therefore, concluded that the ordinary preparation of meat for human consumption does not lessen its food value in this respect.

Hewson, R. W. D., and Stewart, R. M. Acute Febrile Polyneuritis. [British Medical Journal, January 11, 1919.]

R. W. Dale Hewson and R. M. Stewart report a case of acute febrile polyneuritis which, as far as the authors are aware, is the first that occurred in the British Salonica force. The symptoms exhibited conformed closely to those described by Holmes in the cases that occurred in France. The sudden onset of illness in a healthy man with feeling of

malaise and slight fever, but no shivering, vomiting, sweating, or other symptoms characteristic of malaria, the rapidly developing flaccid motor paralysis, the implication of certain cranial nerves, the early loss of sphincter control, and the relatively insignificant sensory changes. The lower limbs showed a marked degree of paralysis, but no individual movement was impossible, nor were the distal segments of the limbs more paretic than the proximal. Muscular atrophy occurred to a very slight degree. The muscles of the upper limbs were much less severely affected. No affection of the intercostal or abdominal muscles was noted. Complete paralysis of all muscles innervated by the seventh cranial nerves was observed on the third day of the patient's illness, and formed a striking feature of the clinical picture. Articulation was slurred and indistinct. Neither the tongue nor the palate was involved, but the patient experienced difficulty in swallowing. There was no involvement of the muscles of mastication, and phonation was unaffected. The reactions of the pupils were normal, but paresis of the left external rectus was noted, and the patient complained of occasional double vision. Cutaneous sensory disturbance was very slight. At first slowness of perception of tactile and painful stimuli was noted, one at a later date a raised threshold for the appreciation of simultaneously applied compass points. Joint sense and vibration "sense" were apparently normal. The abdominal and plantar reflexes were absent; also the deep reflexes (except the triceps jerks). Incontinence of feces existed for two days. There was no disorder of mental functions. Definite imrovement was noted twelve days after the onset of the symptoms. Examination of blood, the cerebrospinal fluid, and the urine yielded negative results. It remains to be noted that in one or two particulars the patient did not conform to the usual clinical features. While sphincter trouble was very transient, the difficulty in swallowing persisted up to the time of the patient's evacuation from Macedonia. Paralysis of the diaphragm, not hitherto recorded, was present in this case. The proprioceptive forms of sensation, which are said to be frequently involved, were unaffected. Although a typical malarial attack occurred on the twenty-first day of illness, the parasite of benign tertian fever being demonstrated in the blood, the authors are of opinion that this fact furnishes no conclusive proof that the case reported was conditioned by the malaria toxin. There was no history suggestive of malaria, nor was the parasite found until the patient had been three weeks in hospital. Moreover, a differential blood count gave normal results. The authors, however, base their opinion chiefly upon the fact that in cases of post-malarial multiple neuritis that have come under their observation, the clinical features have been very different from those described in the case reportd. The recent occurrence of a variety of polioencephalitis in epidemic form in the British Isles suggests the presence of some such pathological basis, but the complete integrity of the mental functions and the clinical course

of the symptoms observed in this case, renders such an etiology extremely unlikely. [Med. Record.]

Bradford, R. Acute Infective Polyneuritis. [Quarterly Journ. Med., Jan., 1919.]

It is held by Bradford and his associates that so-called acute febrile polyneuritis is a very definite entity, capable of being separated clinically from other diseases of the nervous system. It is a diffuse affection of the nervous system affecting the spinal cord, spinal ganglia, and peripheral nerves, with but a slight incidence on the cortex. The lesion is essentially one affecting the nerve elements, cells, and fibers. The malady can be transmitted experimentally from man to the monkey, and the characteristic lesions reproduced in the experimental animal. A living virus can be shown to be present, both in the human cases and in the inoculated monkeys. The clinical and pathologic features of the disease have been reproduced in monkeys by the subdural inoculation of the emulsion of human cord preserved from twenty-five days to seven months in glycerin, and also by direct inoculation from monkey to monkey of emulsion of the fresh cord or of cord preserved in glycerin and, moreover, by inoculation of the pure culture. These facts, together with the apparently definite incubation period of from five to six weeks, lead the authors to the conclusion that this is a specific infective disease of a gradually ascending nature from the nerves to the entire nervous system. Pathologically, it appears to be distinguishable from acute anterior poliomyelitis, although closely allied to it, and suggesting that this term and those applied to other hitherto obscure diseases of the nervous system (Landry's paralysis, acute ascending paralysis, polioencephalitis, and yet others) may ultimately be found to cover or be overlapping designations for a group of closely allied and infective diseases of the central nervous system. [J. A. M. A.]

Coombs, Helen C. Dorsal Spinal Nerve Roots and the Brain Stem in Relation to Respiration. [Am. Jour. Physiol., 1918, 46, 450–471.]

Cutting the thoracic and cervical dorsal roots in the cat caused costal respiration to slacken or stop. If the thoracic roots only were cut the abdominal respiration did not cease. Section of the brain stem below the anterior corpora quadrigemina acts in the same way as double vagotomy, in slowing and deepening respiration, abdominal breathing predominating over costal. After this operation the division of spinal dorsal roots produces no further effect. Reversing the order of the two operations, however, has the result of the second increasing the effect of the first. The same relations described by Sherrington in afferent and efferent nerve roots were found in the afferent and efferent intercostal roots.

Albert, F. The Path of Absorption of the Tetanus Toxin [Compt. Rend. Soc. de Biol., 1918, LXXXI, p. 1127.]

From his experiments on guinea-pigs and white mice, Albert concludes that, as a general rule, there has been a tendency to exaggerate the importance of the nerve centers as paths of absorption of the tetanus toxin. This route is wholly secondary: it cannot evolve a generalized tetanus but gives rise to the atypical, local forms of tetanus. All severe generalized tetanus is the result of an absorption of the toxin by the blood stream. It is by this path that the nerve centers, especially those of the bulb are affected. [Leonard J. Kidd (London, England).]

Taylor, Kenneth. Tetanus. [Journal A. M. A., March 9, 1918.]

Taylor says that, owing to the use of antitoxin in all the allied armies, acute tetanus, formerly a scourge, is a comparatively rare disease, its incidence averaging, perhaps, two or three cases in a thousand. The amount of the prophylactic dose given is usually from 750 to 1,500 units in the French army and United States army and 500 units in the British army. It is recommended that in severe cases, especially in fractures, a second injection of 1,500 units should be given within six days. It should be remembered that the immunity afforded by a single injection lasts for only about ten days, and that if the bacilli remain in the body longer than that acute tetanus may develop. Such cases are not rare, especially in some of the amputations, in which devitalized tissue is enclosed within the amputation flaps. Perhaps the early débridement of the wound is as important as the use of the serum, but it should never be considered as a substitute for serum treatment. Secondary operations are sometimes followed by the disease, and a general order has been issued by the French medical service advising the administration of a dose of 1,500 units of serum before every secondary operation. Anaphylactic reactions from secondary inoculations are very rare, and can probably be entirely prevented by the use of the desensitizing dose, namely, the subcutaneous injection of from 0.5 to 1 c.c. of the serum, followed after three or four hours by the remainder of the dose. Serum sickness may occur in spite of this precaution at any time between three and eight days after injection. It is characterized by edema, local or general urticaria, joint pains, and occasionally fever, vomiting and general malaise. It lasts usually from one to five days. The prognosis is good. The diagnosis of acute tetanus requires no remarks. It is too plain. The treatment of acute tetanus, once the symptoms are established, is unsatisfactory and the prognosis bad. Large doses of serum and all the other remedies are usually unavailing and about 80 per cent. of the patients succumb. Various chronic and more or less local forms of tetanus are not uncommon. Cases are reported occurring more than three months and even a year after operation and complete healing of the wounds. Pure local tetanus is rare. The onset of chronic

tetanus is usually gradual and the diagnosis is not always easy. Its treatment is largely surgical. The wound should be explored and the dead tissue removed, and amputation may be required though this is rarely necessary. Sedatives may be administered and antitoxic serum injections instituted. Quiet and a sustaining diet are as important as in the acute cases. The prognosis is usually good, but is worse the greater the time since the last infection. Gradual involvement of higher centers is, of course, a bad sign.

2. CRANIAL NERVES.

Thompson, George W. Herpes Zoster Affecting the Ciliary Nerves. [Brit. Journ. Ophthalmol., 1918, II, p. 624.]

A record of four cases of herpetic eruptions on the sclera occurring in the course of severe attacks of herpes zoster ophthalmicus affecting the branches of the first division of the trigeminus nerve, including its nasal branch. In cases of this kind, there are seen usually herpetic vesicles on the cornea, keratitis striata, keratitis punctata, and iritis. The efflorescences take the form either of small, reddish nodules, or of larger nodules the center of which is transparent, or even resembles a limpid vesicle. They usually appear about a fortnight after the corneal disturbances have declared themselves, and persist for a month or two longer than the latter. They clear up eventually, leaving a slight discoloration of the sclera, and an adhesion of the overlying conjunctiva. The underlying cause must be treated, be it syphilis, influenza, or nasal or dental affections.

Marchand, L. Facial Diplegia from Trauma. [Prog. Méd., 1918, p. 120.]

This syndrome is rare and even since the war, according to Marchand, it does not seem to have been increased in frequency. The following causes are operative according to the author. (1) Brain lesions which are severe enough to cause the syndrome described usually terminate fatally within a few days, even a few hours. (2) Implication of the aqueduct on both sides in fractures are rare. The author reports the history of a soldier of twenty-two who, knocked down by a truck, developed coma, epistaxis, aural hemorrhage, sub-conjunctival and palpebral echymoses. Facial diplegia then developed without involvement of any other cranial nerve, a syndromy which the author argues following a double Fallopian aqueduct lesion had resulted. When the patient was examined eight months later, on the left side some return of voluntary control of the face had occurred, but the patient had lost the sense of taste in the anterior two thirds of the tongue, and showed motor disability over the left half of the soft palate, proving that on that side the lesion lay central to the geniculate ganglion; on the right side alar symptoms were absent, hence the lesion probably lay on the per-

ipheral side of that ganglion. The relatively rapid recovery of power on the left side suggests that the left facial nerve was merely compressed by a hemorrhage, as it coursed through the aqueduct of Fallopius. The persistence of the facial paresis on the right side was more grave, since no voluntary power had reappeared on this side eight months after the accident. Electrical examination, however, showed that even on that side R.D. was absent; complete recovery was, therefore, more than possible.

Parker, G. H. Sense of Hearing in Fishes. [Proc. of Am. Philosoph. Soc., 1918, 57, No. 2, p. 30.]

A number of fishes from the cyclostomes to the teleosts investigated by different persons and summarized by this author indicated the sense of hearing exists in a number of fishes. Much work on the catfish shows audition mediated through the sacculus mainly, perhaps solely, and that only low tones are audible.

Winkler, C. Innervation of the Semi-circular Canals in the Labyrinth of the New-born Rat. [Arch. neerl. de physiol., 1918, 2, 556–561.]

A use of the Cajal method discovers in the labyrinth of the newborn rat afferent nerves separating into a perilymphatic network which covers the periosteum of the cartilage connected with the plexus basalis, a plexus lying next to the endolymph and a third outside of the membranous canal. Fibers from the basal network surround the bacillary cells. The semicircular canal accordingly constitutes a liquid-filled tube, whose walls include a double netwok of nerve fibrils depending from the perilymphatic plexus. An adaptation for the reception of stimuli is therefore seen in the whole system of canals through its ciliated cells.

Stenvers, H. W. A Position Reflex of the Pelvis in Man. [Arch. neerl. de physiol., 1918, 2, 660–673.]

A patient in the neurological clinic, lying on left side with head bent toward left shoulder, when she turned over to right first rotated the pelvis, then with quick movement the head, and last the shoulders. Holding the pelvis fast prevented her from turning the head either way. The same relative position of head and pelvis was maintained, the pelvis always leading in the motion, and the other parts following as an apparent reflex. Holding the head while the pelvis was moved caused the eyes to follow the pelvis. These purely tonic reflexes of head and eyes occurred as long as shoulder and head were opposed.

Bard, L. The Rôle of Bony Sensibility in the Perception of the Vibrations of the Tuning Fork by the Cranial Walls.

Otologists have attributed the variation in perception of tuning fork vibrations by the cranial walls, this writer states, to an acoustic phenom-

enon in agreement with the sound waves through the auditory labyrinth by means of its bony walls. His attention was drawn to a distinction by finding a totally deaf patient, in whom later autopsy showed the acoustic and vestibular nerves to be completely destroyed, but who had yet been able to perceive such vibrations from the forehead and the mastoid. Later experience confirmed this sensibility in others totally deaf. Those with hearing intact probably have this sensibility beside the perception of these vibrations through the auditory nerve. In all tests it is therefore important to distinguish between these two means and forms of perception. He believes that the first sensations received are the acoustic, which at first dominates and masks the tactile. But the latter outlast the acoustic sensations and are besides more acute. This has been discovered by comparing the duration of this sensation in the deaf and the sound and by comparing in the same subject the duration of perception upon the cranial bones and in other parts of the skeleton. Account must be taken of a certain amount of error in the intensity of the vibrations and of the noise, which may be partially obviated by the choice of the same instrument, also by avoiding contact of the instrument with the ear when testing at the mastoid, as this increases the intensity and duration of the auditory sensations. The acoustic sensation is never as definitely located as the tactile sensation at the point of contact.

Further distinctions can be obtained by comparing the vibrations of the fork with the ticking of a watch, one emitting only sound waves, the other being accompanied by added elements of a shaking character. The fact that the bony sensibility of the skull contributes so much to the perception of vibrations of the tuning fork necessitates a revision in methods of testing. The placing of a watch upon the vertex under the same conditions and in the same subject, does not give the lateralization of the sensation, which may be obtained from the tuning fork. This can be obtained if the two ears are normal by simple pressure upon the auditory orifice. It would seem from the test with the watch that the lateralization of the perception is due chiefly to the vibration of the air of the ear conduits via the bony walls, the sound wave engendering an aërial resonance which arrives at the labyrinth as an auditory sensation by the normal path of the small bones. In unilateral labyrinthine deafness the absence of lateralization is explained by the fact that an insensible cochlea will not perceive the vibration of the air by the normal path any more than by the direct bony transmission, supposing that this could act upon it in reaching it. On the contrary, lateralization in deafness in the middle ear can be explained by the air vibration, which is greater on this than on the sound side. Thus while the value of the tuning fork may be lessened in one direction as a testing means, it is shown to have an added value in the exploration of deep tactile sensation

in its particular form of the sensibility of the bone as conductor of vibrations.

Friedenberg, Percy. EQUILIBRATION. [Journal A. M. A., April 6, 1918.]

The author says that the great importance of aviation and the need of full information as regards the functional integrity of the aviator, has in his opinion led to an exaggerated idea of the importance of labyrinthine vertigo and the belief that a normal labyrinth is the sine qua non and the only essential for equilibration. As a matter of fact, we must recognize, he says, that there is a continuous series of vertigo forms ranging from purely labyrinthine, due to rotation, to the purely visual without any motion or rotation component whatsoever, and that all of these forms are of practical importance as they equally interfere with balance and direction control and with full and undisturbed consciousness. Forms of dizziness that may disable an aviator, may occur in neurasthenic, anemic, alcoholic, and other conditions. Aside from such, apparently healthy subjects suffer from dizziness, due to various ocular anomalies. Labyrinthine disease is not common even in the hospitals, and when it occurs the patient is generally critically ill, at least he is not hunting a position in the flying corps, and the same may be said of those with dead labyrinths. He reviews the various ocular conditions inducing vertigo, such as that due to looking down from heights, and claims that the body position is brought into corresponding relation to a visually sensed standard. Possibly the vertical semicircular canal plays a relatively important part in equilibration, and it would be of interest to learn whether there is such a thing as rotational vertigo in a vertical, instead of a horizontal, plane. Acrobats could perhaps give us some points on this. A trained teacher in aviation could usefully make notes on his pupil's reaction to unusual visual conditions. In conclusion Friedenberg says a word as to vision in relation to flying. Normal distant vision is of course important, but there are other factors. Sight must be used under very unusual conditions. "Thus the question of hypersensitiveness to bright light, the sharpness of the sense of motion—a function of the periphery of the retina that has been studied but little—the acuity of vision in lowered illumination, the appreciation of contrast in form, color and light, all of which have an important bearing on the recognition of distant objects, especially those seen at unfamiliar angles which have no association in shadow or relief, the rapid and accurate judgment of distance, direction, size, and depending on all of these, pace, make an interesting and practical problem."

Lermoyez, M. VERTIGO WHICH RESTORES THE HEARING. [Presse médicale, January 2, 1919.]

Lermoyez notes that in the true Ménière syndrome, there is sudden, paroxysmal, and recurring dizziness; coming on during apparent good

health, the attack suggests sudden brain impairment. Sometimes the patient falls to the ground at the outset, and often he is seized with nausea and vomiting. Consciousness is rarely lost. When the attack subsides the patient becomes aware that he is deaf. Later, audition nearly always returns, but slowly and incompletely. Lermoyez describes a new condition in which the sequence of events of the Ménière syndrome is reversed. Audition becomes numbed gradually and is finally completely lost, apparently without hope of recovery. Suddenly, severe vertigo appears, and within a few hours hearing is restored. The origin of both Ménière's and the latter syndrome is obscure. The author is inclined to ascribe them to disturbances of labyrinthine circulation—particularly to local angiospasms in neuroarthritic or gouty subjects suffering from exaggerated susceptibility of the labyrinth to external excitants such as certain noises or violent, prolonged motions of the body, as well as to internal irritants, viz., various forms of intoxication, including especially those of gastrointestinal origin. Such phenomena belong in the same group as the "vascular crises" described by Pal, and correspond to Wagenmann's case of recurring amaurosis of the right eye during which the ophthalmoscope showed contraction of the retinal arteries. Spasm of the internal auditory artery induces the complete Ménière syndrome. Spasm limited to its vestibular branch induces a paroxysm of vertigo, without concomitant disturbances of hearing. spasm limited to the cochlear branch induces sudden paroxysms of deafness with marked whistling in the ears, but without vertigo. The author has encountered several cases of this half-syndrome of Ménière.

3. SPINAL CORD.

de Boor, S. The Form and Structure of Dermatomes in the Animal Body. [Psychiat. en Neurolog. Bladen; Feestbundel Winkler; Amsterdam, 1918, 1–24.]

How far do the sensitivity and other functional activities of the skin influence the shape and topographical extent of the dermatomes is answered by the statement that they change their position and grow in the direction of those regions of the skin more frequently stimulated. A study of flat fish and other animals shows that the dermatomes more frequently overlap in the ventral than in the dorsal surfaces of the body. A study of the trapezial shape of the trunk dermatome and its variations is made also from the functional point of view.

Riddoch, George. The Mass Reflex in Injuries of the Spinal Cord. [Lancet, December 21, 1918.]

In a short resumé of his work which has appeared in Brain and previously noted in this place Riddoch says that in a well-defined group of cases, especially where there is a complete division of the spinal cord, after the stages of shock and of flaccidity have passed off the "mass

reflex" may develop and give rise to many difficulties in the treatment and nursing of the patient. The mass reflex is set off by any nocuous stimulus applied over the paralyzed parts and consists of flexion at the hip and knee, dorsiflexion of the foot and toes, and flexion of the trunk if the lesion is sufficiently high. The resumption of the former position after the passage of the reflex is due entirely to the action of gravity when the contraction of the flexors ceases. The reflex is a uniphasic movement in which the flexors are alone involved. The response is generally bilateral with a moderate stimulus, and always so when the stimulus is applied in the middle line, as to the genitals. The energy of the stimulus also commonly overflows into regions not usually associated in reflex actions, thus stimulation of the sole of the foot leads to evacuation of the bladder and often to profuse sweating over an area corresponding to the level of the spinal lesion. Conversely, evacuation of the bladder or rectum may provoke the mass reflex. While the exciting stimuli of the mass reflex are usually nocuous, when the excitability is very high it may be provoked by such gentle stimuli as light pressure, removal of the bedclothes, etc., especially when affecting the terminal regions which have the lowest thresholds. The reflex indicates a very low grade of neural control in which the anchored patient has but one reaction to a stimulus—withdrawal. The associated emptying of the bladder, provoked by the reflex, can be utilized to advantage in avoiding catheterization and the patient can be readily taught to employ this method of evacuating his own bladder at definite intervals. This greatly reduces the danger to life which is always associated with retention, catheterization, and infection of the urinary tract. The reflex causes much distress to the patient and gives much trouble in nursing. Every possible care must be taken to prevent setting off the reflex and all nursing procedures, including catheterization, the giving of enemas, moving, changing the bedclothes, etc., must be carried out with the utmost gentleness. Solutions for washing the penis or irrigating the bladder must be bland; excoriation of the skin by moisture must be prevented; bed sores must be treated promptly and with bland solutions and dressings. The patient must be placed in the most comfortable position and the bedclothes may have to be supported by a cradle. Attention must be given to the diet to prevent dyspepsia and digestive disturbances. Where the bladder remains paralyzed it must be emptied regularly by gentle catheterization.

Cobb, Stanley. Electromyographic Studies of Clonus. [Bulletin of Johns Hopkins Hospital, Nov., 1918.]

Five patients were studied by means of a string galvanometer. The results obtained by this method must necessarily be more accurate for the study of muscular phenomena than those formerly applied to clinical observation. Clonus apparently gives a typical electromyogram. Usually the first few periods of clonic contractions are longer than the succeeding

ones, but after a short time the clonus falls into a steady rhythm. In different people the average length of the periods varies by only a few hundredths of a second; the shortest was twelve one-hundredth second and the longest seventeen one-hundredth second. Of the five cases studied two had patellar clonus alone, two had ankle clonus alone, and one had both patellar and ankle clonus. Fatigue did not affect the rate of clonus in these cases. However, variation in the strength of stimulus used to excite the clonus affected the rate. An increased stimulus increases the rate of clonus and the size of the electromyographic waves, but does not change the rate of the action currents.

Monrad-Krohn, G. H. On Abdominal Reflexes. [Christiania, 1918.]

Based on examination of 472 cases—the overwhelming majority of which presented neurological diseases of various kinds—the author discusses the occurrence and significance of the abdominal reflex in various conditions. Most of his observations concern the pathology of the reflex—only the most important of which can here be summarized.

As regards the normal abdominal reflex he has not much to add to what previous writers have already observed. He confirms the statement that, given normal conditions of the abdominal wall, the underlying abdominal organs and the nervous system, the reflex is practically a constant one—and symmetrical, *i. e.*, equal on both sides. It is however less constant in infants and on account of this has but very little diagnostic value during the first six months and in fact a very limited one during the whole first year of life. Toward the end of life the reflex again becomes less constant. Repeated pregnancies no doubt account for loss of the abdominal reflex in a number of cases, although on the other hand the reflex may remain very active even after numerous pregnancies. (As an instance the author records the case of a woman aged 41, pregnant in the sixth month, and for the 11th time, where the abdominal reflexes were very active and equal.) During the puerperal period the abdominal reflex is frequently unequal (apparently due to uneven stretching of the abdominal wall).

The author elicits the abdominal (and epigastric) reflex by means of stroke with a pencil, or more commonly a pin, in the different regions of the abdomen and accordingly distinguishes between epigastric and supra-umbilical, umbilical and infra-umbilical reflexes. The motor response consists in a homolateral contraction of the abdominal muscles resulting in a lateral deviation of the umbilicus and the linea alba. In order to observe this the more easily it has been found advantageous to draw a line with a skin pencil from the xiphoid process to the symphysis ossium pubis. When the stimulus is not too strong it is easily seen that the motor response corresponds to the stimulus in level—in other words the normal abdominal reflex is a homosegmental reflex. When the abdominal wall is fat and flabby, the author recommends stroking vertically

in the lateral part of the abdomen between the nipple line and the anterior axillary line. This is, in most cases, still in the central part of the reflexogenous zone—and a stroke here is less apt to cause a disturbing "wave" in the fat abdominal wall which may conceal or simulate a possible deviation of umbilicus. As for the reflex, which by some authors (*e. g.*, Church and Petersen in their well-known textbook) is described as an abdominal reflex—elicited by a tap on the costal margin with homolateral deviation of the umbilicus as response—the author points out that this is altogether a different sort of reflex from the abdominal reflex proper, which is a cutaneous reflex. It is often exaggerated where the real abdominal reflex is abolished as in pyramidal lesion. The author therefore proposes to term this reflex the periosteal reflex of the costal margin. It belongs to the order of "deep" reflexes and has nothing to do with the cutaneous abdominal reflex as described above. Normally exhaustion of the abdominal reflex is as a rule not noticeable, whereas on the other hand "facilitation" is quite commonly seen. In observation of a case, where facilitation was particularly strong, the author tries to show that the sensation of tickling, which as a rule accompanies the abdominal reflex—a sensation of the motor response (just as tickling elsewhere may be regarded as the sensation caused by reflex contraction of the musculi arrectores pilorum) not the exciting stimulus itself as Church-Petersen will have it.[1]

As regards the abdominal reflex in pathological conditions the author confirms the fact that a pyramidal lesion (cortical, capsular, mesencephalic or spinal) tends to abolish the reflex, just as of course a lesion of the more peripheral part of the reflex arc does.

In partial paralysis of the abdominal wall unaccompanied by any sensory loss the author has found that from the paralyzed areas of the abdominal wall it requires a stronger stimulus to elicit the abdominal reflex, and that this reflex, when elicited in contradistinction to the normal abdominal reflex gives a maximum motor response at a level different from that of the eliciting stimulus, *i. e.*, outside the paralytic area. In other words, while the normal abdominal reflex is homosegmental (maximum motor response corresponding to level of elicting stimulus, cf. above) the abdominal reflex elicited from a paralyzed (but not anesthetic!) part of the abdominal wall is heterosegmental. This heterosegmental abdominal reflex is characteristic of a partial paralysis of the abdominal wall (unaccompanied by gross sensory loss) as frequently seen in poliomyelitis. While peripheral motor disturbances thus cause a distinct alteration of the abdominal reflex, reflex changes do not

[1 In the case referred to a certain stimulus (stroke with a piece of paper) elicited a motor response only when preceded at an interval of less than four seconds by one or more stronger stimuli eliciting marked motor response ("facilitation"). When thus eliciting an abdominal reflex this stimulus caused a tickling sensation, while when applied without preceding facilitation and eliciting no reflex it failed to cause any tickling sensation.]

obtain so markedly in peripheral sensory disturbances. Thus in tabes, even when there is a slight hypo-esthesia over the abdomen, one generally finds the abdominal reflex more than usual. Only when in tabes there is a pronounced hypo-, respectively anesthesia over the abdomen, one finds the abdominal reflex diminished or abolished in the hypo-(an)esthetic area.

In hysteria with one-sided sensory disturbances over the abdomen, one finds as a rule the abdominal reflexes unequal—exaggerated in case of one-sided hyperesthesia—diminished, respectively abolished in case of one sided hypo- or anesthesia.

In paralysis agitans and chorea the abdominal reflexes are as a rule found exaggerated on the side affected (or chiefly affected). Finally the author on the strength of his observations submits that the reflex has a long cerebral arc, which reaches up to psychosensory and psychomotor areas of the brain and that besides this long cerebral arc (as accepted by most authors, denied by a few, amongst others Dejerine) there is an impeding or controlling apparatus represented by the rubral system, lesion of which (paralysis agitans = lesion of lenticulo-rubral or fronto-rubral tracts?, chorea = lesion of cerebello-rubral tracts?) causes an increase of the abdominal reflex. As regards the disturbance of tonus in paralysis agitans and chorea, one has to believe that the tonetic influence through efferent cerebellar (cerebello-rubral and cerebello-spinal) tracts is normally counteracted by dystonetic influences through pyramidal and lenticulo-rubral (fronto-rubral) tracts. When one of these latter is affected, the result is hypertonicity (pyramidal lesion, paralysis agitans), when the efferent cerebellar tracts are affected, hypotonicity. Thus lesion of the lenticulo-(fronto?) rubral tract gives hypertonicity and increased abdominal reflexes (paralysis agitans)—lesion of cerebello-rubral tract gives hypotonicity and increased abdominal reflexes (chorea). It is, however, strongly accentuated that this must only be regarded as a working hypothesis. The actual anatomical facts are not by a long way established yet and it is obvious that in reality the reflex mechanism is vastly more complex than the author's diagrams could indicate. [Author's Abstract.]

Montana, E., and Rueda, M. Stab Wound of Spinal Cord. [Repertorio de Medicina y Cirugia, Sept., 1918.]

A case of spinal cord compression by a fractured vertebra with partial cord section. The compressing lamina was lifted with probe and fingers, and sequestræ and clots were cleared out from below, leaving a rubber drain tube. Immediate relief and subsequent recovery left however certain sequelæ pointing out that laminectomy should have been performed. It is noted that in spite of the merely exploratory operation, this is perhaps the first case of recovery after such a serious injury of the spinal cord. As shown by the symptoms, the right posterior roots

and cords had been severed, together with the direct and crossed pyramidal tracts of the same side.

4. MID-BRAIN AND CEREBELLUM.

Moore, Wm. J. Surgical Importance of the Amygdalæ of the Cerebellum. [Glasgow Medical Journal, Oct., 1918.]

The medulla oblongata is protected, anteriorly and posteriorly, by a fluid cushion provided by the prolongation of the subarachnoid space, and laterally, by the amygdaloid bodies of the cerebellum, which are solid, semielastic bodies. Waves of force produced by violent blows or falls on the head, or falls from a height upon the feet, are dispersed by these cushions and to some extent warded off from the medulla. In particular, in fractures of the posterior fossa of the base of the skull in which the line of fracture runs towards the center of the lateral margin or margins of the foramen magnum, it is prevented from reaching the medulla by the presence of the amygdalæ between it and the bone. If a small piece of the margin of the foramen became detached, it would lacerate the substance of the amygdalæ to a certain extent, with most probably very little, if any, serious effect to the patient. Again, in the case of a longitudinal fracture of the base of the skull in which the line of fracture runs down either the central or lateral aspects of the basilar portion of the occipital bone anteriorly, and involves the tabular portion of the occipital bone either directly, posteriorly, or posterolaterally, the amygdalæ and cisterna would exert a mechanical protective function.

Martin, E. G., and Rich, W. H. The Activities of Decerebrate and Decerebellate Chicks. [Amer. Journ. Physiol., 1918, 46, 396–411.]

Removal of brain in front of the thalami in chicks when hatched does not affect normal locomotor and self-cleaning activities. Such chicks run towards moving objects, showing neither wildness nor fear, do not spontaneously drink, and do not seize food but only peck at it. Postponed till the third to eighth days, decerebration allows a resumption of scratching in litter. Postponed till after the eighth day, there is less pecking and no scratching. Removal of pallium only with corpora striata as intact as possible causes only minor differences. "Deep decerebration" of removing the thalamus produces unsteady walking and difficult preening, with lowering of the body temperature evidenced by effect of cold upon the functions. Removing cerebellum caused complete locomotor incoördination, with loud peeping and much struggling. Self-feeding is therefore thought to be dependent upon the cerebrum, while pecking and scratching, though lost for a time, may be regained in decerebrate chicks. A connection is indicated between the cerebrum and drinking, supposing that this act is developed since the time of marine existence, and that it developed along with the cerebrum.

Léri, André, and Schaeffer, Henri. A Case of Bulbar-Spinal Lesion Due to Concussion by Shell Explosion. [Revue Neurologique, An. XXIV, No. 1, Jan. 1, 1917.]

The explosion of a shell about three meters from the patient caused transient unconsciousness and the development of a Millard-Gübler syndrome, a left hemiplegia and a right-sided facial palsy, dysarthria and dysphagia. The patient recovered sufficiently to return to his post but developed a hysterical mutism as the result of the bursting of another shell in his vicinity. This was cured by psychotherapy. Bulbar hemorrhage is usually fatal. The author suggests that cases of fatalities due to shell shock without visible injury, and formerly attributed to atmospheric decompression or gas intoxication, are, in many cases, due to bulbar hemorrhage. [Camp (Ann Arbor).]

Flamma, S. Pregnancy Chorea. [Annali di Ostetrica e Ginecologia, Feb., 1917, 19, No. 2.]

A woman of 21 developed chorea at the third month of her first pregnancy which was arrested causing the chorea to subside. The choreic movements recurred in the second month of her second pregnancy, a year later. Flamma believing the trouble was principally of nervous origin, made a sham obstetric intervention under chloroform anesthesia. The chorea rapidly and completely disappeared. A review of literature on chorea gravidarum shows chorea in childhood, hysteria, a fright or an inherited neurotic taint as antecedents, while in some cases no factor could be incriminated except the pregnancy. He notes that pregnancy chorea and chorea in the pregnant do not necessarily coincide. A late compilation gives mortality of pregnancy chorea as 8.3 per cent. Sham abortion was followed with similar results in another case in the clinic, the psychogenous manifestation being incoercible vomiting. Before inducing actual abortion in dubious cases of the kind, a sham intervention may answer the purpose.

Flamma considers these two cases, of same origin but different symptoms prove the psychogenous origin, and suggests the trial of sham intervention in similar cases.

Graves, S., and Paige, B. H. Etiology of Chorea. [New York Medical Journal, Feb. 15, 1919, J. A. M. A.]

The case cited by Graves and Paige is unusual because of its rather acute onset, apparently simultaneously with "rheumatism," its associated endocarditis and its postmortem pathology. The patient was ill only about three weeks. The final gross and microscopic diagnoses were: lobular pneumonia, vegetative endocarditis, acute toxic splenitis, toxic hepatitis and midzonal necrosis; toxic nephrits (early tubular), polypoid adenomata of cecum. The bacteriology showed pneumococcus from the lungs and heart's blood (septicemia five hours postmortem) and *Staphyl-*

ococcus aureus with pneumococcus from the right middle ear. This case offers several interesting features. Apparently a typical acute chorea made its appearance synchronously with acute infection. The spinal fluid was negative. Histologically the brain was negative. The authors suggest that the blood and spinal fluid be examined repeatedly, bacteriologically and serologically, in every case of chorea. It is possible that acute or Sydenham's chorea is due to the action of bacterial toxins, perhaps a selective action on central nerve cells, in persons whose inherited nervous instability makes them more readily subject to such toxic action.

5. MENINGES.

Camac, C. N. B., and Bowman, K. M. Epidemic Cerebrospinal Meningitis. [Arch. Int. Med., Jan. 15, 1919.]

These authors report on the findings in ten cases of epidemic cerebrospinal meningitis at Fort McPherson. In five cases Kernig's sign was elicited, opisthotonos in three, headache in eight, orthotonos in two, delirium in six, and rise in temperature in eight. One case showed pulse above 103. Vomiting was present in six. In seven cases lumbar puncture showed a cloudy fluid; in three the fluid was clear. The progress of the disease was marked by the following findings: Serum reactions occurred in all save two, one of which was practically moribund. The other, a negro, had pains in the joints. Of six patients in whom opisthotonos was at first missing, it developed later in two. Orthotonos was frequent. Herpes labialis occurred in three cases. Purpura and rash was absent. The "spotted" rash, one of the usually sought for features of this disease did not occur.

Rydgaard, F. Atypical Forms of Meningitis. [Hospitalstidende, Dec. 11, 1918.]

Rydgaad reports a series of anomalous types of meningitis. Two are emphasized, one a boy of three years and the other a man of 28 years, in which an apparently non-bacterial purulent meningitis was associated with diphtheria organisms in the throat. He speaks of it as a toxic meningeal reaction of which but few instances are on record. The patients were treated with an antimeningococcus serum, with recovery. In a third patient there was an aseptic purulent meningitis with an infectious sore throat but diphtheria bacilli were not found. Non-bacterial purulent meningitis has been found as an accompaniment by a number of toxic factors, notably uremia or parotitis, after spinal cocaine or stovain anesthesia, with infectious processes in the vicinity of the meninges, and with abscesses. Rydgaard calls attention to one case history of a woman, who, apparently sound and free from syphilis, developed monthly with the catamenia an aseptic purulent meningitis.

Glover, J. A. The Prevention of Epidemics of Meningitis. [British Medical Journal, November 9, 1918.]

Glover discusses the several factors which contribute to the outbreak of epidemic meningitis, especially with reference to the troops. The most important of these, and the one most easily attacked, is the question of crowding, or the space allowed per man in barracks. Careful investigations of the changes in carrier rates for the epidemic varieties of the meningococci, and of their relations to cases of the disease, show that the allowance of two and a half feet between beds has been reduced. The appearance of a high carrier rate generally indicates overcrowding and dangerous conditions. The approach of an epidemic outbreak can be foretold by a study of the carrier rate and the epidemic can usually be prevented by prompt reduction in crowding and by "spacing out" of the men's beds to a distance of not less than two and a half feet apart. A carrier rate amounting to twenty per cent. marks the danger line and figures above this rate are usually indicative of imminent danger of the outbreak of cases of meningitis. Carrier rates between ten and twenty per cent. are unsatisfactory and imply a certain amount of overcrowding. Under the best conditions in barracks the usual carrier rate should lie between two and five per cent. In addition to the spacing out of the beds, adequate provision should be made for ventilation, and each man should have at least forty square feet of floor space. The increase in the carrier rate following overcrowding occurs rapidly, while the reduction in the rate which follows spacing out and improved ventilation is far less rapid.

De Nunno, R. Epidemic Meningitis. [Riforma Medica, Nov. 2, 1918.]

This author, from a series of laboratory researches, purports to show the various findings in the cerebrospinal fluid in correllation with the clinical picture of epidemic meningitis. The urea content, but not the albumin content, is said to bear on the prognosis, the albumin content being possibly useful in differentiation from tuberculous meningitis. Determination of the chlorids and the content of substances reducing the Fehling reagent helps in both diagnosis and prognosis. When the fluid is limpid or slightly turbid, epidemic meningitis is indicated when the albumin is about 3 per thousand; of chlorids above 6.09 and below 7.32 per thousand, and the reducing substances diminished or lacking. A favorable prognosis is indicated by chlorids above 6.43 and urea below 0.24 per thousand, and the reducing substances not too low. The Vincent-Bellot precipitation test, more reliable when done with the zonal technic, is valuable for the differential diagnosis. Meningococci, found loose in the fluid, particularly when associated with other germs, indicate a very serious condition. The meningococci are frail, and are liable to die if sent to a distant laboratory for identification. A diagnosis based on the precipitation reaction and the chemical tests facilitates the imme-

diate injection of the specific antiserum. Nunno regards as a very unfavorable sign a limpid fluid at a first examination—serotherapy.

Marañon, G., and Ruizy, Falco. Present Status of Epidemic Meningitis. [Siglo Medico., Dec. 7, 1918.]

The author makes a strong plea for rigid isolation and the detection of meningitis carriers. All people in contact with meningitis cases should disinfect the nose and throat. Preventive vaccination is promising. Serotherapy must be vigorous. 120 c.c. of the antiserum in five days was used by him in one instance. Good results from irrigation of the spinal cavity are reported. 50 or 60 c.c. of spinal fluid is first withdrawn and the same amount of saline is injected. The feet are then raised for two or three minutes, and 50 or 60 c.c. of fluid is withdrawn, an equal amount of saline being reinjected. After this antimeningococcus serum is injected and left.

Despine. Nervous Complications of Influenza in Children. [Arch. d. M. d. Enf., Jan., 1919.]

Two children, about six years of age, are here reported upon. They developed a meningoencephalitis with increased polynuclear leucocytosis in the cerebrospinal fluid and somnolency and paresis of the cranial nerves. The treatment was lumbar puncture, once in one case and three in the other.

Roberts, Dudley, and Stetten, De Witt. Hydrocephalus in Meningitis. [Journal A. M. A., Jan. 25, 1919.]

These authors review the literature of ventricular obstruction and hydrocephalus in cerebrospinal meningitis which has been long observed. All cases had been fatal until 1907, when Koplik revived the discussion of its therapy and others following him reported recoveries after ventricular puncture. The dominating note in the infection in the majority of the cases reported is the extension of the infection by *Diplococcus intracellularis* into the ventricles. This is followed by the formation of a polycephalus or at least a distention of the ventricles by a turbid if not a purulent fluid. The blocking of the ventricles does not seem a vital feature of the pathology, and the treatment advocated is less the drainage of the overfilled ventricle than the intraventricular administration of the specific serum. The authors believe that while this type of case is not uncommon there is another closely allied form in which the question of actual infection of the ventricles has a minor rôle. In fact the primary infective process may be mainly over and the ventricles absolutely free from infection, but the essential picture is one of acute internal hydrocephalus due to ventricular obstruction and secretion of fluid from the ependyma. When this develops intraventricular serotherapy is less important than definite and more or less permanent

ventricular drainage. Clinically these cases are more or less characteristic. After about the first week the spinal symptoms become less marked or may even almost disappear and the patient seems to be improving, when suddenly the cerebral symptoms come to the fore. The temperature is not necessarily abnormal, but irregular, and the pulse becomes relatively slower. Headache is more intense, vomiting is not rare, convulsions, delirium, and stupor develop and incontinence of urine and feces. The optic disks show definite evidence of choking and everything points to rapidly increasing intraventricular pressure. Lumbar puncture gives no relief, and there is reduced spinal pressure which is not increased by coughing and straining. This condition is specially ominous as the ventricles tolerate pressure and distention poorly as shown by the rupture of brain abscess or hemorrhage into the ventricles. It is clear that lumbar puncture or superior vertebral puncture, or drainage of the cisterna magna is futile in this type of case. Simple ventricular puncture is inadequate as the wound closes immediately when the needle is withdrawn, and mere subtemporal decompression does not relieve. Von Bramann, who originally suggested direct puncture of the corpus callosum, seems to have overlooked its possibilities in this class of cases, though he uses it in almost every other variety of intracranial tension. In performing the operation a rather wide opening should be made in the corpus callosum by gently moving the canula. It is said to remain patent and that a more or less permanent connection is made with the subarachnoid space. It may close after the exudate over the fourth ventricle has been absorbed and the foramina have reopened but in that case the object is attained—the intraventricular pressure is relieved. In fact, as Flexner has suggested, the block may not always be due to actual organic obstruction, but to lack of mechanical resistance allowing the distention of the ventricles, and in this case puncture of the corpus callosum would break the vicious circle of distention tightening the closure and causing further distention. A case is fully reported by the authors in which this operation was life-saving, and they also believe that puncture of the corpus callosum, which is not difficult or specially damaging, would relieve the distressing symptoms in some nonfatal cases. The contention that the injury to the association fibers causes an aprxia is not verified by practical experience. The immediate postoperative improvement in the patient whose case is reported was almost miraculous, and the authors feel that they are justified in recommending the method when the clinical picture of ventricular obstruction appears in the course of cerebrospinal meningitis.

Book Reviews

Woodworth, Robert Sessions. Dynamic Psychology. Columbia University Press, New York, 1918.

This small book forms a convenient and readable volume for any one wishing to familiarize himself with the modern trend in psychology in a somewhat cursory sort of way, as well as with a brief history of the origin and development of psychology as a branch of scientific study. There are however a superficiality and confusion about it as a psychological study which are not redeemed by the author's constant insistence upon the "drive" at work in individual and socially collective activity. The time has passed when only descriptions of the forms of behavior or even interpretations which reach no further than to explain a little more in detail some particular eddy in behavior can be offered a thinking throbbing world of human striving and human need. The demand had already been widely made and has already been largely answered for a psychology which shall go deeper and deeper into the sources of human behavior, human feeling and human thinking, investigating these as truly genetic phenomena informed by a dynamism which is the ever-widening and progressive expression of energy and the impulses and reactions through which it manifests itself. "Dynamic Psychology," as the author has used the term, drops the plumbline of investigation no further than just beneath the surface of the stream. Here he discovers a multitude of impulses, instincts, tendencies, methods of trial and error, hindrances, confusing factors of various sorts,—he even attempts to discuss some of the deeper impulses but only as he first hauls these up to this more superficial level where he lays them open to the same descriptive investigation. Of a true investigation into the deepest source of human striving and of all the confusions, successes, renewed, restimulated progress of this, in its essential unity of beginning in the dynamic evolutionary movement of things we do not read. Therefore we do not get the unity at the basis of the striving nor an interpretation of its meaning either in the correlation of individual personality nor of social adjustments. We see neither the aim and purpose in the movement of mental life which has both made this mental life, which is the subject matter of psychology, nor the synthetic understanding of this which justifies and makes fruitful a science of psychology.

The writer's conception of the drive does not appear clear. He speaks of it in the case of a machine as "the power applied to make the mechanism go"; in the sense organ-nerve-muscular mechanism as the

"external stimulus"; then again it is "a mechanism already aroused and thus in a position to furnish stimulation to other mechanisms"; and furthermore he says that "perceptual tendencies do not require a drive outside themselves, each being capable of furnishing drive for itself," etc. But this is sufficiently bewildering. Why could not the author have expressed himself more simply and more synthetically by conceiving of the evolutionary unfolding which strives through and creates the paths for impulsive reactions, the mechanisms and even the conscious consideration and control of all these as subjects for psychological study. Then he would not also have had to believe a sex tendency, on the part of the dynamic psychologists such as Freud, as only hiding around among other tendencies. He would have understood a larger comprehensive meaning for a sex tendency, for all tendency or tendencies as contained in or expressive of a synthetic whole. Of course such a separation out of mental elements makes it only "nice," as he says, if one can believe in sublimation, "to believe that crude motives . . . can be drained off into other activities, so that a libidinous infatuation . . . can be made to drive the wheels of an artistic or humanitarian hobby." Woodworth believes instead that the "impulse is not drawn into service, but is resisted"; "one turns to some other activity capable of enlisting interest." There is some interest in the form and content of this book to the academic psychologist but it can hardly be of value in psychotherapy or any other application of psychology to the pressing vital problems that make or wreck human lives.

JELLIFFE.

Freud, Sigmund. REFLECTIONS ON WAR AND DEATH. Authorized Translation by Dr. A. A. Brill and Alfred B. Kuttner. Moffatt Yard and Company, New York.

The translators have made available in a most convenient form the last of Freud's writings which reached the American public before our entrance into the war. This is a timely essay upon the subject, uppermost in men's minds at the time of writing, the first year of the war. Freud's attitude is that of a thinker for all mankind and a student both of the forces at work to produce the cataclysm and of the deeper effect of events upon men's conceptions of things.

As usual such contemplation of these deeper things leads him into worldwide considerations. He speaks not alone of the breaking through of the only half buried primitive passions of man ready for an opportunity to display themselves in face of the cultural standards of behavior in which the civilized world had believed itself secure. He goes to the deeper root of the matter in pointing out these same feelings and passions as the source of both good and evil in an ambivalence of feeling which ordinarily is quite unrecognized. On such a basis civilization has been too artificially superficial, bringing about an external and only seemingly

successful compulsion toward goodwill. Too much has been suppressed with an apparent adoption of moral standards. We have therefore been laboring under an illusion concerning our morality and need only recognize a fact when we contemplate the existence still of passions which we had thought obsolete. This same sort of blindness has led to the disturbance of clear logical reasoning which has exaggerated and continued the strife between nations.

All this overthrow of our accepted ways of looking at the world brings the author to consider the changed attitude toward death which the war has brought about. He discusses as he has before the typical attitude of man toward death, his innate denial of it as related to himself, but his murderous application of it to others in the history of the race. From this double attitude the emotional content of the conception of death has arisen and phantasy compensated for his fear for himself and atoned for his attitude toward his fellow. These phantasy creations have appeared in religion, literature, custom. In the individual these serve to keep him from a knowledge of these same attitudes mentioned which still exist in the unconscious. No longer though do we build systems of ethics and soul systems, the author says, out of our ambivalence, but neuroses. War has now entered in to strip off the conventional covering which hides these facts and brings us back to a knowledge of the primitive attitudes toward death.

In all these reflections, which are set down not as a definitely worked out thesis, but as flowing from the writer's pen under stress of the time, there is much food for self examination and sober questioning. For the reconstruction in which we are now engaged after the horror of war, individually and nationally, we may well look deeper than the once smooth surface and face all this unconscious attitude far more honestly and courageously than ever before.

JELLIFFE.

Best, Harry. THE BLIND. Their Condition and the Work Being Done for Them in the United States. The Macmillan Company, New York.

This book contains a vast amount of detailed information concerning matters related to blindness and the many practical questions which arise in regard to the blind. The material is confined to matters here in the United States except for the writer's own general comments upon the problems of the blind and society's attitude toward them and some review of the growth of educational interest in the blind as it developed first in European countries. The author presents all this sum of material in an easily accessible form making of the book a very available guide to all sorts of knowledge which would inform the general reader concerning the practical considerations and would furnish information in almost any direction for one who would wish to approach the subject for one or another definite purpose.

Statistics are given in abundance and in detail of the number of blind distributed throughout the country, the proportion as to sex and age and social condition. Heredity and disease as causative factors are discussed together with industrial and other conditions as causes. Much attention is paid both historically and in the descriptions of present measures and facilities to the educational, charitable, compensatory and any other aid which has been or is being rendered the blind. In short, no phase of the subject is left untouched which might enter into a full descriptive consideration of the subject. Emphasis is also laid upon the progressive and hopeful character of the work not alone in a more intelligent, less purely emotional attitude toward those afflicted which is coming upon society, and in the measures adopted for their welfare, but also upon the prophylactic aspect of the situation. And here it is shown how much definite result can be accomplished and has already been accomplished in the matter of preventing blindness in infancy, through disease generally, through better lighting and other conditions and in the industrial sphere.

One thing is missed in the book in spite of the amount of valuable descriptive information and the author's wide knowledge of his material. Today we are being roused more and more to the dynamic side of any situation and in our interest in work for the blind, newly awakened through the casualties of the war, the psychological side which enters in to accentuate the personal side has been emphasized. Of course in a book of this nature which aims primarily to be a compendium of facts there could not be a full treatment of this and moreover the author has not left it entirely unsuggested. Yet the tone of the book is too unappreciative of the depth and force of the psychology that lies both in and behind blindness and which must be given most profound and practical recognition in thoroughly progressive work upon any of the problems connected with this great affliction. The psychology of the blind and of the community in which it finds itself and of their interrelation need more consideration and more forcible presentation in this deeper dynamic spirit.

Jones, Ernest. Papers on Psychoanalysis. Published by William Wood and Company, New York, 1919. Pp. 715. Price, $7.00.

This second edition of the book is double the size of the first edition, published in 1912, and has been brought up to date, containing several papers written during the war. The forty papers are divided into five groups: general, on dreams, on treatment, clinical, and on education and childstudy, but they really touch on every aspect of psychoanalysis.

Though some of the first few papers on general principles are rather echoes of Freud, the author by using illustrations from his own experience makes variety and prevents their being mere repetition. His purely original papers are clearly written and skilful exposition of all phases

of psychoanalysis. Particularly good are those that explain the technic and method and refute the charge of opponents that suggesttion is the real cause of cures by showing that among the systems of psychotherapy psychoanalysis is the one freest from suggestion. The paper on the unconscious mental life of the child gives a masterly description of the genesis of the two systems of thinking, conscious and unconscious, by far the best we have seen.

He does not think, as do some, that the war neuroses have proven Freud's sex theory does not hold in war conditions and that conflict arising from the instinct of self preservation without any element of sex can cause war shock. He argues quite convincingly that the sex element is still present and the main cause. Repressed fear is not enough. As he says, "I have the utmost difficulty in believing that a current wish, however strong, that is half conscious and sometimes fully conscious can ever in itself produce a neurosis."

He has done a great service in collecting his many valuable papers and publishing them in one volume. Probably from no other one book can one get so comprehensive an understanding of the whole subject. No psychotherapist can afford to be without it.

In one point we disagree with the author; his attitude towards Jung. In the preface he states rather warmly that Jung has abandoned, under the guise of pretended development, the principles of pschoanalysis and cites this as another case of the usual reaction, after a revolution in thought, that seeks to nullify the latter's effects and reëstablish the old order. At other places in the book also his antagonism to Jung shows itself. In the opinion of many Jung has carried the principles of psychoanalysis beyond where their originator was able to develop them, and to them his concepts spell progress, not regression. Merely to call him a mystic does not dispose of his arguments. Though Jones clearly sees the emotional basis of Janet's unfair attack on Freud, he apparently is not aware that he has erred somewhat similarly in his antipathy to Jung.

FAY.

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Original Articles

SIMULATION—(MALINGERING)—NOT AN ADEQUATE DIAGNOSIS

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When we come to consider the question of simulation we are confronted by two diametrically opposed views. One held largely by the laity, by lawyers and district attorneys and by newspaper reporters is to the effect that simulation is a common way of escaping the consequences of one's acts; that the "insanity dodge" is frequently resorted to, and not infrequently successfully, and in general that simulation as such is something very definitely to be taken into consideration and guarded against. On the other hand, we have the views of experienced psychiatrists, criminologists and students of human behavior who look upon simulation per se as a relatively unusual phenomenon and see in the simulator an individual of bad personality make-up and in the symptom an expression of such defect.

Before attempting to set this matter aright it may be worth while to discuss briefly the way in which the word simulation is frequently used. The word simulation is applied rather broadly to symptoms which appear to have been assumed on the part of the patient to serve his particular ends which are usually either the avoidance of some disagreeable duty, such as confronts the drafted man for example, or the escape from some punishment, as in the case of the criminal. The diagnosis of simulation is generally made when it appears evident that the symptom might reasonably be conceived to attain those ends (particularly if the ends are contrary to

accepted social standards) and when in addition the individual can be led by some method of trickery into either a verbal expression or some other form of behavior which contradicts the symptom and therefore indicates to the mind of the observer that the symptom as an evidence of disease does not exist but is assumed. It is my thesis that such an attitude towards the symptom is no longer warranted by present-day psychiatry.

In the first place, the mere fact that a symptom is beneficial to a patient or is calculated to bring about, through its influence direct or indirect, some benefit to the patient is no argument whatever that it is assumed, for that might properly be claimed for every symptom. Leucocytosis for example, is a symptom of infection, but it is more than that: it is an indication of the way in which the organism is endeavoring to protect itself from danger and to overcome the invader. The increase in the number of leucocytes is a definite attempt upon the part of the organism to save itself from destruction by an invading foe. The attitude assumed by the patient with appendicitis, the right leg drawn up, is a symptom calculated to bring certain benefits as a result. Besides relieving pain it relaxes the abdominal walls and so relieves the pressure upon the tender and inflamed organ and helps to bring about those environmental conditions which are calculated to assist in a restoration of its integrity. The work of such men as Crile has shown us how in the same way many symptoms, such as fever, headache as a result of infection, etc., have their distinct purpose in furthering the ends of the individual. Certainly no one for a moment would conceive such symptoms as being assumed.

Now, since the advent of a deterministic psychology—since we have come to look for causal relations among psychological events just as we do at other levels of activity of the body, we must realize that in this sphere, too, symptoms come to pass because they are calculated to bring some benefit to the individual. The whole play of psychological mechanisms is properly viewed from this standpoint; man's activity as directed by his psyche invariably has his benefits as ends.[1] The employee who complains that he is under-paid wishes to get a larger salary for his own individual purposes, and the

[1] In the sense that effects can only be conceived as contained in the causes that bring them about whatever results from a course of conduct must be conceived of as having been sought by the individual, or to use a psychological term, as having been wished for by him. Many results, such as pain, paralysis, etc., are apparently undesirable, and are so consciously considered by the patient, but a deeper analysis shows that they are unconsciously desired for ends that are not obvious, as for example, the symbolic representation of sexual assaults, punishment for sinful conduct in the past.

capitalist who negotiates great business combinations does so because he is reaching for still more power. Such examples are familiar and evident to everyone. We see, however, more subtle and not such obviously simple examples among our patients every day. The hysteric who becomes a languishing and interesting invalid for the purpose of getting an enormous amount of attention and being the center of interest and also of authority in the household, is familiar to us all. The neurotic who develops a paralysis and anesthesia of a hand or an arm, or perhaps a leg, as a self-inflicted punishment for conduct in the past which he unconsciously conceives of as having been sinful, is more subtle, while such types as the deeply introverted individual, who, to escape from all the adult responsibilities regresses to an infantile personality, or the paretic, who develops grandiose delusions as compensations for profound organic defects, are not uncommon—the last one of the best known symptoms in psychiatry. All of these symptoms that I have quoted are plainly calculated to advantage the individual and yet I suppose none of them would be for a moment presumed to be simulated.

If we take, for example, the favorite methods of "detecting" malingering as illustrative of these principles. Suppose a patient with paralysis of an arm confronted by some kind of duty for which the arm is necessary. The examiner picks up a dish of fruit and hands it to the patient. As the patient reaches for it with the normal hand and arm the examiner drops the dish and the patient, suddenly, reflexly grasps after it with the paralyzed as well as the normal arm. The deception has been uncovered. The paralysis disappears. Is the conclusion that the patient was malingering, which is frequently drawn, a warranted one? I think not. The experiment has surely proved that the paralysis is not organic, and by that token is psychological. Such a diagnosis might well have been made without such an experiment. The paralysis was a hysterical paralysis. But hysteria is admittedly a psychosis and hysterical paralysis admittedly psychogenic. That is what has been proved, but it was known anyway. The experiment tells nothing of the motive, whether, for example, it was conscious or unconscious.[2] With this particular experiment the reaction would probably have been the same in either case.

Wherein then, lies the proper designation of a symptom as simulated? I think to all who have followed the developments in psychiatry and psychology in recent years it will be apparent that the

[2] For a discussion of the unconscious see the author's "Mechanisms of Character Formation," The Macmillan Co., New York, 1916.

symptoms which I have been discussing are all symptoms which are motivated in the unconscious and as such they cannot be laid at the door of the individual exhibiting them as products of his psyche for which he, in the ordinary acceptance of the term, may be held responsible. It is only when a symptom can be demonstrated to have had its inception in the field of the clear conscious awareness of the individual who at the same time had the conscious purpose in mind to deceive, to avoid responsibility or escape punishment, or bring about some other individually desired and consciously appreciated end by means of deception—that the term simulation[3] is at all applicable. Unless it is used in this absolutely restricted way it can have no meaning.

Now let us examine the symptom simulation (malingering) in this more restricted meaning which demands that the individual should be fully conscious of his purposes and the means by which he is trying to bring them about. This is the sense in which I grant the term in its practical application is undoubtedly ordinarily intended to be used and yet I do not think that those who use it as a rule have such a clear differentiation in their own minds, a differentiation which has only been made possible by the introduction into psychology of the concept of the unconscious. In the case of the arm paralysis which was proved not to be organic by the trick of dropping the dish, a diagnosis of simulation (malingering) would mean that the unconscious origin of the motive was not appreciated.

What are we to say, then, of the individual who, to use a tautological phrase, is consciously simulating (malingering)? Usually when such a diagnosis is made the matter ends there. The patient is put down as a malingerer; he is treated as though he were a perfectly normal and responsible individual. This is the attitude which I am opposing as indicated in the title of this communication, Simulation—Not an Adequate Diagnosis. In the first place, no one does, or at least no one should, make a diagnosis upon a single symptom. Certainly in internal medicine no one would undertake to size up an individual solely from the fact that it was discovered that he had gall stones or a little albumen in his urine, or a cardiac murmur or anyone of the other individual symptoms that might be mentioned. As surely, too, in the realm of mental medicine no one should undertake to make a diagnosis upon the presence of a single symptom, as for example, depression, confusion, delusions of persecution, and so on through the list. Why, therefore, should all of the rules of pro-

[3] It might be desirable to use the word simulation in the broad sense to include all imitation of disease, so to speak, whether conscious or unconscious and to reserve the term malingering to apply to conscious imitation.

cedure be laid aside and the moment a person is "detected" as a simulator the diagnosis of malingering be made as final and sufficient? If the same rules of procedure were followed invariably in this group of cases as in others—if the same criteria and ideals were held to, very different results would be obtained, results which I can briefly point out and with regard to which I conceive that there cannot be very serious difference of opinion. In the first place, the assumption of a symptom, no matter what it is, whether it be a symptom of mental disease or of physical disease, or whether it be, to use an ordinary lay term, a simple lie,[4] is the individual's response to a reality situation. It is his reaction, his way of meeting a problem presented to him by reality. We recognize in general medicine that the individual who is unable to respond in the usual manner to infection by the development of his various chemical and physiological defenses, is doomed. The infection runs a rapid course and is lethal in its results. We recognize, too, broadly that the individual whose mental make-up is defective responds to the ordinary stresses of life not infrequently by the development of a psychosis, and so at the various physiological epochs of life, which it goes without saying that the average individual should pass through without serious upset, certain individuals develop distinctly psychotic episodes, for example under the stresses of parturition. These are defective, inadequate, inefficient types of reaction because they do not enable the person to deal with the reality situations in efficient and constructive ways. Is not all of this argument equally true of a simulated symptom? Is it not true that simulation is an inadequate, inefficient way of dealing with reality? It seems on the face of it to my mind that it is true, and it is a truth which ordinarily we recognize. In children, for example, we expect certain departures from accepted standards and we do not give them that serious consideration which we would under similar circumstances in an adult. If a child sulks and complains of not feeling well when asked to do something it does not want to we are inclined to understand and excuse such conduct. What are we to say of an identical symptom in an adult? Surely the analogy is very close. It is an infantile type of reaction and as such we must recognize the personality which exhibits it as poorly organized—to be perhaps more accurate, as defective and to that extent inadequate and inefficient in dealing with reality. The person who

[4] The term lie, like the term simulation, is purely descriptive and not in any sense interpretative. A person may dispute the facts—lie—from many causes. He may lie to avoid responsibility, to cause some one else to suffer, to bring suffering upon himself to satisfy a masochistic trend in his character, to exalt his own importance (certain false confessions pseudologia phantastica), etc.

has to resort to lying, to drinking whiskey, or to hysterical palsies in his efforts to get along with the everyday problems of reality which confront him, must of necessity be conceived of as presenting a defective type of personality, and no diagnosis of that individual is adequate which picks out alone the obvious, emphasized, superficial, and prominent symptom of that defect and makes a diagnosis upon it alone. Rather the attempt at simulation is in itself a type of reaction which is an indication of a defective personality.

In other words we have reached the conclusion that a symptom which has its inception in the field of clear conscious awareness as the expression of a clearly conscious purpose to deceive may not always be properly solely classified as simulated. The further question which arises is as to the nature of the motive back of this reaction. Is it, for example, a psychotic motive? In the first place there are cases which appear to have fulfilled the conditions of a clearly conscious invention of symptoms in order to deceive, but which on examination prove not to have. Quite often prisoners transferred to the hospital (St. Elizabeth's) from prison will "confess" that they "faked" insanity to get out of prison and into the more agreeable surroundings of a hospital. An examination of the evidence in such cases shows invariably that they were unquestionably suffering from a psychosis when transferred (they may have been convalescent upon admission to the hospital or on the other hand they may have been profoundly psychotic). The reaction has a twofold object: to save themselves from a realization of having suffered from mental disease and also, in the nature of an overcompensation, to demonstrate their ability, smartness, in deceiving the prison officials. Many, even most of such patients have little or no realization of what they have been through and so can hardly be credited with a conscious effort to deceive. The reaction is a pure defense mechanism. I have in mind two patients with similar types of reaction. One insists upon being handcuffed for he is afraid he will injure some one. He delights in being considered dangerous (that is powerful). The handcuffs are loosely applied and when no one is looking he slips them off only to slip them on again when anyone approaches. Another, a defective, says he *must* go to Baltimore to get some whiskey (Washington is a dry town). He likes to be considered a "bad" (that is, a powerful) man.

I have in mind a similar case of a man who had been court-martialed for a military offence and discharged on the ground that he was "insane." This man was convinced that he never had been "insane" and told the story of how he had "faked" insanity in part

for the definite purpose of relieving himself of the stigma of mental disease, but really more for the purpose of showing his brilliancy in escaping from a very difficult position. The history of how he "put it over" the officials was told for the same reason that he boasted of his mother as beautiful and attractive and his father as a dashing "sport" and his family as wealthy and influential, and made him explain his position in the hospital as a patient as having been brought about by wealth and "pull" to help him out of his trouble. Innumerable tales of adventure make a good picture of pseudologia phantastica. This fellow was a definite out and out liar in the ordinary sense of that term, his tales were intended to deceive and to get himself out of trouble and over difficult places. The conscious motives would have made him a malingerer, but there was a perfectly plain defect of personality for which the symptoms were as plainly compensatory The real, fundamental motive was psychotic, that is, in this case was dependent upon a psychopathic personality. Superficially facile, brilliant and resourceful such types are usually treated as clearly criminal.

The diagnosis of simulation therefore cannot be made upon the utility of the symptoms, for all symptoms are useful, some of course more obviously so than others; nor can it be made upon the motive back of the symbol, the motive may be psychotic, and if not at its worst psychotic at least at its best is indicative of a defective type of personality.

I started out with two opposing propositions—the proposition which I may call that of the layman, that simulation is frequent and is an adequate diagnosis, and the proposition of the scientist that the diagnosis of simulation must be restricted very carefully, and at best is an inadequate diagnosis and in any case an infrequent symptom per se. Why this antagonism? why these diametrically opposed points of view? I have endeavored to show elsewhere[5] how as man advanced in his psychological development the function which hate played in that advancement. Hate has the function of destruction and can only be constructively used when used to destroy certain useless things for the purpose of building over and building better. The layman's attitude towards the simulator has in it something of hate. The diagnosis of simulation is made and punishment is the natural consequence. The conflict here, to use the psychoanalytic designation, is at a relatively low level. The scientific attitude brings the whole conflict to a very much higher level and sees very much

[5] Principles of Mental Hygiene. Chapter V, The Criminal. Published by The Macmillan Company, New York, 1917.

more profoundly into the phenomena and realizes the deeper motives. It is the difference between relative ignorance and relative knowledge. The condemnation of the herd is for the purpose of reinforcing the repression and to that extent valuable, but its greatest value is gained when coupled with an effort to sublimate the instinctive expression against which the condemnation is directed, to lead it to expression at higher, socially acceptable and useful levels.

If the thesis which I set forth in this paper is accepted is it a legitimate deduction that the simulator shall not be punished and that by implication he may reap the benefits of his malingering and bring to pass that which he desires by lying and deceit? That is not a legitimate deduction from my paper. To go into the deductions would involve a discussion of the whole theory of punishment which I cannot undertake here. Suffice it to say that punishment should be devised, both as to kind and degree, with the sole idea of changing the type of reaction from a destructive, socially inacceptable form to a constructive, socially acceptable one, and that to do this there must be no rancor nor hate in the attitude of those charged with its execution, but solely the attitude of attempting to attain the best results by the best means for both society and the individual. I can merely indicate that only by an adequate and as full as possible an understanding of the individual can the best treatment of that individual best suited to all the conditions involved, be devised. To attempt to hold a seriously defective individual responsible[6] for some act of his as if he were a normal adult is not only absurd on the face of it, but is positively vicious. Nothing can be accomplished except to crush and distort still further an already defective personality and out of that crushing and distorting no possible good can accrue to society. On the other hand, many relatively well developed personalities who are defective in some minor way need both the stimulus and inhibition of punishment in some form in order that they may develop the best which is in them, and that punishment should be applied, but not in the spirit of hate, but in a judicial attitude of mind which appreciates the whole situation in its various ramifications and has a distinct and clear idea of what it is attempting to accomplish. When such an attitude of mind is developed, and only then, will we be in the way of demonstrating something which may be properly called justice. That is, not an arbitrary attempt "to make the punishment fit the crime," but a scientifically founded attempt to see that the natural consequences of human conduct may work out all of their constructive possibilities to the best advantage

[6] For a discussion of the concept "responsibility" see my Principles of Mental Hygiene.

for all. Punishment, as such, with the motive of hate back of it, needs to disappear and in order to get the best results have substituted in its place a method already mapped out for us by the physiologist Pavlov and which I may designate as a method of using stimuli to condition conduct. Simple condemnation with its resulting repressions, while in the long run it has been beneficial to the race in the past is usually not very helpful to the individual and can be advantageously substituted by an attitude of sympathetic understanding which is distinctly more helpful to the individual and also, by raising the whole problem to a higher level, better for the race. The diagnosis "malingerer" is a formulation of the herd critique which calls for punishment (*i. e.,* a form of retribution reaction).[7] Such reactions have had and still have their place as useful ways of dealing with situations, but like all other methods must yield to advances in knowledge of ways and means and thus be relegated to the past and substituted by better solutions. We are in a position now to advocate better ways of dealing with the group of phenomena included in the concept "simulation."

In order to get this viewpoint over more successfully I have almost given up teaching psychiatry according to the old standards, that is according to the descriptive designations in common use—manic-depressive psychosis, dementia præcox, etc. I insist that the student shall have some idea of what the patient is trying to accomplish through and by means of the psychosis, what he is trying to do, to bring to pass. In other words I emphasize the mechanism rather than the naming. I am more and more convinced of the viciousness of making a diagnosis, which generally means giving a name, the object of the examination. Too frequently, as soon as the name is given, all interest ceases. If, on the contrary, the object is to try to find out the meaning of the patient's behavior, what he is trying to do, there is no such arbitrary limitation of interest. I am sure this is a vitally important direction for present day psychiatry.

[7] The Principles of Mental Hygiene, *l. c.*

BILATERAL FRONTAL HEMORRHAGE[1]

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The mental and physical syndrome both prior to and following the cerebral hemorrhage, in this case, appeared to be of more than a passing interest and brought out several psychopathological features as well as a striking comparative picture of functional and organic psychiatry. It is not my desire to discuss arteriosclerosis and its relation to involutional disorders, nor offer suggestions or theories as to the possibilities of organic or functional emotion. Those points will be left to their respective advocates and only such facts as pertain to personality and behavior will be brought to the foreground.

Case A. S.; age 49; born U. S.; married; wife of a banker.

Family History.—Negative.

Personal History.—Patient was born in Chicago in 1867. She received a moderate schooling. She had no serious illnesses as a child or young woman. She married in 1893 but here were no children by this union. After her marriage and for ten years she had repeated attacks of dysmenorrhea. Was treated by Christian Science without effect and finally was surgically cured by some method, the exact nature of which could not be ascertained. She spent a greater part of her married life in travelling. She was considered a well-informed woman, well-versed in current topics and interested in the various problems of the day. No note was made of emotional variations, attacks of the blues, nor did she manifest a worrisome disposition.

Present Condition.—Patient had not been sleeping well for some time prior to her admission. She talked a great deal in a somewhat rambling manner, mixing fact with fiction. A few days before her admission she became excitable and showed considerable motor overactivity. She was admitted to the hospital October 8, 1916.

Physical examination upon admission showed a well-developed and nourished woman of 49 with a high tension pulse, rate 84, regular. Systolic blood pressure 210 mm. The heart was not enlarged and there were no adventitious signs. There was no peripheral evidence of

[1] From the Pathological Laboratory of Butler Hospital. Presented before the New York Neurological Society, March 4, 1919.

arteriosclerosis. There were no neurological signs and no evidence of an endocrine disturbance.

Mentally, she evinced a rambling stream of thought with flight of ideas, and both visual and auditory distractibility. She manifested a quickening of her imagination with language extravagance. Cares and vexations, disappointments and sorrows appeared to have vanished. There was a feeling of well-being and exaltation with laughter, rest-

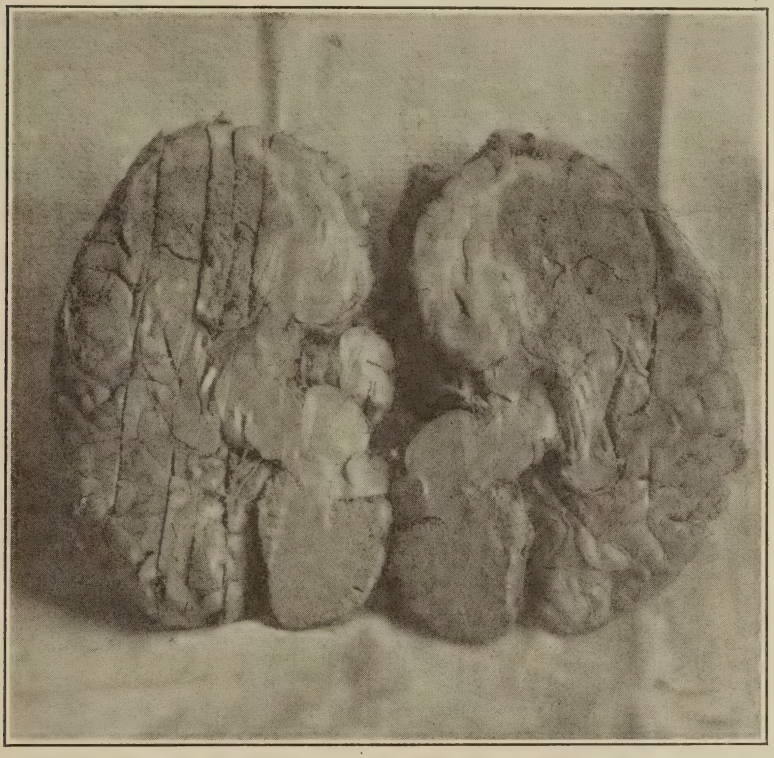


Fig. 1. Brain showing hemorrhagic extension.

lessness and gesticulations. She was correctly oriented, had good grasp upon both recent and remote past with no apparent disturbance in memory or intelligence. This mental symptom-picture continued for several months without any manifest disturbance to her physical state. In the spring of 1917 she settled into a hypomanic condition with talkativeness but a minimum of motor activity and language extravagance. The case was grouped with the manic-depressive psychoses, manic form, occurring in the involution period. Early in June, after attending the theater, patient complained of headache. The day following she had

an attack of unconsciousness with convulsions, general in type. At this time, and for several days following, she presented a flaccid bilateral diplegia with absolute loss of all superficial and deep reflexes. Pupils were dilated and sluggish in response. Optic discs were normal. Corneal reflexes were absent. Patient could not swallow for a couple of days. There was no serious impairment of respiration or heart action. At the end of five days she began to move her arms and after several weeks was up and about. Cerebrospinal fluid at this time was free from blood and negative in serological findings. Impairment at this time was in her gait, which was "draggy." Her station was unsteady

FIG. 2. Hemorrhage in frontal area.

with tendency to fall backwards. She complained of a great deal of occipital headache and dizziness. Mentally she was extremely sluggish; from a hypomanic with an elevation of the threshold of emotion she became a slowly cerebrating individual with silly conduct, a decided disturbance in emotional reaction and a definite loss of memory. A tentative diagnosis of ventricular hemorrhage and multiple medullary softenings was made. She was up and about for four or five weeks, evincing gradually a more marked loss in idea formation and a pronounced emotional deterioration with a simple, silly reaction and childish outbursts of laughter. Before her attack she was quick, alert, easily recognized

mistakes, would correct absurdities, discussed problems in facts and not only recognized humorous mistakes but would even elaborate and enlarge upon their unreality with an adequate emotional response. Now, however, she was slow in perception and apperception; absurdities, problems in fact, humorous mistakes lacked comprehension. Orientation was only approximate, grasp upon immediate happenings and upon remote data was vague and oftentimes lost. Her intellectual life, filled formerly with experiences in travelling, was now even slowly emitted and then under difficult comprehension.

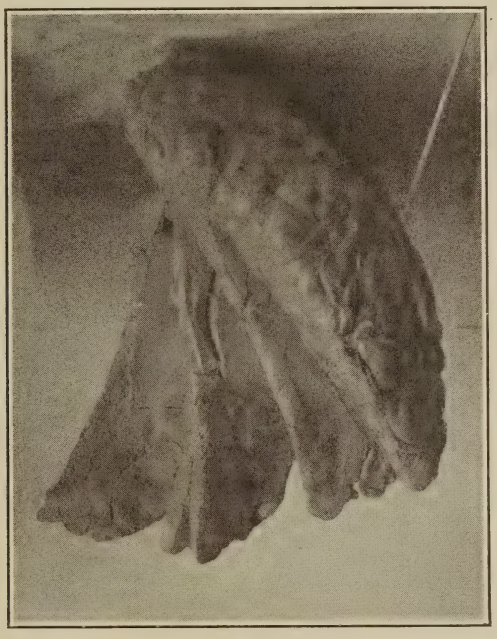


Fig. 3. Frontal area hemorrhage.

The last week in July, 1917, after several severe headaches and vomiting spells, she was placed in bed and her neurological status at this time was a double optic neuritis, ptosis of the left lid; flattening of the left face; weakness of the left external rectus; great difficulty in conjugate deviation of eyeballs. Her right abdominal jerk tired quickly to a loss. Right knee-jerk greater than left. A double ankle clonus. A dorsal extension of the right great toe. A staggering cerebellar gait with a tendency to fall backwards. Two weeks later there was present a complete paralysis of the left third, left fifth, both sixths, left seventh. A double choked disc with retinal hemorrhages. All superficial reflexes were diminished. Mentally she was semi-stuporous with little or no response to stimuli. The cerebrospinal fluid again withdrawn and

examined was negative in every respect. For ten days before the patient expired her neurological signs increased with loss, again, of all superficial deep reflexes and complete muscular flaccidity. She died August 28, 1917, from intercurrent hypostatic pneumonia.

Autopsy performed nine hours after death revealed a lowgrade pneumonic process in both lower lobes of lungs. The liver manifested an interlobular cirrhosis. Both the heart and kidneys were well preserved, and showed no pathological disorder. Upon removal of the skull cap with general exposure of the brain, both anterior lobes were found to be soft, soggy and ruptured at their extreme anterior poles with the extension of a necrotic exudate. The brain was then removed and upon palpation it was evident that there was a large area of necrosis in both frontal lobes and several smaller foci elsewhere. The extent and area involved led to the conclusion that this necrosis was post-hemorrhagic and closely connected with the anterior horns of the lateral ventricles. However, after hardening and cutting, it was noted that both hemorrhages were extra-venticular but with partial occlusion of both anterior horns. The lesion was located largely to the middle frontal lobe centrally and probably due to a rupture of a branch of the anterior frontal artery. As seen the entire cerebral vascular system is quite sclerotic and throughout the brain are small foci of softening as well as hemorrhage. The hemorrhage into the right lobe was far greater and apparently caused more destruction, hence the predominance of left-sided signs primarily.

Summary.—A woman of 49 years, whose make-up, as far as could be ascertained (facts *i. e.*), considered normal. With a clear history of no previous attacks or upsets she develops a mental state not unlike the manic form of manic-depressive insanity which settled, after several months, into a hypomanic condition. Physically there was hypertension—blood pressure 210 and albumin in her urine. Approximately twelve months after the onset of her so-called functional psychosis, she has a cerebral hemorrhage with clinical signs suggesting the intraventricular type. This is followed by a complete change in her mental picture. From a functional psychosis with thought (thinking) disorder, she settles into an organic psychosis with an obstructive disorder or an intellectual loss.

The physical state improves and she is soon up and about but there is no change whatever mentally. In five or six weeks signs of cerebral compression develop and ultimately contributed towards her death.

The interesting features might be grouped as (*a*) mental, (*b*) physical, in an individual who develops two psychoses. Her first aberration is characterized by emotional elevation, acuity of emo-

tional response and quick recognition of logical judgment and even, at times, critical judgment. Following her hemorrhage this emotional state changes entirely into an actual loss with those accompanying behavioristic traits which so characterize the personality of organic brain disease, deterioration in feeling, instinct, conduct, etc.

Then, too, such organic functions as intelligence, judgment, insight, etc., which in her primary psychosis were only interfered with to the extent of thought disorder, too many thoughts coming at once, are in her second psychosis, practically completely destroyed.

The initial physical disorder was limited to hypertension and albumin in urine (this later cleared).

The second physical disorder was considered as a symptom-complex related to the ventricles.

The third physical complex was a syndrome indicating cerebral compression.

Pathologically the brain shows bilateral mid-frontal hemorrhage with organization, secondary necrosis and softening of the brain tissue itself.

These facts are offered for consideration especially to those whose interest lies in the field of psychopathology, with special reference to personality and psychosis, and in addition, to the histopathologist to whom interest will be manifest in the fact that the lesion is bilateral and the vascular sclerosis localized to the cerebral vessel system.

I wish to express my indebtedness and gratitude to Dr. G. Alder Blumer for his permission to publish this case report.

MENSTRUAL DISTURBANCES IN THE FEEBLE-MINDED[1]

By Harold Swanberg, B.Sc., M.D., and H. A. Haynes, M.D.

A gynecological survey of the entire female population of 710 patients of the Michigan Home and Training School (Michigan State Institution for Feeble-Minded) was made for the purpose of ascertaining those suffering from pathologic menstrual disturbances. This was done as a prerequisite for experimental work in the therapeutic use of various ovarian preparations in the treatment of pathologic menstrual disturbances, but this report will be confined to the menstrual disorders found.

The patients at this institution are admitted at any age and are grouped in cottages, according to their age and degree of mental deficiency. The supervisor of each cottage keeps on file in her office a permanent menstrual card of every girl in her charge. On it is recorded the date of the first day of each menstrual period.

The diagnosis of a pathologic menstrual disturbance was based on the information furnished by the various supervisors, attendants, and in the case of those who were only slightly mentally deficient, by the patients themselves. Practically all the patients received a careful physical examination a short time previous to the making of this menstrual survey. In nearly all cases the menstrual card for some previous time, and up to five years, was available for reference. All doubtful cases were carefully observed one or two months before a definite diagnosis was made.

There were no patients 10 years of age or under, or 52 years or over, who were menstruating. If we consider these the extreme age limits of normal menstruation, we can state that there were no cases of premature (precocious) or protracted menstruation. Those whose ages were 18 or over, or 39 or under, who were not menstruating, we considered pathologic, excepting those who were suffer- As it is considered normal for menstruation to be somewhat irreg- ing from a physiological amenorrhea, as in pregnancy, lactation, etc ular the first few years of its onset and also near the menopause, we did not consider any cases as irregular who were under 18 or over

[1] From the Research Department, Michigan Home and Training School (Michigan State Institution for Feeble-Minded), Lapeer, Mich., and Research Laboratory, Parke, Davis & Co., Detroit.

38 years of age. Those who menstruated less than 3 or more than 6 days, we considered pathologic. Due to the fact that it is difficult at times to have the patients report promptly the onset of menses, and also that attendants frequently fail to record the proper date, we have considered those menses occurred from every 20 to 36 days as normal, thus allowing a margin of eight days either way from the normal period of 28 days. An occasional miss or irregular period was not regarded as sufficient to classify the patient as irregular. If the patient had not menstruated for the past three months or more and was within the age limits given above, the case was classified as amenorrhea, if she had missed the last one or two periods, she was regarded as irregular. Those cases were only considered as having dysmenorrhea, who suffered considerable discomfort each period. We might also mention at this time that no cases of periodic intermenstrual pain were found. The onset of menses in the great majority of cases occurred at the normal age, that is, between 12 and 17 years, and there appeared no evidence of marked symptoms at the time of the menopause. The menstrual histories were considered on the basis of how the patient was at present menstruating, so the report given is essentially of the menstrual disturbances that exist at this time. We have endeavored to classify only those cases as pathologic that gave every indication as being such. Those who were doubtful were not included in this list, so the report favors the normal and represents a minimum number of pathologic cases.

An attempt has been made to show the distribution of menstrual disorders according to the degree of feeble-mindedness. Every patient in this institution is given an intelligence test by the resident psychologist, Z. Pauline Buck, A.M., to whom we are greatly indebted for this part of the report. The test used was the Stanford Revision of the Binet-Simon Intelligence Scale (Terman Test), and practically all examinations were personally made by the resident psychologist. There were, however, a few patients who had been in the institution a long time, and who were examined by the old Binet-Simon Test. All adults, whose mental age was found to be 3 years or under, as the result of the above examination, were classified as idiots, between 3 and 7 years intelligence, imbeciles, and those 7 to 12 years, morons. Where the patients chronological age was 16 years or under, the degree of feeble-mindedness was based on the intelligence quotient of Terman.

Table I shows that of the 710 patients, 425 were menstruating normally, 177 had a physiological amenorrhea, and 108 were suffering from pathologic menstrual disturbances. Therefore of 533 pos-

sible cases, 108 had menstrual disorders, making 20.3 per cent, pathologic.

TABLE I

Normal menstruation	425	(59.9 per cent.)
Physiological amenorrhea	177	(24.9 per cent.)
Pathological menstruation	108	(15.2 per cent.)
Total patients	710	
Percentage pathologic cases		(20.3 per cent.)

In Table II we note that of the 117 cases of physiologic amenorrhea, 95 per cent. were due to puberty and the menopause—puberty 134 (76 per cent.), menopause 34 (19 per cent.), lactation 4 (2.3 per cent.), pregnancy 3 (1.7 per cent.), operative 2 (1.1 per cent.).

TABLE II

Puberty	134	(75.7 per cent.)
Menopause	34	(19.2 per cent.)
Lactation	4	(2.3 per cent.)
Pregnancy	3	(1.7 per cent.)
Operative	2	(1.1 per cent.)
Physiological amenorrhea	177	

The pathologic menstrual conditions found are noted in Table III. There were 116 menstrual disturbances in the 108 patients, 6 suffering from two and 1 suffering from three disturbances. The most common menstrual disorders being irregularity, menorrhagia,

TABLE III

Irregular	31	(26.7 per cent.)
Menorrhagia	30	(25.9 per cent.)
Amenorrhea	30	(25.9 per cent.)
Dysmenorrhea	18	(15.5 per cent.)
Oligomenorrhea	4	(3.4 per cent.)
Metrorrhagia	2	(1.7 per cent.)
Vicarious	1	(0.9 per cent.)
Menstrual disorders	116	

amenorrhea and dysmenorrhea in the order named, this group comprising 94 per cent. of the cases. The other disturbances noted being oligomenorrhea, metrorrhagia and vicarious menstruation. Of the 7 patients suffering from more than one disturbance, 5 were morons and 2 idiots.

TABLE IV

Morons	290	(40.8 per cent.)
Imbeciles	241	(33.9 per cent.)
Idiots	179	(25.2 per cent.)
Total patients	710	

Table IV shows that of the total female population of the institution, about 41 per cent. were of the moron type (high-grade feeble-mindedness), 34 per cent. were imbeciles (medium-grade), and 25 per cent. were idiots (low-grade).

In Table V we note that the degree of feeble-mindedness among those suffering with pathologic menstrual disturbances is almost evenly divided, there being approximately an equal number of morons, imbeciles and idiots (morons 32 per cent., imbeciles 34 per cent., idiots 33 per cent.).

TABLE V

Morons	35	(32.4 per cent.)
Imbeciles	37	(34.3 per cent.)
Idiots	36	(33.3 per cent.)
Pathologic menstruation	108	

By comparing Tables IV and V we note that the percentage of menstrual disorders is in proportion to the degree of mental deficiency, that is, the lower the type, the greater the percentage of pathologic cases. For example, the greatest number of patients were of the moron type (41 per cent.), yet this type had the least number of menstrual disturbances (32 per cent.); the least number of patients were of the idiot type (25 per cent.), yet one third of the pathologic cases were of this class.

TABLE VI

	Irregular	Menorrhagia	Amenorrhea	Dysmenorrhea
Morons	11 (35.5%)	9 (30%)	4 (13.3%)	14 (77.8%)
Imbeciles	12 (38.7%)	8 (30%)	12 (40 %)	3 (16.7%)
Idiots	8 (25.8%)	12 (40%)	14 (46.7%)	1 (5.5%)
Menstrual disturbances	31	30	30	18

	Oligomenorrhea	Metrorrhagia	Vicarious	Total
Morons	0	2 (100%)	1 (100%)	41 (35.3%)
Imbeciles	1 (25%)	0	0	37 (31.9%)
Idiots	3 (75%)	0	0	38 (32.8%)
Menstrual disturbances	4	2	1	116

Table VI shows the percentages of the various types of feeble-mindedness suffering from each pathologic menstrual disturbance. Irregularity was found about equally distributed among the various types (moron 35.5 per cent., imbecile 38.7 per cent., idiot 25.8 per cent.); menorrhagia was also almost equally distributed (morons 30 per cent., imbeciles 30 per cent., idiots 40 per cent.); the vast majority of those suffering from amenorrhea were among the lower types—imbeciles (40 per cent.) and idiots (46.7 per cent). Dysmenorrhea was by far the most common among the higher class—morons (77.8 per cent.). There were too few cases of oligomenorrhea, metrorrhagia and vicarious menstruation to draw any conclu-

sions, except possibly that oligomenorrhea, like amenorrhea, occurred more frequently in the lower types.

The fact that dysmenorrhea was so much more prevalent among the morons, may possibly be explained by the fact that they more closely approach the normal and therefore their sensory nervous systems are more highly developed.

TABLE VII

	Morons	Imbeciles	Idiots	Total
Irregular	11 (26.8%)	12 (32.4%)	8 (21.1%)	31 (26.7%)
Menorrhagia	9 (22 %)	9 (24.3%)	12 (31.6%)	30 (25.9%)
Amenorrhea	4 (9.8%)	12 (32.4%)	14 (36.8%)	30 (25.9%)
Dysmenorrhea	14 (34.1%)	3 (8.1%)	1 (2.6%)	18 (15.5%)
Oligomenorrhea	0	1 (2.7%)	3 (7.9%)	4 (3.4%)
Metrorrhagia	2 (4.9%)	0	0	2 (1.7%)
Vicarious	1 (2.4%)	0	0	1 (.9%)
Menstrual disturbances	41	37	38	116

In Table VII is shown the percentages of the various pathologic menstrual disorders in each type of feeble-mindedness. The most common among the morons were dysmenorrhea (34.1 per cent.) and irregularity (26.8 per cent.). It is striking to note how few cases of amenorrhea (9.8 per cent.) and none of oligomenorrhea. Among the imbeciles, irregularity and amenorrhea (32.4 per cent. each) were the chief disorders, while dysmenorrhea was comparatively uncommon (8.1 per cent.). In the idiots, amenorrhea (36.8 per cent.) and menorrhagia (31.6 per cent.) were the most common, dysmenorrhea (2.6 per cent.) being rarely found.

Conclusions

Based upon the examination of 710 cases of feeble-mindedness in this institution, the following conclusions can be derived.

1. At least 20 per cent. of the feeble-minded in this institution have definite pathologic menstrual disturbances.

2. The most common menstrual disorders found were irregularity, menorrhagia, amenorrhea and dysmenorrhea, this group comprising nearly all of the cases. Therefore the remaining menstrual disturbances were comparatively rare, with the possible exception of oligomenorrhea.

3. Those suffering from more than one menstrual disorder were uncommon.

4. The percentage of menstrual disorders were in proportion to the degree of mental deficiency, the lower the degree the greater the percentage of pathologic cases.

5. Irregularity and menorrhagia were almost equally distributed among the various types. Amenorrhea, and possibly oligomenorrhea, were far more prevalent among the lower types—imbeciles and idiots, while the vast majority of cases of dysmenorrhea were among the higher class—morons.

6. Among the morons, dysmenorrhea was the most common menstrual disorder, while amenorrhea was uncommon; in the imbeciles, irregularity and amenorrhea was most frequent, dysmenorrhea being very uncommon; among the idiots, amenorrhea and menorrhagia lead, while dysmenorrhea was rarely found.

Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

THREE HUNDRED AND SEVENTY-SECOND REGULAR MEETING,
MONDAY, APRIL 1, 1919

The President, DR. WALTER TIMME, in the Chair

The meeting was opened by the reading of two memorial addresses, the first by Dr. Edward D. Fisher in honor of the memory of the late Professor William Hanna Thomson, A.B., M.D., LL.D., for many years an active member of the N. Y. Neurological Society, who died in January, 1918; and the second by Dr. Christopher C. Beling, on the life and character of the late Dr. Sarah R. Mead, for many years a member of the Society, who died on March 17, 1918.

FACTS AND FANCIES IN PSYCHOANALYTIC TREATMENT

Dr. A. A. Brill read this paper, having many reasons at this time to speak on the subject chosen, chief among them being the fact that though psychoanalysis had become a well-known and popular subject in many walks of life, many persons, even those in the highest standing in neurology and psychiatry who were sympathetic to psychanalysis, often showed a marked ignorance of its basic principles. It should not be forgotten that this form of treatment did not lend itself to the amelioration of acute forms of neurosis; it was, for instance, as impotent in removing so-called *shell shock* as it would be in removing hernia. Psychanalytic treatment had its limitations, and the cases selected for this form of therapy should not only be persons of normal intelligence and of good character, but they must be over the acute attacks.

The chronic psychoneurotics of normal mental makeup furnished the best cases and some of the most profound hysterias and compulsion neuroses had been cured after every other form of therapy had been tried in vain. Most of these people showed some sexual difficulty. Looking over records of the cases sent to him during the first years of his practice, Dr. Brill found that over 60 per cent. were referred to him just because the patient spoke of sex or his physician expected it. An enormous amount of nonsense had been said and written about sex

and psychanalysis. To understand the strange manifestations frequently found in man, for example, abnormal fancy formation, or the actual perversions, etc., one had to be aware that the sex impulse consisted of many components and partial impulses which were congenital and developed with the individual. To the cultured person sex stood for much more than the sexual act. Conceived in this broad sense, one had no difficulty in comprehending the existence of an infantile sexuality and realizing that no neurosis, even in a child, was possible in a normal sexual life.

A great many cases sent to psychanalysts could easily have been cured without this if the family physician knew something about the cause and effect of psychosexual disturbances. A great many physicians, especially those dealing with nervous patients, also needed to cultivate with them a better *rapport* similar to that cultivated by psychanalysts and designated by them as transference, a mechanism of approach concerning which there was considerable misunderstanding. This mechanism of transference was put into operation by the patient continually applying to the physician hostile or tender emotions which had no foundation in the actual relation but were derived from the patient's unconscious fancies. The transference had to be managed with a great deal of tact and skill, for there was a tendency in neurotics with a floating libido to be ever ready to fix it on someone, identifying that person with the good father who spoiled them or with the lost lover, etc., which was absolutely impossible in the relationship existing between patient and physician. The same mechanism was constantly found in normal life and upon it was based attraction or repulsion.

Since many cases that were sent for analysis were not psychic, it was essential that one practicing psychanalysis should have a thorough knowledge of the mechanism of hysteria and the other psychoneuroses as well as a good knowledge of neurology and psychiatry. Only those possessing these qualifications should prepare themselves for psychanalytic work. It should not be forgotten, also, that a pathological condition could exist in a neurotic individual and no analysis in the world would remove symptoms due to an organic disease. Thorough diagnosis of each case was of enormous importance before resorting to therapy, and therefore it was obvious that this was no subject to be played with by laymen. Psychanalysis was in the strictest sense a part of mental medicine and deserved the sympathetic encouragement of the profession everywhere.

A PSYCHOLOGICAL STUDY OF SOME ALCOHOLICS

Dr. L. Pierce Clark presented this paper at this time because of the seriousness of the modern psychologic aspect of the problem, and through a realization of the fact that the influence of alcohol upon

modern life was not to be disposed of merely by bringing about prohibition. In excessive and habitual indulgences in alcohol there lay a multitude of causes and results for study and analysis. At one time alcohol might serve to bring about harmonious relations in a social group otherwise difficult; at another it might aid to bring about a state of pleasant *rapport;* while at still another it might make easy for free egress deeper and illy adjusted unconscious motives. Alcohol was dangerous only to those who used it for illegitimate means and ends. In many instances these alcoholic individuals had failed to complete certain emotional cycles of earlier development wherein alcohol prevented proper and satisfactory repression or socially acceptable sublimations. Extreme alcoholic repression called for its precise study and analysis and no less insistently than did alcoholic indulgence; it was possible that the ardency of the prohibitionist was a compensatory public inhibition for more intimate personal liberties denied or repressed. It was often popularly held that a man totally abstinent in one field might be licentious in another. It might well be that the alcoholic suppressed his libido and only freed it in drunkenness, while a neurotic expressed himself sexually. As eminently practicable as legal prohibition might seem at this time, it must not be forgotten that a signal increase in all sorts of neuroses and psychoses would come about as a result of such measures. Neither individual nor social alcoholism would be cured by prohibition; these could be effected only by careful analysis which by uncovering the fault would open the way to applying a remedy.

All the conscious motives given for alcoholic indulgence were but specious casuistry, or at least inadequate rationalizations. To arrive at any true analysis of the defect, not only the conscious reasonings had to be considered but an investigation conducted by all methods possible of the unconscious strivings met or perverted by alcoholic indulgence. The use of alcohol was proportioned to one's idea of its value, but the habitual alcoholic was especially tormented with and guided by strong and overweighted feelings and representations, the real roots of which lay in the unconscious. In many cases of dipsomania the homosexual component was quite transparent, shown in the wish to "treat" other men. The fear and restlessness which introduced the so-called dipsomanic attacks were usually rooted on conflicts and repressions of the homosexual. Starting from the fact of bisexuality of human beings, both of organic and psychosexual attributes, surely the homosexual component must show itself in some way; if it could not be done openly and nakedly, then masks and symbols must be used. It showed itself in different degrees of sublimation. It was not merely chance that men so much enjoyed being among themselves and drinking together. Why did the alcoholic deliriant always see certain animals which were well known as sex symbols in general and, especially when seen by men, as showing homosexual designs? Many alcoholics also had a "reverse Œdipus" complex which showed in deliria.

Unconscious homosexuality was only one factor in the alcoholic psyche; atavistic reminiscences played a large rôle. Atavism occurred in both healthy and abnormal states, but especially in the alcoholic one came close to atavistic remains, and chronic intoxication awakened and cleared the way for the ancient relics. Atavism gained new life in those psychically sick, and the drunken man exhibited unmistakable evidence of the sadistic-masochistic complex. The sadistic component explained numerous delinquencies and crimes that accompanied alcoholism. Alcohol numbed the higher functions. All drinkers did not become criminals, but alcohol certainly permitted hidden criminal desires to work out. The sexual component alone did not explain the behavior of alcoholics; the whole psychic content had to be considered. The unconscious had different levels or depths, and in different degrees of intoxication various levels of unconscious strivings and conflicts were released.

This conception of alcoholism afforded a scientific insight, made obvious the innate fault of the instinctive life, the fixation in the evolution of the emotional life, and showed the pattern plan of what sort of training out and social readjustments was necessary to heal such individuals. Anything less in the way of a comprehensive treatment was doomed to an early failure. In the definite periodic drinker the characteracter usually showed less of the epileptic constitution *per se* and more of the instability makeup of the constitutional inferior. Although the study showed the truth of the contention that the line of treatment must always rest upon the individual and social analysis of the particular subject under consideration, and that here, as in other profound neuroses, psychoanalysis might be undertaken. In the majority of cases one might hope for an arrest of the habit if proper precautions and lessened social demands were made upon these special types of inferiors.

Dr. Horace W. Frink opened the discussion of these two papers on various aspects of psychoanalysis, taking up first the question of alcoholism in which though his psychanalytic experience had not been very extensive it had been very unhappy from the therapeutic standpoint. He found that whenever he reached an important and difficult place in the analysis the patient got drunk and repeated this almost indefinitely and he had never yet been able to finish an analysis of an alcoholic. On the whole, the things Dr. Clark pointed out were more or less confirmed by the speaker's own experience; in some of his cases the homosexual element was prominent, in others apparently almost negligible. There were different types of alcoholics; three in particular. One was the true periodic drinker, a condition related closely to the fugue and to cases of alternating personality. Such types were sometimes observed among clergymen and other people of a pious turn of mind in their ordinary state but who showed in periodic sprees an exactly opposite set of characteristics. Then there were cases of mild psychoneurosis in which drinking began as a drug is taken to allay the fears or depressions but

at length became part of the neurosis. Again there was a type that was largely chemical, the man who drank through the external psychological influences that were present and got up a state which called for new doses of alcohol to overcome it. Some of those cases had been successfully handled with hypnotism, which was the only variety of treatment that had been in any way successful in the speaker's experience.

Regarding Dr. Brill's paper, Dr. Frink recalled ten years ago at a meeting of the County Medical Society that Dr. Fisher read a paper on psychotherapy. The president of the society had prefaced the discussion by stating that psychotherapy having been in existence for some time it was time for final opinion and judgment to be formulated. The various methods were discussed, particularly the psychoanalytic, and much invective and sarcasm were let loose against it. For some time it was all one's life was worth to mention psychanalysis at a medical society meeting, to say nothing of reading a paper on the subject. But as time went on, through the efforts of a few sincere men who had to endure much in the way of insults and antagonism, psychanalysis had at length become more or less respected. The battle for its right to exist had apparently been won. On the other hand, in a way, the battle had just begun, for the greatest danger was now presenting itself, in the form of the undue popularity of psychanalysis and its practice by the untrained, to which Dr. Brill had alluded. A serious factor, and one largely responsible for this popularity, was the fact that it was being practiced by those who bore no medical degre and possessed no medical education. There were many objections of the most serious character against psychanalysis being practiced by non-medical people. In the first place, a non-medical person, even supposing he had a good understanding of psychanalysis *per se,* could not safely be trusted to practice. A physician was something more than a person who had listened to lectures on medicine and studied medical text-books. In securing his medical education, in his hospital training, in his association with his professors and fellow practitioners, in the hours spent in studying his cases, something of the ancient ideals and traditions became embodied with the personality of the physician which was not to be found in the layman, an attitude toward patients and toward society in general. The patient of the layman, however well trained in psychanalysis, missed that something which was very important.

There were still more practical objections of the greatest significance. To do good work in psychanalysis was enormously difficult; it took years of the hardest kind of application and study to achieve anything approaching decent success. One could not learn to analyze such an enormously difficult thing as the human mind without every advantage and the layman had no such advantage. It was to be regretted that there were certain physicians who not only had worked with these non-medical people but had sanctioned and endorsed their working alone

and had referred patients to them. Such physicians surely could not believe they were doing the right thing by these patients, nor fail to realize that these patients not only were not helped but seriously harmed. A physician who sent patients to people of this sort was prostituting medicine for some sort of pecuniary profit. There was still a further consideration and one that should give pause to those who regarded this situation lightly. The lay psychanalyst was not bound by medical ethics as was the physician, and medical ethics constituted a protection to the patient which he should be given. A final objection; the practice of medicine by the non-medical was against the law and it was time that this situation was investigated from that end, for it was getting to be a menace and if more of it went on, the good work that had been done and the repute that had been won for psychanalysis by the serious workers would be in jeopardy. Psychanalysis was not Christian Science and could not be regarded in the attitude one could accord Christian Science. It was not a religion; it was a difficult and serious medical procedure, involving medical examination, medical diagnosis and psychotherapy by a trained physician.

Dr. C. P. Oberndorf endorsed what Doctor Frink had brought to the attention of the society as to the necessity for medical training in undertaking psychanalytic work. The question of selecting cases for analysis was sometimes a most difficult one as there were many borderline cases. In some cases attempts at analysis would not only do the patient no good but might be harmful. This was especially true in certain cases of depression of the manic depressive type where, during the active stage, any interference seemed only to accentuate the patient's sufferings without in any way relieving them.

So far as the speaker's experience with alcoholics went, he believed all that Dr. Clark had said was true psychologically. Alcohol furnished a convenient means of relaxation, but it was of most value in acting as inhibitory agent over the conscious mental censorship. Because of this, thoughts and actions ordinarily kept guarded were allowed to find egress. Possibly it was because of this being more or less realized and as such was contrary to one's best interests, that so many excuses had been unearthed for alcoholic indulgence. The relaxation which alcohol afforded was a very desirable one for the community. Prohibition would be a mistake, for though a substitute would probably be discovered, thus far none less harmful had been found.

It was very interesting to note the different types of individuals who found over-indulgence in relaxing agents necessary, as they could be observed in the wards of Bellevue Hospital. In the alcoholic ward one would find the northern races, a frank type of people; in the drug ward was found the clandestine individual of the southern races. Many of both types would explain that it was from an unconscious urge they took the drug or drink. If alcohol was taken from these unbalanced

individuals the tendency to adjust the emotional defect through drugs or other relief might be great. There was also great likelihood of an increase in neuroses and psychoses. The prohibitionist was putting the cart before the horse when he stated that alcohol was the cause of so many mental disorders; rather was the mental disorder the cause for taking alcohol.

Regarding Dr. Brill's paper, the crux of all psychanalytic treatment lay in the handling of transference and resistance and that was difficult to adjust at times. Transference had most of its roots deeply planted; unless unconscious resistance were eradicated analysis could do little good, and unless the analyzer accepted them as the really vital part of his problem, he did not accept his task at all.

Dr. B. Onuf said that he had been so interested in Freud's work that he had been among the first to bring it to the attention of this society and to the profession at large. There were a few points that the discussion this evening had stimulated him to take up. In the first place, if there was anyone entitled to give an opinion of psychanalysis, it was Dr. Brill who was what the Germans called the *alt Vater* of psychanalysis in the United States and he was qualified in more than one way to practice it, first and foremost being his experience in psychiatry. Dr. Frink's warning as to the peculiar fitness for psychanalytic work was absolutely in order. Nevertheless, all knowledge of it should not be kept within the medical profession, but it should be spread at large because it was always true that when medical methods were known to the people they acquired a sympathetic understanding of them which promoted a larger application, not possible when kept within a small circle. There was no doubt that if an understanding of psychanalytic theories was spread among the educated, great help would be gained in applying psychanalysis to the proper purpose. However, there was one thing about psychanalysis; it took a man's whole time and it required special qualifications, an enormous amount of patience, a fine tact and other requisites that made for success, to say nothing of a good medical education. Dr. Brill stated that there was no harm in using psychanalysis in dementia præcox even if there should be no success; this was true in the case of an experienced psychanalyst, but there was danger in the hands of those whose experience had not been sufficient. He had known a case of dementia præcox in which one attempt at suicide after another followed certain revelations in the analysis. Dr. Clark had stated that most of his cases were constitutionally inferior, but many of the dipsomania cases were really cases of manic depression and the alcoholism was a part of the disease.

Dr. Hyman Climenko asked what type of cases should be sent for special study and treatment to the psychanalyst. Psychanalysis had come to be an important part of medicine, but did it cure symptoms or did it cure hysteria. Which were those that could be cured by the shortest route and at the least expense to the patient?

Dr. Russell G. MacRobert said that Dr. Frink's very modest characterization of his results with alcoholics tempted the question, because he knew how careful and painstaking his work was, if he did not consider that the psychogenic symptoms were not only attempted adjustments to real difficulties, but very many times and especially in more serious cases like pathological drunkenness and early dementia præcox were the most satisfactory adjustments to his real difficulties that the patient could be contented with or was likely to find through psychanalytic treatment alone.

Dr. Michael Osnato asked if the impression he had received this evening was true, namely, that psychanalysis had retired from the field of psychiatry altogether. Dr. Brill did not think it effective in the treatment of dementia præcox which totalled more than 40 per cent. of all mental cases in institutions, and Dr. Oberndorf admitted that in manic depressive psychoses psychanalysis had little therapeutic effect and these cases totalled 10 to 15 per cent. of all admissions. They must of necessity express great reserve regarding psychanalysis in general paresis which totalled 15 per cent. of admissions; they spoke discouragingly of psychanalysis in paranoia which totalled 2 per cent. They must admit the same non-success in senile and pre-senile psychoses. Dr. Frink and Dr. Clark had spoken discouragingly of the psychoanalytic treatment of the alcoholic psychosis which totalled about 15 per cent. of all admissions to hospitals for the insane. In fact they definitely admitted their lack of success in handling these cases. Now was one right in believing that psychanalysis had entirely retired from the field of psychiatry?

Dr. Joshua H. Leiner asked under what category the dipsomaniacs who were epileptics and who had a real organic base, according to Oppenheim and Aschaffenburg, came in their relationship to ppsychanalysis.

Dr. Brill said that although his own experience with psychotherapy in alcoholism had been more successful than that related by Dr. Frink, he had nevertheless found the chronic alcoholic, as a rule, to be more or less deficient mentally, and whenever he succeeded in curing the alcohol craving something worse took its place which changed the individual from a menace to himself to a menace to society. Concerning the treatment by psychanalysis of dementia præcox, Professor Freud had always maintained that these cases should not be analyzed because the præcox mechanisms in themselves were their abnormal adjustment, and in analyzing them that adjustment was destroyed. As a matter of fact the adjusted præcox must eventually be sent to a sanitarium, and the disturbed præcox must also remain in the sanitarium. Incipient cases of præcox, however, could sometimes be benefited by psychanalysis; and last but not least, a great deal of insight was gained by studying these cases, which was a great factor in prophylaxis. Dr. Climenko

had asked what cases should be sent to the psychanalyst. The answer was that only chronic cases who had resisted all treatment should be sent for analysis although it would be better for the cases to be analyzed as early as possible. Dr. Osnato's query whether the psychanalyst had retired from the field of psychiatry was surprising; psychanalysts were psychiatrists first, and psychanalysis was only a branch of psychiatry. The answer to Dr. Leiner's question was that no attempt was made to treat by psychanalysis anything organic, but even organic cases like paresis and senile dementia showed Freudian mechanisms in their delusions.

Dr. Clark was very glad to hear Dr. Brill's answer to the question as to whether psychanalysts had retired from mental medicine. One of the greatest advantages to psychiatry had been the psychanalytic method of approach, particularly in the benign pychoses and even in acute cases of manic depression. Properly applied in appropriate cases it prevented the recurrence of attacks. It also gave an excellent understanding of the mechanism of dementia præcox and a better insight into what to do for these cases through occupational and social readjustment, helping them even if they continued to follow a dementia præcox career throughout life. As regarded its application to cases of alcoholism, psychanalysis did not show up brilliantly, but in it lay a method of approach as to the mechanism controlling the condition, and the only way one could do any permanent good was by way of influencing the unconscious motives in those types of cases that were clever and resourceful people who did not lack in intellectual power. It gave an insight into the mechanism and how to help them make their adjustments.

As regarded the relation of dipsomania to epilepsy, as quoted by Dr. Leiner, this conception was a great mistake; the dipsomaniac was more closely allied to consitutional inferiority rather than to epilepsy *per se*.

CHICAGO NEUROLOGICAL SOCIETY

Regular Monthly Meeting, Held February 20, 1919

Dr. Hugh T. Patrick, President, in the Chair

SO-CALLED LETHARGIC ENCEPHALITIS

Dr. Peter Bassoe referred briefly to certain cases he had seen in Chicago of encephalitis following upon influenza and suggested that such might be watched for. The literature reveals that this had been noted at other times and in other places. There had been an epidemic in Germany in 1745 following which a number of cases of somnolence

were quoted. This was later also noted now and then until after the larger epidemic of 1899 and 1890 among nervous complications following influenza there was mentioned a vague undescribed disturbance known as "nona." One writer in Austria defined it more closely as an encephalitis located chiefly in the midbrain. The nervous sequelæ were also briefly described in 1891 by Church, who spoke of multiple neuritis, poliomyelitis, encephalitis and other complications, but did not use the term "nona."

"Lethargic encephalitis" was mentioned in Austria after an epidemic in 1917, 1918. An epidemic was also noted in England and finally considered a new disease, after being first erroneously attributed to food poisoning or later to the appearance of a peculiar form of poliomyelitis. Then Wilson recalled the name "nona" and believed this was the same disease. Sainton in France also revived this name, claiming that the affection was a cerebral form of influenza. These two men described it similarly. The symptoms they give are somnolence, fever, ocular paralysis, but little headache and but few meningeal symptoms. The necropsies which have been made have revealed a simple encephalitis of the pons and midbrain.

The patients which Dr. Bassoe reports are as follows:

Case 1. A 10-year-old girl was admitted to the hospital February 3. About five weeks previously she had showed palsy of the right rectus. Spastic paralysis of the left arm and slight spastic weakness of the left leg appeared two weeks later. About February 1 she began to have difficulty in speaking and swallowing. The facial muscles on both sides were weak. Ankle clonus and the Babinski sign were present on the left side. The spinal fluid on February 5 showed a cell count of 4, negative Wassermann and weakly positive Nonne, with strong Lange (2343321100). February 15 serious respiratory difficulty was followed by death. There was no necropsy.

Case 2. Patient, a woman, 34 years old. About January 20 she gradually became listless and drowsy. She was examined February 10 and appeared disoriented and confused. There was a right facial palsy and protrusion of the tongue was very feeble. There was relative increase in the reflexes of the left leg. The pulse was rapid but the temperature normal. The latter, however, rose until before death February 13 it reached 105.6° F. Death occurred from respiratory failure. Necropsy showed congestion in all viscera but no other gross brain changes. But numerous and large perivascular collections of mononuclear cells were found on section in the lenticular nucleus, pons and medulla, with hemorrhagic areas in the upper part of the pons, where the collections of cells were most numerous.

Case 3. This woman, aged 44, showed when seen February 15, a mask-like facial expression with half closed eyes. Her answers were given in monosyllables though she was conscious. About two weeks

before she had gradually become listless and drowsy and her right foot dragged in walking. Examination showed weakness of the facial muscles more on the left than the right side, but present on both sides. The reflexes were normal but there was some rigidity of the arms and legs, more on the right side than the left. Spinal fluid test showed normal pressure, negative Wassermann, very weak Nonne and Lange. The cell count was 9. After a period without change the rigidity of the extremities increased and there was coarse jerking when movement was attempted. Toward the last there was retention of urine. On February 23 she choked while being fed with a spoon, pulmonary edema began to manifest itself and she died in two hours. The necropsy findings were like those mentioned in the previous case.

Case 4. At the last report of this case, March 12, there had been practically no change for a month. A girl of 13 was suspected of influenza when on February 10 her temperature rose to 102° F. after having complained about a week before of buzzing in the ears and showing redness of the eyes and throat. She developed drowsiness but no headache. She had been since the latter date entirely tube fed. The temperature remained at about 101° F. Her condition remained extremely lethargic. The facial muscles showed weakness on both sides and there was suggestion of Babinski side at the left. The deep reflexes were increased especially on the left side. The neck and extremities had become very rigid. The leucocyte count on February 11 was 12,200. Spinal fluid and blood cultures remained negative. There was constant nystagmus.

Case 5. This was a man of 44. He was admitted to the hospital February 20. He had been attacked with diplopia February 9, which had disappeared after three days. A day or two later there was weakness of the left hand and the temperature rose to 103° F. February 18, two days before admission, retention of urine appeared, the jaw became weak and stiff, the neck grew stiff and listlessness and somnolence were present in marked degree. Spinal fluid showed increase in cells and globulin, but there were no organisms in blood or spinal fluid cultures. The patient was able to speak and swallow, but could never protrude the tongue further than the lips. Attempt at voluntary movement produced coarse tremor. The rigidity of the bodily muscles increased as the condition grew worse. The temperature gradually rose and the patient died March 8 retaining consciousness until a few hours before death. There was no necropsy.

Dr. Bassoe ascribed the muscular condition and the facial expression, which resembled those of paralysis agitans, to lesions in the basal ganglia, the motor disturbances being extrapyramidal.

Dr. S. D. Wilgus reported a similar case who had shown much lassitude after an uneventful attack of influenza. There were diplopia for about a week and great somnolence. The pulse was about 50 and

there was some general feeling of weakness and some neuralgic pain in the occipital region. Ten days after the disappearance of the diplopia the patient was suddenly seized with right facial paralysis. The tongue showed a distinct protrusion to the left. Taste was disturbed. The reflexes were normal except for a distinct Gordon reflex on the left. Later double facial palsy developed and great difficulty in swallowing. The temperature was running from 99° F. to 102° F., perhaps with an afternoon average of 101° F. Dr. Wilgus was willing to consider this case one of influenzal encephalitis.

HISTOPATHOLOGY OF CARCINOMA OF THE CEREBRAL MENINGES

Dr. G. B. Hassin called attention to the acceptance of the fact that carcinoma of the nervous system is a secondary process either spreading to these tissues from neighboring infected regions or reaching the brain and its meninges by metastasis, which has been shown to take place even from regions most remote and long after the original growth has been removed. Distinct gross or microscopic nodules have been found, even as much as eighteen years after operation for carcinoma elsewhere, and these have been sufficient to account for various clinical symptoms, as hemiplegia, monoplegia, jacksonian epilepsy, psychical disorders, etc. Other cases have been reported in which no such metastasis could be proved and these Oppenheim has explained as due to the cancer toxins. This view, however, has not been expressed since it was found that though the brain tissue may be free from cancer elements the dura or pia-arachnoid may be so sufficiently infiltrated to cause all the clinical symptoms that are noted. The infiltration of the dura has been called "pachymeningitis carcinomatosa" and that of the pia-arachnoid, when the dura was not involved, as "meningitis carcinomatosa." Some authors claim that there is an actual inflammation present due to the presence of cancer cells.

The two important questions, the reactive phenomena in the meninges to the presence of cancer cells, and the method of the involvement of the meninges, form the subject of Dr. Hassin's report. He refers to a woman aged 40 who entered the Cook County Hospital in April, 1918, having had a malignancy of the left breast removed a year previously and a small solitary left axillary gland six months later. Four months after this last operation severe headache appeared which became constant and with which were nausea and vomiting, the latter unrelated to the taking of food. There was also numbness in the left arm and the right corner of the mouth. The family and personal history as to disease otherwise was negative.

Examination revealed a well nourished woman, with no abnormalities of the genito-urinary organs, speech, gait, mentality, etc. Pharynx,

larynx and nasal accessory sinuses were normal. No tumor masses, cervical or axillary adenopathies were found. Sensibility was unimpaired except for an analgesia over a small area below the right corner of the mouth. The skin, tendon and pupillary reflexes were normal. Vision was 10/10 in the left eye, 4/10 in the right, with normal fundi.

After entrance to the hospital severe pain in the epigastrium developed about two hours after meals, ptosis of the right eyelid, with convergent strabismus, manifested itself. As the ptosis progressed the fundi also showed a beginning papilledema, the strabismus became more marked and the numbness spread over the right temporal region, cheeks and eyes. The spinal fluid showed increased pressure. Its color was normal, there were 3 lymphocytes to the cm.

Nonne was positive. There were epithelial cells in the urine but there was no albumin. Roentgen examination of the stomach and cella turcica was negative. Test meals also showed no gastric trouble. Brain tumor of indefinite location was suspected and the patient was operated upon a month after entering the hospital. The dura was found covered with nodules and thickened. Microscopic investigation of one of these nodules proved it to be a carcinoma. Examination of a particle of the amputated breast proved tiself to the same nature. The patient died in three weeks.

Necropsy revealed primary medullary carcinoma of the left breast, secondary carcinoma of the axillary, mediastinal and anterior cervical lymph glands, carcinosis of the visceral and parietal pleura, secondary carcinoma of the liver, left suprarenal body, metastases of the meninges, . . . recent surgical trephine defect in the right temporal and parietal bones, etc.

The dura was thickened only on the right side, chiefly over the parietal region. The outer surface was roughened by the nodules and the inner surface consisted of a pseudomembrane well merged with the dura with numerous nodules. Some nodules were colorless, some hemorrhagic. The dura vessels were much distended, congested and prominent. There were no indications on the pia except that on this same side it was very opaque, somewhat thickened and showed many distended veins. Neither the left dura, left pia-arachnoid nor any other part of the brain or basilar nerves revealed anything abnormal.

Microscopic examination was made with stain of toluidin blue, Van Gieson, hematoxylin-eosin, Herxheimer and Mann. The interspaces between the connective tissue fibers of the dura were packed with red cells, large masses of epithelial cells and so-called "gitter" cells. The lacunæ were always empty of contents. The deeper layers of both dura and pseudomembrane were alveolar in appearance with numerous vacuoles packed with conglomerations of cancer cells, large necrotic masses and fibrin.

The carcinomatous cells were grouped in distinct foci, in which

the cells were blended with each other, forming one mass of cytoplasm with many nuclei (giant cancer cells). Sometimes the cytoplasm was broken up, sometimes the nucleus was granulated and sometimes had completely disappeared. Hemoglobin was present in some cells and large quantities of fat globules. The necrotic masses were large, but staining left them indistinct. Fat was shown to be present, also fibrin in many vacuoles, and hemorrhagic foci or scattered red blood cells. The foci of cancer cells lay freely within their aveoli without touching the walls. The pia-arachnoid presented practically the same appearance. Many cells showed vacuoles containing pigment granules, which were also frequently found over the connective tissue stroma. Some cells resembled macrophages, others were changed almost into one large vacuole with a disappearing nucleus, in others the nucleus had gone. There were also many gitter and plasma cells. The pia vessels were occasionally thrombosed and the walls were thickened, but without showing distention or infiltration. The pia changes on the whole were similar to those of the dura, but the reactive phenomena were more pronounced.

Dr. Hassin summarized his findings by stating that all the membranes after examination of the brain substance, the ganglion cells, all forms of brain tissue and the cranial nerves, in spite of the marked cancerous infiltration, showed a passive behavior. The invading cells, though they multiply in the meshes and tissue spaces, soon become converted into lipoid substances or form necrotic masses. Meningitis could hardly be said to be present. Yet there were marked parenchymatous changes in the brain substance proper together with proliferation of the capillaries and of the glia nuclei and showed a glia reticulum, which the speaker considered specific for encephalitis. This would account for paralysis and anesthesias and other such nerve symptoms through absorption of toxins or of the necrotic masses.

Dr. Hassin then discussed the problem of the pathways by which the cancerous infiltration of the meninges takes place. It cannot be simply by way of the lymphatics, for there are no lymph vessels in the central nervous system. Weed has confirmed earlier findings by showing that the cerebrospinal fluid flows from the subdural or sub-arachnoid space down to the corresponding perineural spaces of certain of the cranial nerves and so reaches through the tissue spaces the lymph vessels of the neck. The cancer cells may be conceived of as passing through this route but in the opposite direction, from the lymph glands of the neck back to the submeningeal spaces. Recklinghausen had named such a mode of metastasis "retrograde transportation of the cancer cells, in spite of the valves." The subdural space as well as the subarachnoid space surrounds these cranial nerves for a certain distance after they emerge from the cranium and the dura and arachnoid coverings of the nerves become blended into the perineural sheath. Either of these

spaces may become involved from the space about the nerve independently of the other, along its own channel, which probably happened in the case under discussion. The two spaces are closed formations with no means of communication. On the other hand the so-called dural interspaces, where also cells were found identical with those in the subdural space, is connected with the subdural space.

The Pacchionian bodies scattered near the lacunar region in some specimens contained or were surrounded by masses of the cancer cells seeming to show that these bodies do serve for the purpose of eliminating, through the spinal fluid, the subarachnoid and subdural space. The fact that the Virchow-Robin spaces were empty of cancer cells seemed to prove the theory that the contents of the subarachnoid space come from within the brain, since the Virchow-Robin spaces are drained by the subarachnoid space flowing from the brain tissue. Were it the other way the brain tissue would in this case have been filled with the cancer cells. The speaker called attention to the value of such a study upon an experiment by nature herself rather than an artificial injection for helping in the practical and the theoretical solution of the question of the connection of cerebral spaces with each other, with the periphery and brain tissue proper and in estimating the value of intraspinal arsphenamin therapy.

Dr. Bassoe asked if there had been any involvement of the skull, since carinoma of the breast frequently showed bone metastases. He had had a case of endothelioma of the dura which had spread in all directions, growing into and filling the superior longitudinal sinus, also the occipital lobe, and in the crater-shaped depression formed in the dura there was a thick button of bone which proved to be infiltrated with tumor. He had also had a metastatic carcinoma of the brain from a breast case where two thirds of the right hemisphere was affected, the brain tissue being replaced by carcinoma without material increase in volume. There had been no pressure symptoms but profound mental loss and a very marked aphasia.

CASE WITH SYMPTOMS OF DERCUM'S DISEASE AND HYSTERICAL MANIFESTATIONS

Dr. Samuel N. Clark reported a case of special psychical interest, manifesting, as it did, distinct physical symptoms, which, however, had a purely psychical origin. Examination revealed a woman of adipose build, a weight of 188 with only 4½ feet in height. There were lipomata in large numbers and of the size variously of a hazelnut or chestnut distributed subcutaneously on the buttocks and thighs, arms and forearms. There was itching with these, but no pain. There had been supposedly at 33 an attack of pleurisy. After this the patient was subject to coughting spells, which seemed to be voluntarily induced, and

were followed by expectoration of large amounts of bright red blood. No diseased condition could be found on examination of the sputum, the chest, or through exposure of the pleural cavity. At the age of 38 the hemorrhages ceased along with other hysterical symptoms.

At 33 after the death of a lover there had developed fixed phantasies of marriage and motherhood, hysterical paralyses and other conversions. There were occasional tantrums and at 37 an alleged suicidal attempt. The patient had then been committed. It was evident when an acute illness was claimed and a false register of the thermometer attempted that these symptoms had been used as purposeful [unconscious? reporter] means to certain ends. On exposure of the thermometer attempt, combined with the physician's neglect of the symptom, acceptance of proof that certain beliefs could not be true and a growing reliance on the judgment of another person in regard to the phantasies, the various phantasies and tantrums, together wtih the acute symptoms of illness lost their hold upon the patient. The speaker believed that in this case the emphasis lay upon the type of reaction rather than on repressed complexes as in the production of the phantasies.

RECOVERY IN PARANOIA

Dr. Richard Dewey presented a paper on this subject dealing with case histories of a number of patients.

PHILADELPHIA NEUROLOGICAL SOCIETY

Regular Meeting, Held February 28, 1919

Dr. J. Hendrie Lloyd, President, in the Chair

TWO CASES WITH ATTACKS OF SOMNOLENCE PROBABLY OF PITUITARY ORIGIN

Dr. B. P. Weiss presented first the history of a trainman, aged 41, suffering from uncontrollable somnolence, when perhaps anywhere from three to twelve times during a "run" of fourteen hours he would fall into a profound sleep, which would last only a few minutes. At other times he could go from fourteen to sixteen hours without a single attack. This had continued for about a year. His family history was negative. Syphilis was denied. There was no alcoholic use and only moderate use of tobacco.

Physical examination showed equal, regular pupils, with reaction to light and accommodation. Eye grounds normal. No cranial nerve involvement. The subcutaneous tissue was rather boggy. There was no ataxia of the limbs, gait and station were normal. No tremors and

the grip was good. Biceps and triceps reflexes were normal. Knee jerks and tendo-Achilles jerks were present and equal on both sides. Ankle-clonus and Babinski reflexes were absent. No disturbance of sensation. Mental reactions were rather sluggish showing some slowness in answering questions and slight impairment of memory.

Spinal fluid test showed no increase in pressure. Ten c.c. clear fluid were removed. The test showed globulin, plus 1; cells, 6; sugar, positive; Wassermann negative; blood Wassermann also negative. Urinalysis was negative.

The roentgen ray revealed enlargement of the sella turcica with some change in the posterior clinoid processes, probably bony deposits. Perfect clearness in sinuses.

The second case presented complained of attacks of somnolence while at his work, that of a salesman, which increased so that he could sleep sitting or standing. He would sleep continuously twenty-four to thirty-six hours if undisturbed. Even a noise or listening to a band would not prevent the attacks. He complained also of snoring and of polyuria which was nocturnal only. According to his wife's description the respiration during sleep resembled Cheyne-Stokes respirations. It stopped at times for a minute or two, then became rapid and irregular, with a good deal of difficulty of breathing and actual choking attacks. He was the son of first cousins. There were no nervous diseases in the family history. No personal history of alcohol or syphilis. Smoking of cigarettes had been rather excessive previously. He was married and had one healthy child and there had been no miscarriages. Had had grippe a month before the report in which he had lost considerable weight when attacks of somnolence had occurred only at very infrequent intervals and were of very short duration.

Physical examination revealed a rather sallow, short, obese man with small hands and feet and tapering fingers. Dryness of the skin was evident and the subcutaneous tissue had a mucoid consistency. The eye examination revealed normal pupillary reaction, normal muscle balance, in fact nothing negatively worthy of note. The thyroid was palpable. Ankle clonus and Babinski signs were absent. Station, gait, reflexes normal. No change in sensation.

The spinal fluid examination showed no changes, blood Wassermann also negative. Urinalysis negative with perfect sugar tolerance.

The roentgen ray revealed comparatively small sella turcica but no other abnormality.

Dr. F. X. Dercum said he considered such cases the result of disturbance of internal secretion. Good results were sometimes obtained from thyroid administration. The latter case had improved for a time on combined thyroid and pituitary treatment. He believed that the retarded growth in this case suggested pituitary deficiency and that there was some sexual weakness. This patient, Dr. Weiss said, had

reported some deficiency in the sexual apparatus but none in function. In the other patient sexual morphology and function were both normal.

TRAUMATIC BRACHIAL PLEXUS PALSY, OPERATION—MARKED IMPROVEMENT

Dr. F. X. Dercum presented this case for a second time. He was a young man of 24 who in April, 1918, had been thrown into the air by the explosion of a press loaded with 60 pounds of gun cotton. The patient had fallen upon a table ten or twelve feet away. He was unconscious for a few minutes but was soon able to walk a little way. It was found on immediate examination at the hospital of the Dupont Powder Works, where the explosion occurred, that the right arm was paralyzed from the shoulder down; the metacarpal bone of the right thumb was burned; the left arm and wrist were bruised, abraded and burned in several places. Sensation was lost, according to the patient's statement, in the right arm but there was pain of the left arm.

Examination by Dr. Dercum in May revealed a flaccid palsy with loss of reflexes of the hand, forearm, upper arm and also the deltoid. Shrugging of the shoulder was the only movement possible. The brachial plexus as well as the nerve trunks showed no pain or tenderness. Sensation was slightly present in the upper arm, best preserved on the inner aspect, where it extended a short distance over the forearm. On the anterior, outer and posterior aspects sensation remained in this slight form for about a third of the arm, but otherwise the forearm and the hand were quite without sensation.

When admitted to Jefferson Hospital in June there was marked wasting of the muscles of the hand and forearm and to a less extent of the upper arm and shoulder. Galvanic and faradic extinction had taken place in muscles of the entire arm and hand. The deltoid responded equally to KCl and AnCl. The sensory condition remained the same except a slight diminution in the exterior aspects of the upper arm. Roentgen ray examination proved negative. Exposure of the brachial plexus revealed a probable severe contusion there with perhaps marked extravasation of blood. No loss or interference with continuity was evident but there was an abundance of scar tissue from which the various cords were separated with difficulty.

The arm was treated for the intervening months with massage and electricity. In October, when the case was first presented, very little improvement could be noted except perhaps a slight return of power to the deltoid. But at this meeting a remarkable change was reported. Extension of the arm at the shoulder was possible; flexion and extension at the elbow had begun to show themselves though slightly as yet; the biceps and triceps showed evidence of activity with feeble pronation due to the biceps. The hand and the wrist had not yet showed signs of return of power. Sensation for touch and pain were present in the

upper arm, except for one small area externally on the lower portion of the arm. The forearm still showed absence of sensation except for one small area near the elbow internally and posteriorly. The improvement was sufficiently marked to give hope for a more complete return of function.

Dr. T. T. Thomas believed that this was an exceptionally severe case. He had not been able to find either relaxation of the shoulder joint or ankylosis. He had previously found relaxation remaining in some cases after return of function, but this had been restored to firmness after operation. In his cases he believed that there had not been actual rupture or injury of the brachial plexus. There had probably been extravasation of blood or synovial fluid around the nerves, which had disappeared by absorption. Here there was no actual rupture of the plexus. He believed that as a rule in obstetrical palsies there was no rupture of the nerves and that operations were proving themselves uncalled for.

Dr. W. G. Spiller added that he thought there had taken place in this case what is observed in palsies of longer standing also, a compensatory action of other muscles to supplements the weak ones. The patient's manner of movement seemed to indicate this. The ground for hope in such cases had also been illustrated in a case of severe ulnar nerve palsy, which had almost entirely recovered under massage and electrical treatment.

Dr. Dercum said that he had considered Dr. Thomas's operation but had thought the shoulder capsule was not relaxed. He could feel, he thought, the deltoid contraction under his finger.

ENCEPHALITIS SIMULATING BRAIN TUMOR

Dr. D. E. Smith reported a patient of 16 at the University Hospital under Dr. Spiller's service in January, 1919. A little more than two months before he began to suffer with a heavy dull sensation in the frontal region, followed by a rather severe headache. This condition was aggravated by work and for about three weeks grew more intense with nausea and projectile vomiting, which did not follow necessarily the taking of food only. There were no convulsions nor unconsciousness. The condition subsided and then for a month there was a period of only occasional and less severe headache and vomiting. Then in January the patient was seized by intense headache, drowsiness, nausea and vomiting. Although drowsy the pain prevented sleep. There was severe aching in the eyes. Sight was disturbed in that he frequently saw objects double. There was a possibility that he had influenza before the first attack. There were no evidences of syphilis.

The physical examination was in most respects negative. There was anesthesia of the soft palate, this being also paretic, and this extended to about the median line on the left side of the pharynx. The soft

palate was paretic but this paresis had decreased on February 27, when the report was made, although the muscles were still sluggish and sensation had increased on the left side of the palate and pharynx. On February 28 no diplopia and no muscular paresis were observable. The pulse was full and regular at all times and the temperature had shown no marked rise. Sometimes it was subnormal.

The ocular findings were the most important and were frequently examined for. January 17, vision was reported O.D. 6/7.5; O.S. 6/15. Pupils were equal and normal. There was paresis of the left superior oblique muscles. The media were clear but the disks were hyperemic and moderately swollen with margins obscure. The retinal veins were dark and tortuous. O.D. disk level was + 3 D., fundus + 1.5 D. O.S. level was + 2 D., fundus + 1 D. The entire fields was diplopic. The lower fields were full. The color fields showed some concentric contraction. The ocular condition grew worse. Test on February 13 revealed vision of the right eye 6/9, of the left eye 6/15. The right disk was + 5½ D.; the left + 5 D. Decompression was not performed because after lumbar puncture the swelling, which was at once reduced 1 diopter, gradually subsided. On February 28 vision of O.D. was 6/6 of O.S. 6/12. The right disk was + 3½ D., the left + 2½ D. [Later report has given the vision of O.D. as 6/5, of O.S. 6/9. The disks were level with the fundi.]

Dr. W. G. Spiller said that though there had been thought of intracranial tumor when the patient was first seen, this could not have accounted for the paralysis of the left superior oblique muscle, the paresis and the disturbances of the soft palate and of the left side of the pharynx. Lumbar puncture in January 19 gave 3 or 4 cells per cm. Wassermann and globulin reactions were negative.

The condition was diagnosed as the result of a diffuse process, possibly encehpalitis, or possibly serous meningitis. There had been a little fever. The patient had recovered.

Dr. A. Gordon compared with this a case with similar headache and vomiting. There was distinct asynergia and marked diminution of the knee-jerks. It seemed to be a case of cerebrellar involvement. The Wassermann had been negative. The patient had improved upon removal of 20 c.c. of spinal fluid and had made a complete recovery.

BRAIN TUMOR WITH EXACT ROENTGEN RAY LOCALIZATION

Dr. J. Hendrie Lloyd reported a particularly accurate localization of a lesion by Roentgen ray of an already suspected gumma in the right hemisphere, which the x-ray revealed as a dense circumscribed shadow in the posterior cerebral region, the parieto-occipital region. The patient, a male 34 years of age, having a history of venereal infection, had complained of severe frontal headache, vomiting and dizziness when

admitted to the hospital. The vomiting was frequent, projectile in type, unaccompanied by nausea and having no relation to the taking of food. There was staggering gait to the left. One eye had been lost previously by accident, but the other eye showed normal fundus though the form field could not very well be taken on account of the patient's mental condition. Wassermann test was positive in the blood but reported negative in the fluid, though the cell count was 40.

The patient did not do well on specific treatment with mercurial inunctions and the iodids. A stupor was added to the persisting headache and vomiting. A decompressive operation was undertaken in the region indicated by the Roentgen ray. This revealed a bulging and soft cortex but the patient's condition on the table did not permit of further exploration. He died the following day.

Necropsy revealed a gummatous infiltrating meningitis located at about the tip of the temporal lobe and reaching backward. The new formation, which the Roentgen ray seemed to have suggested, was found to be of the nature of a very free lymphocyte infiltration.

Dr. C. K. Mills said that he had seen this patient with Dr. Lloyd and diagnosed the case as one of lesion in this region. He had thought there might be a tumor. There had been a doubtful hemianopsia, some impairment of muscular sense and perhaps of cutaneous sense. The findings at necropsy had revealed even more than he had suspected.

THE CENTRAL NERVOUS SYSTEM IN PURPURA HEMORRHAGICA

Dr. Alfred Gordon made a histological report concerning the brain and spinal cord of a child of five which he believed revealed a hitherto neglected field of investigation of the nervous tissue in cases of purpura hemorrhagica. He did not find hemorrhage on the surface of the brain or in the cerebral cavities as in hemophilic cases. There were however profound changes in the brain and spinal cord which were confined to the gray matter. The gross appearance of both brain and spinal cord was that of extreme paleness with the tissue very soft and flattened out. On section the pallor was seen to extend through the brain tissues. No blood was present in any of the vessels. Histological examination of the cerebral cortex revealed the destruction of many cells and empty round spaces filled or not with blood clots or round cells were seen widely diffused. The appearance was that of diffuse vacuolation. The empty spaces have the shape of blood vessels with a row of round cells on one side. This condition of things prevailed over the entire cortex but was most prominent in the motor area while the occipital area was least affected. The cerebellar cortex did not show this vacuolation, which was absent from the white substance of the brain.

In the spinal cord also the lesions were confined to the cornea and chiefly the anterior ones. This involvement of the gray rather than

the white substance, the opposite of the condition in anemia, might be explained. Dr. Gordon thought, by the more abundant blood supply of the gray matter and also by the impossibility of repair and the rapidity of destruction because the central branches are of the terminal variety. This paper appears in full in the August, 1919, number of the JOURNAL OF NERVOUS AND MENTAL DISEASE.

SPECIAL COMMUNICATION

DR. W. G. SPILLER made a brief report of some observations made in epidemic cerebrospinal meningitis where the palpebral fissures were much enlarged and the pupils as he thought dilated presenting a remarkable wild staring appearance in the patient. He believed that this was due to irritation of the cervical sympathetic by the meningitis. He spoke also of four cases which he suggested were cases of transverse myelitis caused by influenza. One of these patients died, another will probably not recover, but two had made considerable improvement after a time.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MEETING, FEBRUARY 20, 1919

DR. GEORGE A. WATERMAN, Presiding

NON-DEMENTIA NON-PRÆCOX: A NOTE ON THE ADVANTAGES TO MENTAL HYGIENE OF EXTIRPATING A TERM

DR. E. E. SOUTHARD spoke in regard to the unsuitableness of the term "dementia præcox" furnished by Kraepelin, upon the badness of which term all are agreed. Some international committee on psychiatric terminology should be formed to select desirable psychiatrical terms.

Neither dementia nor præcox are indispensable features of what is called dementia præcox. The use of the term brings unhappiness to patients and much wrong results from its use. Catatonia was first described in 1858. In 1896 Kraepelin used the term dementia præcox to include several types of mental disease. In 1913 he evolved thirteen types, containing nine types of dementia præcox and four of paraphrenia, and designated these thirteen types as endogenous deterioriation. Bleuler later suggested that schizophrenia should be used instead of the undesirable term dementia præcox. This conveys the idea most important to this disease, the splitting of the personality, and it forms a good basis for various derivations. It does not commit one to

any one notion of the mechanism involved nor of the nature of the process.

Dr. E. S. Abbott said that though the term was undesirable still many cases do reach dementia. Errors in diagnosis tended rather to greater caution than to the necessity of eliminating a term. There should be a clearer definition of symptoms. Science he believed develops by delineation not by substituting terms. Dementia præcox has a wider significance than schizophrenia therefore there is no advantage in the latter as a substitute for the former. There should be a term separating those who dement from those who do not. The mere diagnosis is a secondary matter however in comparison with the treatment.

A CASE BEARING ON THE JAMES–LANGE THEORY OF THE EMOTIONS

Dr. A. Myerson discussed a case which related itself to the James-Lange theory of the emotions, which holds that the essential features of any emotion are its bodily manifestations. Feeling sorry is the result of weeping, fear, of running away.

In the case reported it was evident that feeling itself may be absent from consciousness. The patient cries or laughs without being either sad or glad; weeps without feeling sorry; laughs though she does not feel happy. The fundamental organic sensations were also absent, fear, anger, hunger, thirst, sex desire and fatigue. Absence of feelings was recognized but psychic pleasure and pain were not present.

The patient was a single woman of 32, Anglo-Saxon. The family history was negative, early life uneventful. She was artistic and emotional, had been considered "nervous," temperamental and sensitive. The patient had suffered from "nervous prostration" after returning to her home in Georgia at the age of 25 succeeding a love affair. This illness was characterized by easy fatigability, "hysterical" attacks, seclusiveness, depression, introspection, headaches, etc., with later delirium and confusion. Since then affection, patriotism, emotional pain have been absent.

Physical examination was negative. She appeared overemotional, as far as could be judged from facial expression, voice, laughter, tears, respiration, etc., that is objectively. But she eats, drinks, rests, sleeps out of pure force of social habit, experiencing no hunger, fatigue, thirst, sleepiness nor fear, though she evinces every reaction to fearful circumstances. She has no pleasure of anticipation, of realization of activity, of relaxation, of variety, color or any of the things that give joy to life. There seemed to be no deception in all this. There were no evidences of psychosis.

The important thing here seemed to be the reflex excitation of the

emotional expression through the environment with conformity of conduct but without resulting feeling. The case is evidently one of permanent dissociation of affectivity from the other links of emotion. Changes of emotion are conspicuous in hysteria, manic-depressive, the psychoneuroses (the "anhedonia" of Ribot), in some phases of dementia præcox, in organic brain disease involving the basal ganglia and in the type of case here noted.

Dr. D. Gregg asked whether the features here were not analogous to those seen in fatigue and in some cases of habit alone. The conditions might be likened to an artificial anesthesia affecting the emotional sphere.

UNIFORM STATISTICAL REPORTS ON INSANITY NOW ASSURED. AN OFFICIAL CLASSIFICATION OF PSYCHOSES

Dr. J. V. May stated that psychiatric progress was hindered by the overwhelming predominance of theories over facts in regard to mental diseases. There is much discussion based upon very little actual experience with insane patients or with reference to sources long considered inaccurate. Personal opinions take the place of facts. Textbooks are filled with unsubstantiated statements about the frequency of various forms of insanities and the rate of recovery in different psychoses. These are derived from personal observation or the statistics of single hospitals.

The etiology of mental disease, long a matter of discussion, and heredity, doubtless an important factor, both need careful statistical study. The mendelian ratio and its importance needs investigation. The extent of the relation of mental defects and insanity to criminality, prostitution, alcoholism and pauperism calls also for careful study. Few reliable figures are available of the relation of psychoses to single drugs, although this is a remarkably infrequent one.

This lack of statistical study is most felt in regard to epilepsy. Nervous and mental diseases, feeblemindedness and alcoholism are prominent in the family history of epilepsy. L. Pierce Clark and others have called attention to the "epileptic constitution." The epileptic psychoses have received no satisfactory classification. There are associated psychoses incidental to the epileptic features in many cases.

There is little accurate knowledge in regard to the psychoneuroses. The government now recognizes constitutional psychopathic inferiority as reason for rejecting immigrants but the relation of this condition to the psychoses is very little understood. There is practically no available material in regard to the frequency of the different forms of psychoses and their rate of recovery. Facts are but imperfectly available in regard to the peculiarity of certain psychoses to certain races, communi-

ties and stages of life. If the 200,000 or more cases in the institutions of this country could be submitted to one standard there would be better knowledge.

Statistics are inaccurate concerning care and maintenance of the insane owing to the different modes of making out the budget in different states, although this is an important matter upon which legislative investigation often hangs. Discrepancies occur sometimes in the report merely as a matter of bookkeeping. Correlation of statistics has also been difficult because of the differences of administration in the various states. Some states have central control, others do not; in some a Board of Charities controls, in others commissions, etc. There has been no uniform classification of mental diseases and the result is chaos.

This paper appears in full in the July, 1919, issue of the JOURNAL OF NERVOUS AND MENTAL DISEASE.

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

Cruchet, R., Moutier, F., Calmettes, A. Non-Traumatic Segmental Paralysis Due to Vasomotor Disturbance. [Presse Méd., July, 1918.]

The writers report three cases identical in every way. They were three military patients. Two had previously been slightly wounded and one had had typhoid fever without complications. There was no marked emotivity or suggestibility. The onset of the present difficulty was very sudden. They had been physically weary and had slept on the damp ground in the snow and cold. Waking some hours later each felt an upper limb benumbed, tingling, with the hand awkwardly placed, and the fingers and wrist immovable for several days. The hand after some hours grew cold and cyanosed up to the fold of the elbow. This area was also anesthetic. The fingers were curved, the back of the hand swollen and engorged, and the skin over the phalanges was shiny though not pronouncedly so. The surface was lilac when the temperature was low, and salmon pink when warmer. The paralysis was the chief feature though it was not absolute. It began at the fingers and wrist and gradually extended itself. The wrist movements returned in a relatively short time, but the movements of the fingers were for a long time feeble, measured and without force. There was no appreciable amyotrophy. Tendon reflexes were reduced and also muscular excitability. A slight mechanical hyperexcitability seemed to be present. The effect of bathing in warm water was to excite the tendon and muscular reflexes and raise them to normal. Cold water produced a sort of swelling without pain. The total anesthesia gave way except at the fingers to a varying hypesthesia. Periosteal sensibility was particularly interfered with. The hands remained glossy and dry even at an elevated temperature. There was also local hypothermia of an accentuated type. Hydrosis was considerably retarded. The pulse did not show any marked change and arterial pressure differed little from that of the sound limb. The amplitude of the oscillations was pronounced on the affected side. Heat equalized both this and the pressure with those of the normal limb. Examination of the cerebrospinal fluid revealed a lymphocytosis but little above normal and a slight increase in albumin. A careful study of the vasomotor reflexes, based on experiment with heat and cold,

confirmed the presence of a vasoconstriction. The writers conclude that this is a nontraumatic segmental paralysis in which vasomotor disturbances play the largest part. They believe this is due to a central lesion. This may have been caused by the cold and the stasis of the circulation due to external conditions, or by toxic processes or a direct centripetal disturbance, an alteration of the medullary and sympathetic centers. Treatment with heat showed gradual improvement, the various symptoms disappearing one by one and the prognosis seemed very favorable for a complete cure. Should cold weather bring a return of the vasomotor symptoms the treatment with heat would be easily procurable and effective. [Jelliffe.]

Mirallié, C., and Emile-Weil, P. The Naso-Facial Sympathetic Reflex in Facial Paralysis. [Presse Médicale, 1918, XXVI, p. 49.]

Irritation of the mucous membrane of the nose by a probe gives, in addition to the naso-lachrymal reflex studied many years ago by Spiller and others, a naso-cardiac reflex described in 1916 by Emile-Weil and Philippe, shown usually by slowing of the cardiac rhythm, sometimes by its acceleration, and sometimes without any change at all (absent naso-cardiac reflex). The writers now describe certain vasomotor effects of endonasal stimulation, viz., bilateral redness of the face, especially of eyelids, frontal region, cheeks, and conjunctivæ; rarely redness of ears and neck is seen; lachrymation is constant. In complete peripheral facial palsy the nasal mucosa on the side of the palsy is hypo-esthetic; the naso-facial sympathetic reflex is lost on this side. The reflex reappears with the recovery from the paralysis; and its degree, when present, depends on the degree of recovery. In cases of hemiplegia, both organic and function, the naso-facial reflex is normal on the side of the facial palsy. The afferent path of this reflex is in the trigeminus nerve; its synapse is in the bulb; and its centrifugal path is by way of the sympathetic filaments in the facial nerve. In old cases of incompletely recovered facial palsy, where the diagnosis of the seat of the lesion is uncertain, the study of this naso-facial sympathetic reflex may prove helpful. [Leonard J. Kidd (London, England).]

Atkinson, Mildred. The Histological Structure of the Moderator Band of the Sheep. [Proceedings Phys. Society, July 28, 1917.]

Purkinje fibers enter the moderator band from the inner ventricular wall in a well-defined roughly circular group. This group may be seen to turn sharply almost at right angles to its original course to run through the band. The group has a sheath of connective tissue, and in some cases fatty tissue, separating it from the muscle of the band. The group of Purkinje fibers may contain perhaps twenty to thirty fibers on entering the moderator band, but owing to the branching of the fibers, the number increases as it approaches the outer ventricular wall, and the

arrangement becomes more diffuse. On reaching the outer ventricular wall the mass of Purkinje tissue lies next the endocardium, and fibers run out from it in all directions into the heart muscle. The group of Purkinje fibers is always accompanied by small nerve trunks, but in no case have nerve cells been seen. Though as a rule the group of Purkinje fibers is definitely separated from the muscle of the band until the group approaches the outer ventricular wall, in certain cases a fiber can be seen leaving the group to run out into the muscle. Besides this well-defined group of Purkinje fibers, individual fibers always lie among the muscle fibers which make up the major portion of the band. In the sheep a transverse section of the band shows that the group takes up one sixth to one tenth of the band, the remainder being ordinary heart muscle with a varying amount of fatty tissue. Actual connection between the individual fibers mentioned and the muscle fibers can be clearly made out in many sections, and this is also the case with the Purkinje fibers which run out from the group to the muscle of the outer ventricular wall. Masses of connective tissue occur in the band associated with the insertion of chordæ tendinæ into the muscle. Inserted into these masses is found a peculiar type of heart muscle, of which the fibers are larger, contain numerous nuclei, and stain only at the periphery.

The Purkinje fiber itself is of considerable length, consists of a central portion of homogeneous substance, assuming with Mallory's stain a purplish tinge, and showing at intervals unstained granular areas in which the nuclei lie, very often two together. The nuclei with Mallory's stain show up as bright pink in color. The Purkinje fibers are pervaded with muscular fibrils which run roughly longitudinally in a reticular manner through the fibers. These show distinct cross-section and on staining take on the same tint as the heart muscle itself. The Purkinje fibers are separated from one another by loose connective tissue, and surrounded by a delicate network of elastic fibers. Connection between two adjacent fibers is often made by means of side branches. The fibrillar substance can be made out to be continuous across the ends of two fibers.

Tracy, Edward A. Chronic Vasoconstriction Spots and Their Significance. [Boston Medical and Surgical Journal, Jan. 2, 1919.]

Tracy says that chronic vasoconstriction spots, observed in the forearms, hands and face, are found associated with nerve and brain lesions. One or more pigment spots are found nearby. These spots imply an increased flow of nerve stimuli over the vasoconstrictors involved in the production of the spot—a true hypertonia of the vasoconstrictors involved. The cause of the hypertonia of the vasoconstrictors involved in the chronic spots is probably mechanical—an enmeshment of the fibers in glial or hypertrophic connective tissue, and a consequent constant irritation of the neurones by the pressure of this

tissue. The cause of the intensification of the spots at times observed, especially in idiopathic epilepsy, is probably a toxin in the blood stream, the product of a faulty metabolism, that further irritates the abnormal sympathetic neurones. Chronic vasoconstriction spots, in cases in which peripheral nerve and cord lesions are excluded, point to an organic brain lesion.

Langley, J. N. Stimulation and Paralysis of Nerve Cells and Endings. II. Curare, Strychnine, Brucine, Nicotine. [Jour. Physiol., 52, 247–268.]

Work done on cats showed the first three drugs have the least effect in paralyzing preganglionic nerves, on adrenalin secretory fibers and abdominal vaso-constrictors, and a greater on the following, in the given order: Nerves of nictitating membrane and eyelids, and probably cutaneous vaso-constrictors; secretory fibers of chorda, sweat fibers, pilomotors, pupillo-dilators and constrictors; cardio-inhibitory. As the three drugs have no paralytic effect on post-ganglionic nerves and as nicotine stimulates peripheral nerve cells, the three affect the same structures or directly on the chromaffine cells if these structures are absent from adrenalin secretory fibers. The proportions of the antagonistic alkaloids determine the capacity of stimulation in tonic contractions after curare, but in twitchings the absolute concentration of the paralyzing alkaloid plays the chief rôle. No means was found to raise the blood pressure permanently after the paralysis. Nicotine antagonizes the action and stimulates, having the latter effect in inverse proportion to the paralysis. [J.]

Pieron. Mechanism of Muscular Tonus. [Presse Méd., Feb. 18, 1918.]

This paper makes a distinction between the sarcoplasm and the rapidly constructing fibrils, the latter being innervated by cerebrospinal nerves, and having a metabolism of carbohydrates. The slow contraction of the sarcoplasm is said to be nitrogenous (creatine), leading to slight fatigue if any. In tonus of action of the antagonistic muscles the sarcoplasmic contraction innervation is cerebrospinal, but originates, as far as rest is concerned, in the sympathetic system. [J.]

Garry, W. E. Light and the Muscle Tonus of Insects. The Heliotropic Mechanism. [Jour. Gen. Physiol., 1918, 1, 101–125.]

The entrance of light into the eyes of heliotropic insects is the cause of the tonus which they manifest. Like the labyrinthine mechanism of the vertebrates there is a relation between the different areas of each eye and the tonus of particular groups of muscles. Partial blackening of one eye results in an unbalanced condition shown by unusual postures and forced movements in certain directions. [J.]

2. ENDOCRINOPATHIES.

Maisonnet. Acute Addison's Disease Following Destruction of the Right Adrenal Body. [Presse Médicale, Jan. 2, 1919.]

The author reports the case of a man who had been hit in the right flank by a shell fragment. He soon developed slight hematuria, without abdominal symptoms. In the succeeding days a distinct Addisonian syndrome came on, with discoloration of the mucous membranes, ochre color of the skin surface, Sergent's white line, low blood pressure, greenish brown urine, pronounced asthenia, and a small, frequent pulse. The patient died on the tenth day. The autopsy showed an oblique tear of the lower pole of the right kidney, the vessels of the hilum being, however, intact. The right adrenal was completely destroyed. The shell fragment was found embedded in the body of the tenth thoracic vertebra. The left adrenal body was very small, measuring one half by one centimeter; it contained no tuberculous lesion. The clinical picture and ultimate death are boubtless to be ascribed to this anatomical peculiarity, Sergent and others asserting that Addison's disease does not result from unilateral adrenal disease.

Comby, J. Suprarenal Hemorrhage in Children. [Arch. d. Med., Dec., 1918.]

The author reviews the recent literature on hemorrhage in the adrenals in children. Actual apoplexy is inevitably fatal, but in minor grades of hemorrhage low blood pressure, intermittent cyanosis and asthenia develop. Large and repeated doses of epinephrin are indicated. Vollbrach's case of purpura a year before developing Addison's disease is quoted.

Zueblin, Ernest. Pituitrin and Adrenalin Injections in Hay-Fever. Cincinnati, Ohio. [New York Medical Journal, Vol. CVIII, p. 51, 1918.]

Report of a series of 6 cases with enlarged heart, chiefly of the right ventricle, with indistinct heartsounds, low systolic and high diastolic bloodpressure, increased or decreased cardiac strain pro minute, marked signs of vasomotor depression. The dose of adrenalin varied from 0.5 to 0.2 c.c., the dose of pituitrin from 1 c.c. to 0.25 c.c. At first the dose of adrenalin was high, then gradually diminished whilst the pituitrin dose was gradually increased, depending upon the heart, bloodpressure findings. The injections were repeated whenever any tendency of cardiac weakness was noticeable, first every other day, then twice a week and gradually discontinued. The subjective improvement after these injections were favorable as regards the severity and the duration of these attacks, in a number of cases the hay-fever symptoms disappeared without recurrence extending over an observation period of several years. Cases of hay-fever can be favorably helped by these injections,

but careful supervision in every way being required as individualized treatment. Certain cases will be favorably helped only by vaccine treatment. Frequent digestive disturbances which are encountered in these hay-fever cases, as well as marked indicanuria, require medicinal and dietary treatment. Further details see original. [Author's abstract.]

Gerson, M. Addison's Disease and Scleroderma. [Berl. kl. Woch., Dec. 23, 1918.]

Remarkable results obtained by treatment of scleroderma with adrenalin are here reported. In one of his patients he maintains a diffuse pigmentation of the Addison type by the use of thyroid tablets. Scleroderma is due to vagotonia according to the Vienna school and in some cases of this affection the writer refers to the relations existing between the vegetative nervous system and the endocrine glands. He was able to note that, in the vagotonias, the pigment metabolism might be influenced by four factors, namely, pregnancy, scleroderma, thyroid products and by nerve lesions.

Vincent, S. The Function of the Adrenal Cortex. [Surgery, Gynecology, and Obstetrics, Vol. XXV, p. 294.]

This is an article on the influence of the adrenal bodies upon the genital system, read as a part of a discussion at the American Gynecological Society, in 1917. It contains an interesting summary of the facts of comparative anatomy bearing upon the functions of the adrenal body. Dr. Vincent illustrates the fact that the medulla and cortex belong to two different systems, and that their association in the adrenal body is, so to say, an anatomical accident. The medullary substance is an accumulation of the chromaphil tissue which has arisen from the sympathetic in certain abdominal segments and has insinuated itself into the adrenal body proper, that is, into what is usually called the cortex. The adrenal cortex is developed from the germ epithelium, as are also the accessory cortical adrenals which occur so commonly in many animals as to compel one to regard the cortex as part of a system. His contention is, therefore, that it would be wise for investigators to search for a separate function for each of the two systems, cortex and medulla; there is already evidence strongly favoring the view that the cortex has certain important functions in connection with the development and growth of the sex organs. There is also abundant experimental evidence that it is the cortex, and not the medulla, which is essential to life. Extracts of the cortex do not contain any very special physiological principle. It is true that when injected into the veins of a living animal they lower the blood pressure, but this action is common to extracts made from all organs and tissues. The nature of the substance producing this effect is not certainly known; it is not choline, but it is possible that it may be betaiminazolylethylamine.

The cortical cells contain numerous lipoid granules, the so-called cortical granules; their function is not known, but it may be that they are to be regarded as secretions about to be poured into the blood stream. The function of the adrenal cortex has not been ascertained, but there is good clinical evidence that it is related to growth and development, especially of the sexual organs. Bulloch and Sequeira reported in 1905 that tumors or hypertrophies of the adrenal body were sometimes associated with precocious development of the reproductive organs.

Vincent adopts Glynn's classification of the tumors and rests of the adrenal cortex. The main divisions are into (*a*) diffuse hyperplasia passing into adenomata, frequently associated with female pseudohermaphroditism, and (*b*) malignant tumors, either sarcomata or hypernephromata or mesotheliomata. Hypernephromata of the adrenal body in children are much commoner in females than in males, and tend to increase the male primary and secondary characters at the expense of the female. Enlargement of the adrenal bodies occurs in some animals in the breeding season and in pregnancy, and Glynn has found some evidence of enlargement in pregnant women. Some experiments in which small doses of the gland substance were given to white rats in their food seemed to show that enlargement of the ovaries or testes, as the case might be, occurred; but the evidence on this head is incomplete. Vincent admits that it is hopeless at present to attempt any explanation of the precise manner or the essential mechanism of the influence of the adrenal cortex upon the reproductive organs. The adrenal organs may secrete a hormone which passes into the blood stream and so reaches the reproductive organs; or there may be more than one hormone. It is, he thinks, possible that the simple physiological conception of underaction or overaction of the various ductless glands, now held to account for the various pathological states observed, may have to be supplemented or superseded by a consideration of modified or deranged function. [B. M. J.]

Corral, J. M. The Dependence of the Inner Secretion of the Pancreas upon the Nervous System. [Zeitsch. f. Biol., 1918, 68, 395–418.]

Eight dogs were anesthetized with ether and either morphine or urethane, shock being decreased by tracheotomy and vagotomy in the neck. The periportal region was treated with pure carbolic acid to destroy the innervation of the liver and the vagus was stimulated at its peripheral end just above the diaphragm with inductive shocks for a period of ten minutes or more, alternating one minute of stimulation with one minute of rest. Bang's micro-method was used to determine the sugar content of the blood before and after the operation. In either normal blood content or when hyperglycemia was caused by narcosis

the blood sugar was decreased by the stimulation of the vagus. Sugar cleavage as the fundamental action of the pancreatic hormone was indicated by the rapidity of the onset. In some cases a rise of blood sugar was produced by the introduction of a resting period. The same operation without the stimulation of the vagus caused an increase in the blood sugar after the end of the operation. The general conclusion was that the vagus has stimulating fibers for the internal secretion of the pancreas.

Bourdinier, J. Adiposis Dolorosa. [Progres Méd., Sept. 7, 1918.]

A case of typical adiposis dolorosa in a girl of 16 whose menses had been suppressed for several months showed pains returning at monthly intervals. Under ovarian treatment the clinical picture changed for the better. After two years menstruation returned, whereupon the paroxysms of pain were much less pronounced. The pituitary region seems to be normal, as also the thyroid. Another case, a young officer, had developed at about 16 years of age small absolutely symmetrical movable lipomas on the forearms; nothing else pathologic was found. The lumps are only slightly painful.

Cecikas, J. Cure of Adíposis Dolorosa. [Grèce Médicale, Jan.–June, 1918, 20.]

This patient, a man of 32 years of age, developed his disorder six months after marriage, which fact the author believes should be taken into consideration. The unusual location of the lipomas on the abdomen were due to local pressure against the work desk. The normal balance in the chromaffine system he believes was due to an upset in the gonadal functioning. He was cured, even of his lipomata, by the continuous use of thyroid, 1 part; extract of pituitary, 1 part, and of ovary, 2 parts, supplemented by a vegetable diet and exercise. Whenever treatment was interrupted, the symptoms returned. The patient learned to make his own medicine, taking it in soup morning and evening.

Murray, John G. The Relation of the Ovary to the Causation of Sex. [Bulletin of the Johns Hopkins Hospital, Dec., 1918.]

Murray presents a critical review of Dawson's theory that the supplying ovary is in reality the essential factor in the causation of sex. An analysis of Dawson's cases which are chosen to demonstrate the theory clinically shows that only four of them are acceptable proof of the above statement. Murray has gone over the records of 17,500 deliveries occurring on the Johns Hopkins Hospital Obstetric Service from September, 1896, to March, 1918, in an attempt to test the accuracy of Dawson's claim that a male fetus is due to the fertilization of an ovum that came from the right ovary and a female fetus is due to the fertilization of an ovum that came from the left ovary. A tabulation was made of

seventy cases, there being actually seventy-five pregnancies, as five of the women were twice pregnant. In each case the location of the corpus luteum was demonstrated by Cæsarean section, at laparotomy for therapeutic abortion, at laparotomy within two weeks after delivery, or at autopsy. Also, there was no doubt as to the sex of the child. The corpus luteum was found in the right ovary in thirty-eight of the cases, and in the left in thirty-seven. In twenty-six of the cases (sixty-eight per cent.) in which the corpus luteum was situated in the right ovary, the child was male, and in the remaining twelve cases (thirty-two per cent.) the child was female. In twenty-one of the cases (fifty-seven per cent.) in which the corpus luteum was located in the left ovary the child was male, while in the remaining sixteen the child was female. There were forty-seven male and twenty-eight female children. For the forty-seven males the corpus luteum was found in the right ovary in twenty-six instances, and in the left ovary in twenty-one, while for the twenty-eight females the corpus luteum was found in the right ovary in twelve instances, and in the left ovary in sixteen. These figures show that Dawson's theory is incorrect, and the clinical evidence indicates that the determination of sex is probably not due to any factor present in the unfertilized ovum. Murray concludes that the "chromosome theory" must be considered the only explanation of the causation of sex now acceptable, and that the sex of an unborn child cannot be foretold, nor can either sex be produced at will by any rules known at present.

Climenko, H. Corpus Luteum in Neurological Practice. [N. Y. Physicians Association, N. Y. M. J., Dec. 26, 1918.]

Dr. H. Climenko read this paper in which he reviewed the results achieved, in a number of selected cases, by the administration of corpus luteum in varying dosages and in combination with other forms of opotherapy. Endocrinology had long passed from the realms of academic speculation into the land of practical knowledge. There was hardly a vital function in the living organism that did not depend upon the secretions of one or another gland, upon the proper relation in the confederacy of glands of internal secretion. There was still much to be learned, however, as to the *modus operandi* of the extracts of the glands, and the attainment of this knowledge was very desirable from the therapeutic viewpoint. Toward this end the practitioner could assist by clinically confirming the findings of the laboratory, keeping careful records of results in all the cases where opotherapy seemed indicated and comparing these results from time to time with those of others. With this object in view the writer has studied the effects of these extracts on various groups of symptoms, but this article would be confined to the results obtained by the therapeutic use of corpus luteum. Present day knowledge of the physiology of corpus luteum could be summarized briefly. Through its use there was a tendency in the body to retain

nitrogen and put on flesh; it had a marked vasodilator effect; the development of the mammary gland depended upon the formation of corpus luteum; the fixation of the embryo, the formation of the decidua and menstruation depended upon the secretion of the corpus luteum. Extracts of corpus luteum, however, did not replace the function of the normal gland. Corpus luteum was a true puberty gland and it was an antagonist of the pituitary. Extract of corpus luteum caused diminution of nitrogen excretion in the urine, diminution of oxygen absorption, unstable output of carbon dioxide, increased activity of sweat glands, and a marked fall in blood pressure. With these physiological data on hand, extract of corpus luteum had been used by clinicians in syndromes believed to be caused by disturbed sexual gland activity. The writer had been interested in its use in the so-called "nervous syndromes" associated with disturbed sexual gland function, and he carefully watched the therapeutic results in a selected number of type cases. Details of these cases were given, but they might briefly be summed up as follows: Satisfactory results were obtained and, in most instances, very rapidly in menstruation insanity; mild manic depressive insanity; menstruation psychosis; headaches occurring with menstrual disturbance; and symptoms of diminution of hydrochloric acid with menstrual disturbance. There were no results in menstrual disturbance due to obstruction; in menopause due to surgery; cessation of menstruation with symptoms of acromegaly; in hysteria; or in organic nervous disease. The clinical data following upon these observations was: (1) corpus luteum extract was effective only in the female; (2) it acted best when there was reason to believe the native corpus luteum was still present; (3) the administration of the extract could not replace the function of the native corpus luteum in pregnancy and probably also not in menstruation; (4) when menstruation was discontinued by virtue of disturbance in the secretion of another gland, corpus luteum would not produce menstruation; (5) its action was more or less prompt and small doses were effective; and (6) corpus luteum extract, when effective, produced almost always the same chain of phenomena.

The general conclusions were that corpus luteum had a specific action; the administered extracts probably did not act as the native hormone; and the extract, in all probability, stimulated the native corpus luteum to function. The two contraindications to the use of corpus luteum were an abnormally low blood pressure and profuse and frequent menstruation. [Author's Abstract.]

Sanes, K. I. The Vertigo of the Menopause. [American Journal of Obstetrics, Jan., 1919.]

The author points out that this form of vertigo is usually ascribed to vasomotor derangement which, by causing irregularities in the circulation of the different parts of the vestibular apparatus, disturbs the bal-

ance sense. The vasomotor derangement is supposed to be due to the loss of ovarian secretion during the menopause, this loss resulting in lowered metabolism or changes in the functions of the thyroid, adrenals, and pituitary body which, in combination, induce vasomotor disturbances. Vertigo at the menopause comes on at irregular intervals—attacks occurring sometimes days and weeks apart, or again, several times daily. In some, it comes on without apparent cause, in others only after unusual movements or postures. In most of the author's patients the vertigo was of the objective type. Nearly always there coexisted such disturbances as hot and cold flashes, cold perspiration, palpitation, blurred vision, flickering before the eyes, headache, nausea, tinnitus, etc. Before undertaking treatment, such other causes of vertigo as lesions of the internal ear or of any other part of the balance mechanism, cardiovascular, renal and ocular diseases, and especially muscular imbalance of the eyes, must be excluded. In the true climacteric vertigo, Sanes strives to favor general nutrition and elimination and administers an ovarian preparation each dose of which represents a grain of fresh ovarian substance. The dose used is five grains, two to four times a day. When this dose failed, better results were, in a few cases, obtained from larger amounts. The records showed about thirty-seven per cent. of cases improved, and about twenty-five per cent. completely controlled. The relief from vertigo either preceded, followed, or accompanied the relief from the other menopause symptoms. The drug was used for a month or for many months and in one case for three years before final cessation of the symptoms. In most of the prolonged cases, the vertigo would recur or become worse upon temporary discontinuance of the remedy. If it be true that, while the ovaries are still functionating somewhat, ovarian therapy not only supplies a substitute for lacking ovarian secretion but also stimulates the ovaries to increased secretion; the earlier in the menopause the ovarian substance is given, the better should be the results.

Jordan, H. E. A Case of False Hermaphroditism. [Anat. Rec., Aug., 1918, 15, No. 1.]

Rudimentary phallus, vestigial scrotum, cryptorchism, prominent mammary glands, feminine hips, limbs and hands, polydactyly, left handedness, club-foot, adiposis and feeble-mindedness are reported in a male false hermaphrodite. Hyalinization of the walls of the convoluted tubules of the testicles was shown by microscopical examination, the patent tubules being lined with a variable epithelium, mainly of Sertoli-cell origin. Hyalinization and fibrosis of the intertubular stroma, with only scattered interstitial cells, which are about half normal size, with normally distributed content of lipoid granules collected into large groups. This case is marked by a great numerical decrease and change in the interstitial cells and a lack of sexual desire, agreeing with the

supposition that male erotic desire depends on the internal secretion of the interstitial testicular cells.

II. SENSORI-MOTOR NEUROLOGY

2. CRANIAL NERVES.

Dunn, J. Some Phases of the Vestibular Nerve Problem. [Arch. Ophthal., 1918, XLVII, 354.]

Holding head erect and turning it to the right causes the eyes to move to the left and an excess of movement in the endolymph with body and extremity adjustments. This triple coördination is mediated by the cerebellum, working so as to accomplish any voluntary movement, but not originating movement. The cerebellum both initiates movements and receives stimuli from muscles, joints, etc., involved in the movement, and enabling the movement to be continued or posture to be maintained. The coördination is independent of the will, and, after the movement is initiated, beyond its control. Connections for this purpose exist between the cristæ of the horizontal canals and both the cerebellar cortical centers and the vagic ocular centers. To permit other movements of the head a similar connection has arisen between other canals and the cerebellum and optic centers. Those centers alone whose hyperexcitation produce body falling and past-pointing of the type made manifest by irritation of the cristæ respond to vestibular peripheral irritation, others being directly associated with the cerebral motor cortical centers.

The primal eye being a part of the vegetative system and was under the control of the vagus centers, its development has also come under the control of the will, so that excitation of the vestibular terminals results in impulses to both the vegetative ocular nuclei and the voluntary nuclei. The nystagmus therefore has two elements. The one results from a hyperexcitation of the primary stem centers rendering possible a nystagmus, even in deep unconsciousness. The other results from overexcitation of the centers which have developed from voluntary control over the external ocular muscles. The same rules which determine the direction in past-pointing and body falling obtain here too. When the eyes are fixed and the head is moved the eyes move in the opposite direction with a slow, pendulum-like movement, but when the head is fixed and the eyes move, the movement is jerky. The former movement is under the control of the voluntary nuclei. In nystagmus the slow movement represents the response to irritation of the vagi nuclei. The rapid movement represents a past-pointing of the eye and necessitates an element of the will for its performance.

Movements of the eyeball, whether normal or pathologic—*e. g.*, albinism—do not give sensation of the movement of external objects, but vestibular nystagmus always does. Two cases of vertigo are described and analyzed, and lead to several questions: What are the functions of the

utricle and saccule, and why is the vestibular never divided so that some fibers go to the utricle and the vertical canals, and some to the saccule and the horizontal canals. Why should nausea and vertigo be a sequence from the ear? Do they pass centralward from the cristæ, fibers some of which are destined to arouse stimuli in the oculomotor centers, others to assist through the cerebellar centers in stabilizing the head, spinal cord and joints of the extremities for the fullest performance of willed movements of these parts? Can nausea be induced by disturbance of the cristæ nerve end alone, or it is a manifestation of disturbance of the otolithic branches of the saccule? (and utricle?) What are the effects upon the endolymph, beyond the semicircular canal, of disturbances of the endolymph within them?

Blohmke, A., and Reichmann, Fr. Significance of the Bárány Test in Differential Diagnosis. [Arch. f. Ohrhkl., Vol. 101, p. 80.]

The use of Bárány's test need not necessarily reveal only lesions of the labyrinth or cerebellum, but injuries as well, these writers suggest, in some other part of the brain—of the nerve tracts connecting the cerebrum with the cerebellum. Such symptoms as disturbance of equilibrium, ataxia, faulty pointing with the arm, have been observed in cases of frontal tumor. If there are symptoms of disturbance of the semicircular canals, cerebellum and pyramidal tracts, all have to do with the pointing reaction, so that when there are other symptoms present which denote lesions—disturbance in any of these areas —one cannot be certain that the failure of the pointing reaction is due to a lesion of the fronto-pontile-cerebellar tract. Cerebellar failure in this test due to cerebral disturbance is distinguished from labyrinthine or cerebellar in the fact that it will appear upon the contralateral side from the region of its release. The writers emphasize the importance of always utilizing the test in cases of suspected intracranial disturbance, but it must be used in connection with other localizing signs.

Magnus, R. Tonic Neck and Labyrinth Reflexes on the Muscles of the Decerebrated Ape. [Arch. neerl. de physiol., 1918, 2, 484–488.]

Two decerebrated cercocebus apes were studied for tonic neck and labyrinth reflexes, showing similar results to those with other animals. Centers of these reflexes are below the place of entry of the eighth nerve. The right arm and leg showed an increase of tonus if the lower jaw was turned in their direction those on the left showing a diminution of extension tonus. A position of maximum tonus and one of minimum tonus. The extension of tonus of lifting muscles of the neck was paired with that of the four limbs.

de Kleijn, A. Reflex Action of the Labyrinth and Neck on the Muscles of the Eye. [Arch. neerl. de physiol., 1918, 2, 644–649.]

Tonic reflexes in the labyrinth cause for each position usually for the eyes, which appear to attempt to parallel the orientation of the head. Study of five rabbits to establish a tonic cervical reflex of the eye muscles like that of other head muscles, was carried on after bilateral extirpation of the labyrinth and showed that while the head position in space did not affect the tonic reflexes of the neck, the tonic reflexes of the neck are similar to and parallel those of the labyrinth. The eyes maintain their relative position in space by their own motion. Sensory roots of C1 and C2 in a rabbit lacking both labyrinths prevented the tonic neck reflex, thus showing the route of the reflex.

Vernet, Maurice. Paralysis of the Glosso-pharyngeal Nerve. [Med. Rev. of Reviews, 1918, XXIV, p. 521.]

The motor disorders of glosso-pharyngeus palsy are but little known; they "may exist while the taste remains unimpaired, but when taste is affected paralysis of the superior constrictor of the pharynx invariably exists." In 1862, Chauveau showed that stimulation of the roots of the glosso-pharyngeal nerve caused contraction of the antero-superior part of the superior constrictor of the pharynx. Vernet believes that the upper constrictor narrows the caliber of the pharynx, while the middle and lower constrictors shorten the pharynx. The present war has given much information on the symptomatology of cases of paralysis of the glosso-pharyngeus. Of the functional signs of palsy of the superior constrictor muscle, the most important is inability to swallow solids, especially bread and meat. A few days after the injury, the patient feels that the throat has become smaller, or he complains of discomfort or of pressure on the posterior wall of the diseased side. Visual inspection of the pharynx shows nothing abnormal while the parts are at rest. If, however, nausea is produced by plunging the tongue spatula deeply or if the patient be made to say "Ah" or "a" the posterior wall of the pharynx moves from the injured to the sound side and a little obliquely upwards. This movement is rapid and very characteristic: Vernet calls it the curtain movement. He has often obtained a greater amplitude of movement by making the patient open his mouth vigorously, and by drawing out his tongue with a compress while he was uttering a sound or swallowing. Tickling the pharyngeal mucous membrane on the healthy side is also effectual. Vernet discusses the question of the taste function of the glosso-pharyngeus nerve, and gives the following conclusions:

1. Difficulty of swallowing solids is due to paralysis of the superior constrictor of the pharynx.

2. The superior constrictor is innervated by the glosso-pharyngeal nerve, and palsy of the former is a sure sign of injury to this nerve.

3. Paralysis of the vagus or the spinal accessory nerves cannot in any way give similar disorders of deglutition of solids, whether the middle and the lower constrictors are innervated by the glosso-pharyngeal or not, as the stylo-pharyngeus and stylo-hyoid muscles may be capable of shortening the pharynx.

4. The curtain movement of the posterior pharyngeal wall from the diseased to the sound side characterizes the paralysis of the superior constrictor (Vernet).

5. Taste disorders of the posterior part of the tongue invariably accompany motor paralysis when the nerve is radically amputated or deeply injured. These symptoms may not exist in cases of superficial injury or mild compression of the nerve. In these cases motor palsy is sufficient evidence on which to declare injury to the glosso-pharyngeal nerve.

6. The easy and rapid recognition of this motor paralysis must cause us to search for it systematically in cases of disorders of deglutition of solids. [Leonard J. Kidd (London, England).]

Du Pan, Levy. Post-influenzal Palatal Paralysis. [Rev. Med. Suisse Romande, 1918, XXXVIII, p. 613.]

A record of two cases of post-influenzal paralysis of the velum palati. Case 1 was a man of forty who had violent pains in head and limbs, irritable cough, and a temperature of 40.3° C. Slight sub-delirium, pupillary inequality, slight neck stiffness. Kernig negative. Increased reflexes. Pfeiffer's bacilli found in sputum. Palatal paralysis on tenth and eleventh days. Recovery at end of fifteen days.

Case 2 was a boy of twelve who had violent pains in head, and broncho-pneumonia. The sputum showed Pfeiffer's bacilli and the pneumococcus. The fever subsided on the twelfth day. During the next two days signs of palatal palsy appeared. Recovery in two or three days. This case was much slighter than the first one, which showed signs of pseudo-meningitis. The nervous symptoms were caused by the toxin of Pfeiffer's bacillus, or rather by an endotoxin which, according to Galli-Valerio, is set free by the dissolution of the bacteria. [Leonard J. Kidd (London, England).]

3. SPINAL CORD.

McClendon, J. F. Cerebrospinal Fluid. [Journal A. M. A., April 6, 1918.]

The author says that the view repeatedly expressed that the spinal fluid is a secretion and its composition more or less independent of the composition of the blood, is an incorrect one. It is not an ordinary filtrate like lymph, since it is almost free from proteins, in health. It may, however, be an ultrafiltrate, and he describes the method used by him in the experiment to compare it with filtrate of blood plasma, from

which he deduces the view that it is formed primarily by ultrafiltration and to which filtrate the secretions of cells may be added. The high protein content in disease may be explained by supposing that the disease causes leakage of the filter, thus allowing protein, and sometimes cells, to pass through. If the spinal fluid is an ultrafiltrate of the blood, or is in diffusible relation with it, any change in the alkaline reserve of the blood plasma should cause a somewhat similar change in the spinal fluid, and McClendon gives the details of his study to determine the presence of acidosis. He has developed an electrometric method for titrating the alkaline reserve of blood plasma. In using this method with the spinal fluid, he found that the proteins were so low in concentration that it is possible to titrate the fluid with a suitable indicator, but it is impossible to find an indicator that is not rendered worthless by as much protein as is present in the blood plasma, and because of technical errors in the methods, separate tables for spinal fluid and plasma are hardly worth while. McClendon describes his method of determining hydrogen ion concentration in the spinal fluid and blood plasma. He gives a conversion table which he thinks gives more reliable results, than those usually obtained by any direct method, though it is not absolutely correct. The method is based on the assumption that the hydrogen ion concentration of blood and spinal fluid is the same as that of the solution of sodium chlorid and sodium bicarbonate of the same osmotic pressure, alkaline reserve and carbon dioxid tension as the blood or spinal fluid. He says that: "In using the conversion table shown in the chart, it is assumed that the carbon dioxid tension of the blood and the spinal fluid is the same as that of the alveolar air as determined by any method that may be chosen. The alkaline reserve is determined by titrating the spinal fluid and the diagonal of this alkaline reserve found in the chart. The alveolar carbon dioxid is measured on the ordinate with a pair of dividers, which are moved to the right until their upper point falls on the alkaline reserve diagonal. At their lower point, the hydrogen ion concentration of spinal fluid (and blood) may be read off. The logarithm of the hydrogen ion concentration, which is used to calculate the result, can be found by following the vertical line from the hydrogen ion concentration to the top of the page." The paper is a rather technical one, and does not easily lend itself to a more detailed abstract. One chart and four tables are included.

Weil, M. P. Sugar in the Spinal Fluid. [Ann. de Med., Dec. 1918.]

Weil has here made an exhaustive study of the significance of sugar in the cerebrospinal fluid. He holds that its study reveals far-reaching factors of more importance than any other element in it. The Bertrand technic is reliable. In twenty-eight average individuals the sugar content ranged from 0.42 to 0.60 gm. per liter. The average is 0.50 gm. When above this Weil coins the term hyperglycorachy. This hypergly-

corachy follows disorders of the peripheral motor or sensory neurons, in war neuroses, in shell shock, in epilepsy, etc. Simple congestion of the meninges increases the sugar content. An increase in meningitis is a sign that the bacterial growth is becoming attenuated. In syphilitic meningitis there is generally increase in the sugar content.

Pignot, Jean. Colorimetric Determination of Glucose in the Diagnosis of Acute Meningitis. [Paris médical, December 28, 1918.]

The author directs attention to the absence and gradual reappearance of glucose in the cerebrospinal fluid in nontuberculous, acute meningitis tending toward recovery. In relapses, glucose disappears again, and returns when the relapse subsides; in serum disease, on the other hand, the glucose remains constant. In cases with meningeal symptoms but with normal, aseptic spinal fluid, the glucose likewise remains constant. In preparing samples of the fluid for the glucose test, the author first adds to about five mils of spinal fluid a small amount of a mixture in equal parts of lead acetate and zinc acetate. The fluid is then brought to the boiling point on a water bath, centrifugated, and the supernatant clear fluid taken for the test. The latter is carried out as follows: Exactly two mils of the fluid are placed in a test tube with five mils of freshly mixed Fehling's solution and the tube kept seven or eight minutes in the boiling water bath, and then centrifugated. The clear fluid is decanted, the tube turned bottom up on filter paper for two minutes, without detaching the sediment of oxide of copper, and about five mils of an acid decinormal solution of ammonium molybdate then poured into the tube. An intense blue coloration at once results, which is proportional to the amount of copper oxide present. The volume of fluid in the tube is brought up to twenty mils by addition of water and the resulting color compared with a series of five or six standard tubes previously prepared with known amounts of glucose. The molybdate is an extremely sensitive reagent, and in this procedure shows quantitatively the extent of reduction where the amount of oxide of copper is so small as to be hardly visible.

Weissenbach. Reducing Power of Cerebrospinal Fluid. [Bull. d. l. Soc. M. d. Hop., Nov. 29, 1918.]

Weissenbach here would show that the leucocytes play the main part in the modification of the reducing power of the cerebrospinal fluid. He cites two experiences among others to support this. These were patients with bacterial meningitides but no leucocytes. The reducing power was average. In other cases there were many bacteria and leucocytes up to 2,000 per cubic millimeter. The reducing power was normal. On the contrary, the reducing power diminishes with aseptic purulent meningitis with great increase of leukocytes. The reducing power is therefore no

index as to the septic or aseptic state of the fluid. The reappearance of the reducing power or as Weil or Pignot would state, the presence of sugar, however, in the course of a purulent meningitis is a favorable prognostic sign indicative of diminished infection.

Stern, A. Poliomyelitis in the Army. [Deut. m. Woch., Jan. 9, 1919.]

The author reports five cases of acute poliomyelitis occurring in the German army, although there was no epidemic among the children in the region where these cases occurred. However, the writer remarks that the coexistence of influenza should be given attention, all the more so because the coexistence of these epidemic diseases has already been noted. One of the patients had had the grippe six weeks before he developed the poliomyelitis. Stern also learned that two other of his patients came from a region where there had been a high mortality among hens.

Amoss, Taylor and Witherbee. Effects of Roentgen Rays on Poliomyelitis. [Jour. Exp. Med., Jan., 1919, J. A. M. A.]

In two series of the experiments here recorded the monkeys which had been repeatedly exposed to roentgen rays responded with typical acute poliomyelitis to an intracerebral inoculation of poliomyelitic virus filtrate, whereas, the normal control receiving the same dose showed no symptoms. In another series the roentgen-rayed animal came down with typical poliomyelitis after inoculation with three fourths of the dose which was not infective for the control. It has been demonstrated that roentgen rays diminished both the number of circulating lymphocytes and the resistance of the animal to the weak poliomyelitic virus. Whether the lowered resistance of the animals as the result of the treatment with roentgen rays is due to the reduction of circulating lymphocytes in each of the roentgen-rayed monkeys is not determined in these experiments. However, the great reduction in lymphocytes in human cases and in monkeys during the acute stage of experimental poliomyelitis and the gradual return of the cells to their former numbers during recovery strongly suggest a definite relation between these cells and one factor of resistance in poliomyelitis. On the other hand, the reduction in resistance by roentgen rays, while definite, is not sufficiently great to warrant the conclusion that we are dealing with major factors governing infection or noninfection. Another experiment in this paper deals with the survival of a subinfective dose of the virus in the normal monkey brain. A monkey receiving the subinfective dose of the virus was exposed to roentgen rays at twenty-eight days, another at fifteen days after injection, but neither animal showed symptoms of poliomyelitis. It is concluded that within this period the virus did not remain unchanged in the normal monkey brain. An attempt to reduce the immu-

nity in a monkey acquired by an attack of experimental poliomyelitis was unsuccessful.

Taylor, H. D. Blood Counts in Experimental Poliomyelitis in the Monkey. [Journal of Experimental Medicine, Jan., 1919.]

The author studied the type of change in the white cell count of the blood in monkeys in the following stages of experimental poliomyelitis: the incubation period, the acute stage, the stage of prostration, and of recovery, and compared it with that of normal monkeys and with that of animals which were inoculated with the virus of poliomyelitis, but did not succumb to the disease. The counts made during the course of typical acute experimental poliomyelitis varied from the normal. After injection with the virus, the lymphocytes are diminished at first, but between the fourth and sixth day of the incubation period are actually increased. During the first three days after the onset the lymphocytes are markedly decreased, and there is a rise in polymorphonuclear neutrophilic leucocytes. During prostration the lymphocytes remain low, the total polymorphonuclear neutrophilic leucocyte count returns to normal, but there remains a relative increase. During recovery, the cell count and relation again become normal.

Kuhn and Steiner. Etiology of Multiple Sclerosis. [Med. Klin., 1917, 13, 1007, Neur. Ctblatt., 1917, 36, p. 844.]

Nonne was one of the first observers to note that in some patients with multiple sclerosis with negative syphilitic anamnesis, a positive Wassermann had been found. Kuhn and Steiner think they have found a specific spirochete in this disease, and the subject of the underlying causative factors of disseminated sclerosis has received a considerable amount of attention in Germany since the publication of the experimental findings of Kuhn and Steiner. These authors inoculated guinea pigs, rabbits and other experimental animals with material obtained from the blood and cerebrospinal fluid of a number of patients suffering from rapidly progressive disseminated sclerosis. They found that within periods varying from three days to twelve weeks, and averaging six to seven weeks, nervous manifestations often appeared in the inoculated animals. Positive results were obtained with greatest regularity if the inoculations were made intraperitoneally in the case of guinea pigs and intraocularly in the case of rabbits. The nervous manifestations which developed in the inoculated animals were drowsiness, excitability, difficulty in getting about, and later rapidly increasing weakness and localized paralyses. From the material obtained from one patient suffering from disseminated sclerosis a set of four successful passages through guinea pigs was obtained; after each passage the severity of the illness in the animal increased. In animals successfully inoculated a spirochete was found collected into foci inside certain blood vessels, capillaries

and also in tissues proper, such as the liver. This spirochete differed from the *Treponema pallidum* found in syphilitic tissues.

Strümpell. Etiology of Multiple Sclerosis. [Neur. Centrblatt., Vol. 37, 1918, p. 401.]

Strümpell here discusses the findings of Kuhn and Steiner. He looks for further confirmatory observations of the experimental findings before he accepts the view that the spirochete is an essential factor in the causation of all the cases of this disease. Disseminated sclerosis differs from other diseases in a number of ways, its sporadic appearance, its lack of spread in households and communities, its age and sex incidence, its indefinite mode of onset and its course, etc. Strümpell contrasts the knowledge of the factors at work in the causation of tabes dorsalis and of disseminated sclerosis; for the mode of entry into the patient of the spirochete in the former there was definite knowledge, in the latter none—not even a suspicion as to when, much less as to how, the patient is infected. The mode of infection, if an infection it be, in disseminated sclerosis is completely unknown. The remissions in the clinical manifestations, their inexplicable regular-irregularity and the early age of onset, unaccompanied by general disturbances such as fever or malaise, or by local changes such as excess of cells or proteid in the cerebrospinal fluid (*cf.* syphilis, tuberculosis, and neoplasmata) are features not seen in other groups of infectious disease. The pathological anatomy, with changes confined to the central nervous system alone, is also remarkable. The changes are of the nature of exudative infiltrations in sharply localized patches, accompanied by the appearance of a particular type of rod cells; moreover, they are characteristic and unlike those seen in generalized infections. In many ways disseminated sclerosis calls to mind malignant growths, carcinomatosis, sarcomatosis, etc. Strümpell eventually concludes that an infecting agent is probably an essential factor, in so far as in no patient can such a factor be absent, but other varying and occasional factors must also be present; if this be not the case the whole problem seems inexplicable. He appears to accept the spirochete of Kuhn and Steiner as this infecting agent, but seems inclined to the view that the patients grouped on clinical grounds as suffering from disseminated sclerosis will be found eventually to fall into more than one pathological subdivision.

Siemerling. Spirochetes in Multiple Sclerosis. [Berl. klin. Woch., Vol. 55, 1918, No. 12.]

Following Kuhn and Steiner's findings Siemerling has obtained from sections in the frontal region of the brain of a 36 year old patient, who had died from an illness diagnosed as disseminated sclerosis, a number of focal lesions of varying size, some pinkish in color, others gray, situated both in the superficial cortex and in the deeper substance of

this region, which, under dark ground illumination, was found to contain living spirochetes. Stained preparations failed to reveal their presence and he in a manner confirms the findings of Kuhn and Steiner.

Roussy, G., and Cornil, L. Commotion of Spinal Cord. [Prog. Med., Aug. 3, 1918, 33, No. 31, p. 263.]

Five cases, of different types, confirm the necessity for reserving the prognosis at the first examination. Merely temporary suspension of function may cause some cases to appear exceedingly grave, although the patient gradually recuperates. Systematic immobilization, and care in preventing bedsores and involvements of the lungs, often result favorably in cases of quadriplegia from concussion of the spinal cord. In three of the cases the motor function began to return between the twentieth and twenty-fourth day. The concussion was by indirect contusion. In the two other cases direct contusion of the cord and dislocation of a vertebra, the interval was two and four months. These two men, ten and fourteen months after the wound, show only simple hemiparesis or traces of hemiplegia, with the Claude-Bernard Horner syndrome. In the former the sphincter and genital derangements still continue.

Desplats, R., et Buquet, A. Arterial Obliteration an Esthemia of Neurological Origin. [Rev. de Med., Sept., 1916.]

The authors believe injury of the medium-sized arteries is an important factor in the nervous disturbances of the wounded. Motor, sensory, and trophic disturbances and modification of electric reactions are caused by obliteration of a trunk artery alone. Disturbances caused by the nature of terminal distribution are more pronounced at higher points in the artery, where arterial circulation is less compensated for as in the arm. The most dangerous zone being that of the axillary artery. Traumata in this artery may cause ulnar, median or radial paralysis, reacting in degeneration in the segment of the arm involved and complete anesthesia of the tips of the fingers. The fingers may also show characteristic deformity. These symptoms are less pronounced as the obliteration or compression of the artery is farther from the trunk. In the leg a tendency to gangrene is shown. Both the artery and the nerve, however, being generally injured by the projectile, the exclusive treatment of either is neglecting an important factor.

Neuhof, Harold. Wounds of Spine. [Journal A. M. A., Jan. 4, 1919.]

The author discusses a class of gunshot spinal wounds in which the dura is intact and the paralysis is caused by commotion or concussion or both combined. In the fatal cases a diffuse or a focal necrosis of the affected portion of the cord with a varying degree of edema is found, sometimes destroying all the cord elements at the same level though

most frequently some portions remain intact. The presumption is that in cases in which recovery either total or partial occurs, edema was the cause of paralysis. In injuries by shell fragments the chances of recovery are the slightest if the wound is deep seated in addition to the functional lesion. There may be fragments of bone or clot directly compromising the dura, the removal of whch is indicated chiefly, however, for reason of infection of the wound. Four cases are reported of this class. The spinal column was fractured in three of them while there was no demonstrable bone injury in the fourth case and in none of them was there any appearance of pressure on the dura and in none of them was it opened. The article is written to call attention to such cases.

Brookover, Charles. The Peripheral Distribution of the Nervus Terminalis in an Infant. [Jour. of Comp. Neurol., 1917, XXVIII, p. 349.]

This paper is based on two series of sagittal sections of stillborn negro infants at about full term. Brookover's description is based largely on a pyridine silver preparation of the right half of the nose. The modification of Ranson's method used by Huber and Guild (1913), on the rabbit was used to permit of the section of the cribriform plate after decalcification. As in the rabbit, the peripheral rami of the nervus terminalis lie next the cartilagineous septum deep to most of the vessels and other structures of the nasal mucosa. Centrally the ganglion terminale lies median to the obfactory bulb, embedded for the most part in the dura lateral to the crista galli. Brookover sums up by saying that the peripheral nervus terminalis is so large in man that it may be said to be hypertrophied as compared to the known development in other mammals, without appreciably increasing its central root. In addition to many cells in the ganglion terminale it contains about fifteen hundred cells peripherally under the nasal mucosa. Though disposed in three or four chief rami emerging from the lamina cribrosa there is a vast network of interlacing bundles deep to the main arteries. Some of the fibers trail over the walls of the arteries, but the pyridine silver method does not reveal ultimate endings. There is considerable evidence that the interlacing rami of the nasopalatine nerve send a bundle of considerable size through the cribriform plate to establish a sympathetic chain connection posteriorly via the sphenopalatine nerve and ganglion. More work is needed to settle this point. [Leonard J. Kidd (London, England).]

Reynolds, C. E. Inflammation of Cauda Equina. [Journal A. M. A., Jan. 4, 1919.]

The author reports a case of inflammation of the posterior roots in the cauda equina on the right side in a man, 48 years of age, without

specific history or positive Wassermann, who suffered from rather obscure symptoms similar to those described by Kennedy, Elsberg, and Lambert, in 1914, thus making a sixth case of obscure disease of the cauda equina relieved by operation. The roentgenograms were negative but operation revealed the nerves of the right side imbedded in a purplish mass of apparently inflammatory material, and probably involving the anterior roots on the left side, also. The actual boundaries of the mass were not looked for, for fear of permanent damage to the bladder function, and no attempt was made to remove the whole of the affected tissue. Immediate relief was obtained after operation, and the bladder acted normally for a week, followed by two weeks of retention requiring catheterization. Since then the function is normal. The paralysis has disappeared largely, and the patient walks and expects to return to work. There is a slight band sensation in the region of the right knee, but the muscular tissue has increased in the legs and swelling and blueness of feet have disappeared. This medicinal treatment was hexamethylenamin and potassium iodide on alternate days for seven weeks, after which potassium iodide was alternated with an iron, arsenic and strychnine mixture.

King, J. L. Knee Jerk in Women. [Am. Jour. Physiol., Dec., 1918.]

Taking the knee-jerk as a physiologic index of the tone of the nerve centers, King believes that there is a period of hyperexcitability immediately preceding, accompanying or following menstruation and a tendency after that time toward a fall approaching to an intermenstrual average.

Low, R. Cranston. Herpes Zoster: Its Cause. and Association with Varicella. [British Medical Journal, January 25, 1919.]

The author reports three cases of herpes zoster, each of which was followed by one or more cases of chicken-pox either in the same family or in the same hospital ward, after an interval of nineteen, thirteen, and two days respectively. These cases support similar observations made first by Bokay in 1892 and since then by a number of other observers. In all the recorded cases the chicken-pox eruption appeared in from eight to twenty-one days after contact with a case of herpes zoster. In one of the author's cases, two days interval only elapsed between the appearance of herpes zoster and chicken-pox but as both patients had been in hospital for some time, the infection was probably brought by visitors. The converse condition, that is chicken-pox followed by herpes zoster, has also been reported by several observers, but not so frequently. Further, cases have been recorded from time to time in which herpes zoster and a varicella-like eruption have occurred in the same individual. These facts would lead one to conclude that the two conditions are due to the same virus. The author would go further, and suggests that in

herpes zoster the infection is probably local, through the nose, along the lymphatics, round the olfactory nerves, as has been shown to be the mode of infection with the virus of anterior poliomyelitis, which has many points of analogy with herpes zoster. Once the virus reaches the meninges and cerebrospinal fluid, it is easy for it to get to the ganglia on the sensory nerve trunks. In chicken-pox there is probably a blood infection with the virus. In cases in which the two conditions appear, the virus probably attacks the ganglia first and, four or five days later, gets into the general circulation. Microscopically, the vesicle in herpes zoster is similar to that seen in the early stages of varicella. The lesions in chicken-pox occur in groups, suggesting that a small branch of the peripheral nerve is the seat of a focus of infection. Moreover, many of the chicken-pox lesions show a vesicle with no inflammatory halo around it, as is seen in pemphigus and dermatitis herpetiformis, which are generally considered to be nerve lesions. These facts would seem to show that the eruption in varicella is primarily not due to the virus settling in the end capillaries of the skin but in the nerve endings or minute nerve twigs in the skin. No causal organism has yet been discovered in chicken-pox or herpes zoster. It is possible that the virus belongs to the group of filter-passing ultramicroscopic organisms mentioned by Flexner in his Huxley lecture as being the cause of poliomyelitis and vaccinia among other diseases. Since both chicken-pox and herpes zoster occur in epidemic form, if they have a common origin one would expect simultaneous epidemics to occur. The only instance on record is that reported by Heim as occurring in Budapest during April and May, 1912. As neither disease is notifiable, statistics are wanting. As regards immunity, an attack of chicken-pox usually conveys immunity for life. Similarly, an attack of herpes zoster is rarely followed by another; most of the recurrent attacks are attacks of peripheral neuritis due to pressure by a tumor on nerves. An attack of varicella does not necessarily protect the individual against herpes zoster. It is possible that an attack of herpes zoster may confer immunity to chicken-pox, but individuals who have herpes zoster in many cases are past the age when they are likely to have the former. Further knowledge is required on this point. In cases of herpes zoster which occur whilst arsenic is being taken, the question arises whether the arsenic produces an arsenical neuritis with the eruption in the distributon of the nerve, or whether the arsenic renders the nervous system more susceptible to infection with herpes zoster. The latter would seem to be the more probable explanation, because even although the patient continues to take the arsenic, the herpes zoster runs a normal course, heals up, and does not recur. Parkes Weber, moreover, reports an instance in which a patient was taking arsenic and developed herpes zoster with a generalized varicella-like eruption, and another patient from the same ward developed chicken-pox fifteen days later. [Med. Record.]

4. MID BRAIN AND CEREBELLUM.

Marinesco, G. Pathology of Lethargic Encephalitis. [Bulletin de l'Académie de médecine, Nov. 5, 1918.]

Marinesco notes that this condition was first described by Economo, and that many cases of it have been brought to light and studied in France and England since Netter called attention to it in the spring of 1918. The author's pathological study is based on material from four cases. Among the chief features were intra and perivascular hemorrhages situated particularly in the substantia nigra, the raphe, and the gray substance surrounding the aqueduct of Sylvius. The hemorrhages were not exclusively localized, however, about the vessel walls, but pressed into the parenchyma in streaky formations. The lesions of the nerve cells were not found very intense, differing in this respect from those of infantile paralysis. Even in the vicinity of the foci of inflammation the nerve cells preserved their ordinary morphologic features and did not become the prey of neurophages. Yet in some regions, such as the dorsal pneumogastric center, the locus ceruleus, and the locus niger, there was a marked diminution in the number of nerve cells and atrophy of those that remain. Less pronounced cellular changes were noticed in the upper part of the oculomotor nucleus, in that of the facial, and in one case, in the anterior horn cells of the superior cervical region. In the locus niger and locus ceruleus there had occurred a process of cytolysis which set free melanotic pigment—the latter then engulfed by neighboring neuroglia cells acting as pigmentophages. Inflammation of the meninges and meningeal veins constitutes a frequent change in lethargic encephalitis, and the motor disturbances are undoubtedly due to involvement of the roots of the oculomotor, hypoglossal, pneumogastric, etc. In the medulla and peduncles of two cases the author found colonies of peculiar corpuscles—possibly parasitic cells—straining with the Leishman and Gram stains. The virus of the disease probably extends from the nasopharynx along the lymphatic channels of the nerves to the bulb and pons. The condition constitutes a distinct form of inflammatory poliencephalitis, which differs in respect of the existence of this inflammation from the poliencephalitis of botulism and the hemorrhagic poliencephalitis of Wernicke.

Chartier. Lethargic Encephalitis. [Presse Méd., Dec. 23.]

Chartier emphasizes the importance of strict differential diagnosis. This disorder should be diagnosed only under the most rigid rules of exclusion. Leichtenstein's monograph published in 1892, and the reports of hosts of other observers, have established hemorrhagic or exudative, midbrain encephalitis from the influenza organism.

James, S. P. The Distribution of Lethargic Encephalitis. [Lancet, Dec. 21, 1918.]

The author made an epidemiological investigation of the distribution of this epidemic disease in the hope of throwing some light upon its cause, or its relation to other diseases. The observations indicated that the disease was widely, but very sparsely, distributed through the country generally; that cases occurred in localities in which there were no cases of true poliomyelitis at the time; and that cases have occurred where true poliomyelitis was present, but rare. It seemed evident, therefore, that this new syndrome of lethargic encephalitis was not a form of acute poliomyelitis.

Lesné. Choreiform Movements After Lethargic Encephalitis or Influenza. [Bull. d. l. Soc. M. d. Hop., Nov. 29, 1918.]

Among the less frequently observed symptoms of mid-brain encephalitis of influenzal origin, choreic movements may be noted. This article discusses this group of symptoms and cites the work of Marie, Souques and Netter who also have recorded this symptom complex.

Khoury, A. Lethargic Encephalitis. [Bull. et Mem. Soc. d. Hop. d. Paris, 1918, 3, 42, 455.]

Accounts of isolated cases of lethargic encephalitis continue to be recorded in the French literature. Saint-Martin and Lhermitte [see Feb. issue, 1919, p. 155] have published the case histories of two almost identical cases, in which the onset of the disease was characterized by headache, prostration, and drowsiness, followed a few days later by the sudden development of diplopia and ptosis. All parts of the motor branches of the oculomotor nerve were affected, the intrinsic muscles of the eyeball, as well as the internal rectus, the superior rectus, and the inferior rectus, being paralyzed. Mydriasis was very intense, and was accompanied by paralysis of accommodation and loss of the light reflex. In neither case were motor disturbances of the face or limbs present, and in neither case was the mental condition, apart from somnolence, greatly affected. In both cases the somnolent state persisted for a month or six weeks, and then the patients recovered completely, except for a certain amount of ocular paresis. These authors record the fact that in the Berry district, in the center of France, where these two cases occurred, a simultaneous epizoötic disease amongst fowls resembling human poliomyelitis raged.

Khoury records a fatal case in a man aged fifty-seven. In his case the characteristic somnolence and ophthalmoplegia fourteen days after onset became complicated by attacks of Jacksonian convulsions affecting the left half of the body and the appearance of an extensor, Babinski, plantar response. There was no autopsy. In the subsequent discussion Netter and Chauffard stated that they also had observed similar cases.

In the former of the two fatal cases whose clinical histories were described by Chauffard and Bernard, and whose postmortem appearances were published by Pierre Marie and Trétiakoff, the noteworthy features were the hyperacute course, death occurring from syncope on the ninth day, and the fact that naked-eye examination of the central nervous system revealed *no* gross changes. Histological examination, however, showed areas of diffuse acute inflammatory changes in the grey nerve centers. The lesions were most definite in the cerebral peduncles, and especially in the locus niger. Moreover, although the patient was a relatively young man (aged thirty-two), his brain presented lesions which must have appeared prior to his terminal illness, calcareous infiltration of the arterial walls being found in the inner part of the lenticular nucleus; a small scar was also found in the pons. In the second of these two cases the typical ophthalmoplegia, which was present in the first case, was absent; there was little or no fever apart from what appeared to be related to and accounted for by a large bed-sore; lethargy was extremely noteworthy. On histological examination the brain showed much less intense and much less extensive inflammatory lesions than did the brain of the first case. Indeed, only an area of sub-acute inflammation around the locus niger and extending towards the basal ganglia on the one hand and to the juxtaventricular grey matter of the pons and medulla on the other, was discovered.

6. BRAIN.

Carnot and de Kerdel. Hypothermia as an Epileptic Equivalent. [Paris Mèd., 1917.]

Drs. Carnot and de Kerdel have published notes of a curious case of a noncommissioned officer of an Alpine regiment, wounded in 1915, by a bullet which caused depressed fracture of the frontal bone just above the eyebrow. He was trephined two hours later and eight days later right hemiplegia supervened which cleared up very slowly. Seven months after the receipt of the wound he had a typical attack of Jacksonian epilepsy followed shortly after by a second one. A month later he had an attack of hypothermia preceding an attack of partial epilepsy. On the following days he had a period of hypothermia not accompanied by a frankly epileptic attack which thus possessed the value of an epileptic equivalent. Operated by Dr. Dambrin on the advice of Dr. Sicard the patient recovered and since then no longer suffers from attacks of hypothermia or epilepsy.

To sum up, here was a man who had been trephined through the frontal bone, who was exposed to cicatricial compression of the subjacent convolutions giving rise to (1) attacks of frank Jacksonian epilepsy (2) periods of hypothermia preceding sensitivo-motor attacks or happening in their stead. Both disappeared simultaneously after an operation to remove the cause of the compression. The hypothermia may therefore in this case be looked upon as an epileptic equivalent.

Owen, Robert. HEMIPLEGIA. [Journal A. M. A., March 23, 1918.]

Owen quotes somewhat different opinions of two authorities (Thomas and Church) as to the time of beginning systematic exercises in hemiplegic cases. The former says the paralyzed limbs should be rubbed and moved passively before the appearance of voluntary power, while Church advocates the use of faradism with massage as soon as the coma has passed off. The fear of greater injury, according to Church, is without reason, provided the measures are properly carried out. In this Owen follows Church, and strongly recommends the Swedish movement cure method. The movements may be divided into two general classes, the active and the passive. The former are brought about by volition or effort of the patient, and are subdivided into the duplicated or resisted according as they are made against the masseur or physician's operation or resist it. The passive movements are applied to the inert patient, or one in as relaxed a condition as possible. There are four kinds of passive movements applied on or to the paralyzed part: Effleurage or stroking is used to stimulate the venous and lymphatic flow and bring about relaxation of contracted muscles. In petrissage the tip of the thumb or the tips of the first three fingers are employed to make circular and loosening movements to break up adhesions and promote circulation of the parts. Friction consists of grasping a muscle and thoroughly kneading it with the fingers. Its effects are like those of petrissage, but more powerful and extensive. A special form of petrissage or friction is given to nerve trunks by drawing the fingers along their course or across it. The application is made to the nerve instead of the muscle to cause its contraction. In tapotement the part treated is struck sharply several times in quick succession, usually with the ulnar side of the hand, and its chief use is in a mechanical stimulation of the muscles. Each of these types of passive movement has its special indications for its use. Effleurage has its chief though not its only use in loosening the tight contraction of the muscles and preventing it. The uses of petrissage have been mentioned. The use of friction is to increase the nutrition of the muscle or nerve, and tapotement also increases the irritability. In cases of hemiplegia, we find that certain muscles are more and differently affected than others, some contracted and some relaxed. Thus in the upper extremity, the muscles which usually cannot be moved and which are flaccid, are the lateral muscles of the forearm, the supinators and extensors of the forearm, and the extensors of the fingers. In the lower extremity, the muscles chiefly affected are the adductors of the thigh, the flexors of the leg, and the dorsiflexors of the foot. In the upper extremity, contractures are found; some come early and some only after a considerable period, according to the site of the lesion (cortical or subcortical). The contractures of the arm produce an adduction of the arm on the body, flexion at the elbow, wrist and fingers, and some pronation of the hand. In the leg,

the knee is usually extended, the angle is dorsiflexed, and these two conditions accompanying inability to overcome them with the appropriate muscles bring about the outward swinging and dragging of the foot that characterizes the hemiplegic gait. Each case, however, should be treated individually, for there is considerable variety in degree and distribution of the paralyzed muscles and muscle groups, and the one might be treated for contraction, if relaxed, while the other requires the opposite measure. Several cases are reported and commented on, and the benefits of early treatment pointed out. Several experiments on monkeys are reported, showing that while recovery may occur spontaneously after artificial cerebral paralysis, it may be hastened by proper exercises. Oden holds that the facts, clinical and experimental, in most and perhaps all cases of cerebral paralysis may be relieved, and while the treatment may not show complete recovery from the use of the Swedish movements, the prevention or cure of deformity and return of power that can be obtained are not to be despised.

Laignel-Lavastine. Brain Wounds. [Press Méd., Jan. 27, 1919.]

This paper takes up various types of brain injuries seen by the author in his neurological service in France. Such cases should immediately pass into skilled hands in the neuropsychiatric service and be segregated from the action of army red-tape as much as possible.

Cushing, Harvey. Penetrating Wounds of the Brain. [British Medical Journal, Feb. 23, 1918.]

Cushing draws from his experiences at three continguous casualty clearing stations which were set aside for the reception and treatment of all head injuries during a period of activity. During the first two weeks of the period, 23.5 per cent. of the cases admitted with head wounds had penetration of the dura, while of the total number of cases verified by operation the percentages with dural penetration was a little over forty-nine. Of the verified cases about a third died without operation, while of the remaining two thirds, all of which were operated upon, one half died, giving an operative mortality of fifty per cent. Efforts were therefore made to reduce this mortality of about fifty per cent. by proper supervision of each case from start to finish, and by the development of an improved operative plan. That this was accomplished is shown by the results obtained in the entire series of cases of penetrating wound which were operated upon, considered in consecutive thirds. The mortality in the first forty-four cases was 54.5 per cent.; in the second forty-four, 40.9 per cent., and in the third forty-five it was only 28.8 per cent. There was no selection of the cases, except that as the results improved there was a tendency to include such severe ones as would not previously have been considered. The improved results were due very largely to the development of a general technic, the main points of which

were: Excision *en bloc* of the area of cranial penetration, instead of piecemeal. Detection of indriven fragments of bone by palpation of the track with a soft catheter instead of the finger. Cleansing of the tract and removal of the disorganized brain by suction, and the use of oily solutions of dichloramin T for the brain. Several other points contributed to the success, such as the careful preoperative neurological study of the case; shaving of the entire head; the taking of stereoscopic X-ray negatives; the invariable use of local anesthesia, combined with omnopon; the use of a radial tripod incision; magnet extraction of foreign bodies where possible, and the closure of the wound with buried sutures in the galea.

III. NEUROSES; PSYCHONEUROSES; PSYCHOSES

Henderson, D. K. A Case of Pathological Lying Occurring in a Soldier. [Rev. of Neuro. and Psych., Vol. XV, No. 7.]

The case related is the first and only one in 1,400 soldier patients with nervous and mental illness received at the Lord Derby War Hospital. He was a small, well-nourished, attractive looking man of about 26, who looked younger and rather effeminate. He showed no disease of his organs and there were no neurological signs. He gave a history of quarreling with parents, running away to sea and drunkenness, and had a criminal record for minor offenses. He broke his parole from the hospital and the police report stated: "As a liar this man is somewhat of a phenomenon, but to the ordinary man he shows no sign of mental weakness, and exhibits himself as he is—a thorough rogue, an accomplished liar, an impostor, and, when cornered, a foul-mouthed loafer."

An authentic history of the patient from members of the family or others was unobtainable and his own statement varied at each examination. Several instances where he was caught in lying are related. The case was looked upon as one of "high grade mental deficiency," the diagnostic features being:—(1) Precociousness, as seen by a facility with which ordinary school knowledge was acquired, and on interest in books of adventure; (2) a roving disposition, with inability apparently to concentrate; (3) blunting of the emotional tone, as evidenced by the absence of any real consciousness of guilt or shame, and the lack of any particular affection towards his family; (4) the lying, but in contrast to it the absence of adequate precautions to prevent the lies from being detected; (5) a rather attractive personality, and (6) the total irresponsibility of the individual.

The fact that the memory of these individuals for their acts of wrong-doing is intact, the absence of anesthesia, and of any splitting of consciousness readily differentiates such conditions from hysteria and epilepsy.

Differentiating the case from one of wilful criminality the writer argues that the true criminal plans his work with a thorough knowledge

of the risks he is taking, and fully realizes the punishment in store for him should he fail or be arrested. In other words he formulates beforehand, and weighs in the balance the risks which he is going to take, with the possible gain which may accrue to him, and then acts towards the given situation in the same way as a normal adult man would do when called upon to meet some more or less unexpected difficulty.

Cases of high-grade mental deficiency, on the other hand, although they may be adults in years, retain their childishness in that they sacrifice their future for the gratification of their immediate needs, and thus act with utter lack of foresight and total irresponsibility.

At a time such as this, when the feelings of the public have been strongly aroused to do everything that is possible for the welfare of our wounded soldiers, the attractive personality, the easy address, and the plausible lying of such a case as the one presented contitutes a very real danger, and it behoves us, therefore, to attempt to safeguard the public by adopting some method for repression. But what is it possible to do? It would be manifestly unfair both to the public and the patient to return such a case to the army, owing to the fact that it is more or less certain that he would prove to be quite inefficient as a soldier, would no doubt in a short period of time not only be a trouble and danger to himself, but also would be a danger to others, and a burden on the state. We have no charge against him whereby it would be possible to hand him over to the police, and so far as his mental condition is concerned it would be impossible, with our present laws, to commit such a patient to an asylum.

In addition it has been over and over again emphasized that prison life, instead of acting as a deterrent, tends to act as a sort of hardening process, and practically means nothing, as such cases are practically impervious to any form of punishment. It is true that in many asylums one, from time to time, comes across such patients, who have been committed principally on account of their past record, and maybe a transitory outburst of irritability, but one does not need to have had much experience of asylum work before it is clearly brought home that such patients are a focus of infection to all around them, and exert a most malign influence.

There seems to be no doubt that what we must strive to do is to get such cases before they have started on their criminal course, and to that end parents, school teachers, and those who administer justice in our courts for juvenile offenders should have some knowledge of the problems presented by such cases.

The writer suggests that such cases are capable of doing such splendid work that, not only from the philanthropic standpoint but also economically, it will repay the State to segregate such individuals in colonies, where they would be educated and trained to become useful citizens.

CHAS. E. ATWOOD (New York).

Lind, J. E. Phylogenetic Elements in the Psychoses of the Negro. [Psychoanalytic Review, July, 1917.]

Lind observes that the Negro in the United States is more nearly like his African forefathers than appears to superficial consideration. Indications of this lie in his precocity in childhood, early puberty, strength of instinct with few inhibitions, low resistance to syphilis and alcohol or other toxins. Lind then reviews some of the material obtained as to the racial characteristics, religion, etc., of those Africans from which the American Negro comes. The theology in one in which objects are defined only with some good logical reason. Their notions of spiritual individualities is very definite and distinct and have their origin largely in their dreams. They consist of his belief in a spirit which passes in and out of a man, as when he sneezes, or one which surviving a man hovers about homeless or must go to a land of desolateness. There are various beliefs in such spirits or similar ones and to them are attributed apoplexy, convulsions, mania, etc.

Polytheism, malignity of his gods and the large amount of imposture are striking characteristics of the religion of these peoples. The origin of these gods was generally the presence of misfortune, disappointment and all sorts of calamity, which led him to conceive of malignant powers, which became his gods, and which he next learned to propitiate. Disease is attributed to mysterious powers working locally in the body. The priests who arise to act as mediators, increase the people's respect and reverence for the gods and create new deities. Fear, the personification of fear and then worship of the deity constitute the history of the gods or groups of gods. Then there is a decline until many a god falls to the rank only of a lesser being like a fairy, and finally exists only in legends and myths. The priesthood is based largely on imposture but yet with a faith of his own on the part of the priest. Closely associated with the priesthood or identical with it are the medicine men or witch doctors. They perform various magic functions and treat disease by magic means performing also divination and administering the ordeal. The choice of these persons seems to depend on their abnormal ability to dream and to detach themselves from their environment. Witchcraft consists of good or white magic and evil or black magic. There are secret societies aamong both men and women. Also special ceremonies are incident to the onset of puberty for both sexes. There is everywhere a certain amount of ancestor worship and always great reverence paid to elders. The form of government is of a feudal type and largely influenced by European contact. There are hosts of beliefs, superstitions, customs, etc., besides those mentioned which form probably the superstitions which often underlie the psychoses of the American Negro. The cases among these Negro psychotics which are offered for comparison with these African beliefs and customs illustrate the easy return of the Negro mind to the mental activity

of these levels during the psychosis. Images seen in hallucination, disturbing beliefs, explanation of attacks, such as of epilepsy, belief in many spirits inhabiting the patient, belief in magic power, are some of these indications of the phylogeny of their thought life.

The distinction between these manifestations in Negro and white patients is that the former more quickly regress to these ancestral traits and beliefs. With the white patient the regression is a much deeper one.

Frink, H. W. A Psychoanalytic Study of a Severe Case of Compulsion Neurosis. [Psa. Rev., July, 1917. Concluded from Apr., 1917.]

Frink continues to show how the patient's conscious wish led to a conscious unbelief in her tuberculosis, causing the repression into the unconscious of various facts that would lead her to an opposite opinion. This led her to accept assurance from the Mahoshef, or fortune teller, but she could not long hold such a faith. She then tried to transfer her incredulity about this to her the fact of her tuberculosis but as in consciousness this denial could not be accepted in its real meaning she was disturbed by intense and disagreeable emotions. Other painful affects were added. Thus her unconscious murderous tendencies were retranslated from her friend's remarks consciously to refer to the Mahoshef, to which the self reproach and displeasure were transferred. Also her fear of Mahoshef was in reality a fear that others knew her condition and the Mahoshef became thus the object of a paranoid projection, but as such he represented some person really loved by the patient, who was evidently her father. Her conflict in regard to him had resulted in the pseudo marriage into which she had entered and it was the father in her conflict that drove her to do "crazy" things. Moreover playing doctor as a child and later seeking a doctor had to her a sexual significance such as that related to her experience with her father and her subsequent phantasies, and this the fortune teller also represented.

The wish element in all this obsession related to her passionate desire for a sexual life and to the phantasy that arose regarding her keeping herself intact for a true marriage or, unable because of her tuberculosis to attain such a marriage, of allowing herself to be violated and thus yield herself to free promiscuous intercourse. The conflict over this led her to the temporary marriage, while at the same time the unconscious wishes made her strongly resistant to her husband. Her consequent sense of guilt caused her reproaches against him.

Analysis and discussion of these motives caused the permanent disappearance of the Mahoshef fear and the patient showed great improvement mentally with a lasting physical betterment. The analysis was broken off before the patient had learned completely to readjust herself to life.

Frink emphasizes the fact that while he has dwelt upon the tubercu-

losis factor in her neurosis because it was something which could be externally substantiated, yet behind that was her unsatisfied sexual desire. This gave the driving force to her obsessions, representing her wishes and the fears that grew out of them.

Burrow, T. Genesis and Meaning of "Homosexuality." [Psychoanalytic Review, July, 1917.]

The author is interested here in a latent, unconscious homosexuality, which escapes the libido discharge of an manifest homosexuality. The basic mechanism of homosexuality has been described as due to the mother complex and love for one s own body or narcissism, the latter being the consequence of the repression of the former. Narcissism yields to homosexuality through association of similarity. More directly also homosexuality is a refuge from the mother complex through a contrast mechanism. The writer accepts these explanations as dynamically correct but there must also, he believes, be a more genetic biological conception. There these three components are different developmental aspects of a basic biological principle. This he calls the principle of primary identification by which he means something more genetically fundamental than the dynamic process of identification with the mother. It means the organic homogeneousness of the infantile psyche with the maternal. The infant has not yet attained that psychological constant which is his adjustment toward environment and his personality. The infant's early experience, in tactual correspondence with the mother, principally through suckling, at first supports this continuity which was complete in its prenatal life. Yet consciousness is awakening through organic processes but at this early period the associations are primary, subjective and unconscious and thus tend toward indissoluble welding of the infant with the mother image. This establishes through the mental union a postnatal organic bond correlative with that of the prenatal period. The chief experience of the infant during this period is suckling, which has shown itself to be analogous to the sexual experience. Only in this subjective stage the object is not yet distinguished but the infant is identified with the mother in this act which pertains to the sexual instinct. In this way his first object of interest and concern is the same as that of his mother that is, himself, in his own body. Then weaned from his mother he tends more to this self worship and becomes autoerotic. The next step is natural to the love of bodies like his own. These are the three components in the biological unity, mother-complex, narcissism, homosexuality. This explanation does not exclude female homosexuality as does the mechanistic one. Burrow does not find in his cases that female homosexuality can be explained on the basis of a recoil from the father. It does not seem biologically possible that the female child identifies herself with the father and replaces him with herself as the sexual object. The

father relation is not an organic one like that of the mother. The latter however exists for the female child as well as the male. The father's rôle, though important, is a secondary one for both sexes. On the principle of primary identification with the mother the female child too first objectivates as the mother with whom it is identified and so comes to regard its own body as the mother regards it, as the chief love object, and then loves the sex to which it belongs.

The neurosis arises on this basis from an extension into adult life of the individual's original identification, the neurosis being then a heightened subjectivity, an accentuation and a fixation of the original subjective mode, and so this latent homosexuality is a neurosis, and is a purely mental situation. Burrow believes that the concomitancy of psychic sex ambivalency with structural ambivalency has been too much emphasized. He believes that this unconscious homosexuality must be conceived wholly as mental. This makes it necessary to recognize a psychology of sex distinct from its biology and to study the individual not as of one sex but in regard to his primary identification and persistence of this to form a neurosis. In love we find the same tendency to identification with the love object. Normally this identification takes place with an object to which one is organically adapted, that is of the opposite sex, but in the neurotic the primary identification is so intense that the individual unconsciously identifies himself with an individual of his own sex. The writer believes that from this point of view the various phenomena met with in latent homosexuality and their interrelation are explained.

Schaller, W. F. Traumatic Neurosis. [J. A. M. A., Aug. 3, 1918.]

First remarking that the outlook for recovery in accident neuroses is variously considered by writers and that the question of compensation for injury largely enters into the prognosis, Schaller takes up the subject, quoting largely from authorities and giving the opinions of other writers on the subject. The American literature, he says, dealing with the question of recoverability is quite sparse. At this time particularly it is a matter of importance. Industrial insurance and compensation is provided for in many states and probably will be universal, and after the war there will be many claims for pensions based on injuries claimed in the way of nervous trauma. The war psychoneuroses known as shell-shock, which seem to fall under this head, are increasingly numerous. As referee medical examiner for the Industrial Accident Commission of California, Schaller recommended that a study be made of the subsequent course of all industrial accident neuroses that had occurred since the enactment of the California Compensation Act. C. B. Hensley, statistician of the commission, started his investigation in June, 1917, continuing until April 1, 1918. During the months of July, August, September and October, 1917, G. F. Helsley was able to investigate fifty cases out of a total of 105 from the records of the commission and from

the author's own personal records. The complete records of these cases and other details may be found in the graduation thesis of the special agent, G. F. Helsley, Stanford University, "Prognosis of Traumatic Neurosis." Each case history was abstracted in detail and the results tabulated. A percentage was figured on an analysis of the different factors having an influence on the establishment and continuation of the disease. The questions answered cover all the important factors and the following comment is made in an analysis of the tabulation. Of the entire series seven cases show satisfactory recovery, thirteen cases are industrially rehabilitated, although still complaining of symptoms, eighteen cases are definitely improved, twelve cases are not improved. Age is apparently unimportant, but of the twelve cases under thirty years of age no one case has recovered completely. Although the women show a greater tendency to partial recovery, not one is entirely relieved of symptoms. The severity of the original injury apparently bears no relation to the outlook for recovery. More severe cases have been restored to industrial efficiency than those classed as mild. An attempt was made to divide the cases into major groups of hysteria and neurasthenia, although often there is a mixed condition. Predominately hysterical cases are more unfavorable than the neurasthenics. Cheerful patients as compared with the depressed ones show a marked contrast in the percentage of complete and partial recovery in favor of the cheerful ones. Visible effects of injury influence the outlook unfavorably and discontent, improper treatment, conviction of the seriousness of the disability and any kind of unfavorable suggestion influence the prognosis unfavorably. Of all the factors, the question of compensation is one of the most important and its psychic influence in a considerable proportion of cases cannot be denied. There is almost a consensus of opinion that in the mental make-up of certain persons an accident neurosis may be unfavorably influenced, even perpetuated and aggravated by the pension system. The cases showing lump sum settlement proved most favorable for recovery. There were two patients undoubtedly accident neuroses and still presenting symptoms who were not receiving and had not received industrial compensation. In the entire series of fifty cases the average duration was about two years—the longest three years and nine months, the shortest seven months. Only four cases showed the duration between injury and recovery from all symptoms and the average of these was eleven months. The average time between injury and return to work in twenty-three cases where this was ascertained was eleven and eight-tenths months, and between final settlement and return to work, when known (thirteen cases), was six and seven tenths months, while the average total disability was fifteen and eight tenths months. The bulk of the paper is given is given to reports of illustrative cases. Schaller concludes that the condition is a curable one and of all the psychic factors that influence the course, compensation is one of the most important. That it is not the only factor and that so-called compensation neurosis is not identical with traumatic neurosis is shown by some

of the cases here reported. Recoverability is favorably influenced by the following conditions: (*a*) if patient is in satisfactory environment and not subjected to unfavorable suggestions; (*b*) does not have a fixed belief that he has been seriously and permanently injured, that he has received improper medical or surgical treatment and cheated in settlement; (*c*) does not have an organic disfigurement or defect; (*d*) remains cheerful; (*e*) has symptoms of predominantly neurasthenic nature; (*f*) gets an early lump sum settlement. The nature of the original injury is of little importance. For a favorable hypothetic case as outlined a duration of considerably less than one year might be expected, but a case of traumatic neurosis lasting more than one year with marked symptoms affecting earning capacity indicates serious psychic factors unfavorable to recovery which should be investigated and, if possible, removed.

Book Reviews

Maloney, William J. M. A. Locomotor Ataxia (Tabes Dorsalis). An Introduction to the Study and Treatment of Nervous Diseases, for Students and Practitioners. D. Appleton and Company, New York and London.

The author of this book has proved in his treatment of this disease that, as he suggests, the subject of tabes may be made an example of the kind of practical teaching which the students of nervous diseases should receive. He believes that tabes furnishes a royal road to such practical knowledge of nervous diseases because here the exciting cause can be determined in the spirochete and the lesions, the effect of such causes upon structure, the disturbance of reflex integration, interruption of sensory and motor functions by invasion of their paths, vegetative disorders and with this all the psychical consequences as well as the effect of the psychic influence upon the progress of the disease, and also upon its therapy.

The book is written solely in regard to treatment but here the point of view is such a comprehensive and extensive one that it forms a manual of unusual interest. It contains a record of facts which forms an instructive background for the understanding of tabes as a clinical entity and presents all the forms of interest in which it must be followed clinically from the preataxic period before its actual development through the possibility of clinical correction and amelioration of the ataxic difficulties.

A brief history of the discovery and recognition of tabes as it relates to the practical clinical study of it is given with a discussion of the spirochete and its mode of attack as it invades various tissues with a persistence which may cause the invasion of the nervous system perhaps after a long period of time. There is an illuminating discussion of the relative accessibility of various tissues to the spirochete and the immunity which may be acquired by such tissues. Any portion of the nervous system is subject to invasion, though this may halt after certain inavsions have taken place. The site first attacked is usually the chief site of the disease.

The results of the syphilitic lesions are reviewed with special emphasis upon the invasion of the posterior roots. Disturbances of the reflex motor functions and the sensory function are discussed in detail. The tabetic disturbance as it spreads to interference with attitude and muscular coördination is treated very fully, always with stress laid upon the psychic aspect of this, how much of the disturbance is dependent, in

spite of the fact of actual lesion, upon the mental attitude of the patient. This is taken up as a special chapter and brought into very close and practical relation to the treatment to be accorded the tabetic patient. Its influence upon the development of the ataxia through the mental attitude of the patient to his increasingly distressing condition is conversely made the starting point for a therapy which takes full account of the psychic factors, institutes training and encouragement here and through this reaches the physical symptoms.

At the same time equally clear and definite attention is given to the subject of antisyphilitic treatment with great emphasis upon the prevention of tabes by a recognition and treatment of a preataxic state, which may be obscured for many years. Attention is also given to the syphilitic invasion in tabes of the cranial nerves and of the vegetative nervous system. The whole subject is treated with a recognition and presentation of every important detail from the etiological, pathological and therapeutic aspects and in a spirit of approach which is a strong plea for a broader view of the whole subject as an important neurological problem and as a psychical one as well. In all there should be systemization of the treatment. A significant sentence is applicable to all therapy but particularly so to any treatment of psychic disorders. "Disturbances in his gait" the author says in speaking of the coöperation of the patient in his own improvement, "now induce in him not fear but study." This is the attitude which a real and practical psychotherapy seeks to bring.

JELLIFFE.

Carroll, Robert S. THE SOUL IN SUFFERING, a Practical Application of Spiritual Truths. By Robert S. Carroll, M.D., Medical Director, Highland Hospital, Asheville, North Carolina. New York, The Macmillan Company, 1919. Pp. 241.

In psychoanalysis it is not enough to separate the patient's mental structure into its original elements and lay them out naked to his view. After this he must build another and a better character, and the magnitude of the task often appals him. He is discouraged not only over what he must unlearn but also over how he is to reconstruct his life. Here the analyst hesitates to counsel and inspire for fear of entangling the patient in the father complex, but surely there is no such danger in giving him a volume like this. He is not likely to become unhealthily dependent on an unseen author, and he does need encouragement.

To hearten such a dispirited sufferer this little book is well adapted. It is written in a spirit of broad tolerance and culture, and breathes a sane optimism and a wholesome conception of religion. The chapter on Reality, which explains fantasy and constructive thinking, is particularly good.

One might wish the author had not stressed so much the evil effects

of improper diet. Since he fails to state what proper diet consists of, the patient with food notions will be likely to avidly grab on to these paragraphs to justify his own beliefs.

FAY.

Mordell, Albert. THE EROTIC MOTIVE IN LITERATURE. Boni and Liveright, New York.

Mordell has voiced in the larger form of a complete volume a tendency to apply to literary interpretation the principles of psychoanaylsis as a practical and universally applicable form of thought and investigation. Psychoanalysis early showed its interest in the thought and work of the artist of any kind, the literary artist as well as any other. Mordell has brought it more fully to bear in tracing out in a wide range of individual authors the unconscious factors lying in their impulses and in the past experiences of their lives, especially of their earlier years, and reviewing the influence these had upon their writings. He shows therefore more specifically how these traits within themselves and the facts of their own life experiences have wrought upon their choice of subject and the matter which is expressed through it. In doing this he has of course unearthed certain motives and trends which the ordinary critical mind would pass over, of which it would not be aware.

The book reveals a wide and deep acquaintance not only with published literary material but with these finer elements which ramify through the unconscious and work themselves to the surface of conscious expression. There is a wide appreciation of the human side of the lives of these writers and of the fact that the artist's work cannot actually be separated from this. The new insight that is thus given into some unknown or scarcely known facts of these authors' lives and into the impulses which must have moved their writing should make the reader not merely better acquainted with the individual writer but, which is of chief significance, make him realize the common humanity which such a writer expresses and therefore prove his work of greater value. For the artist should be he who has a special power and ability to put into external expression the struggles, the repressions, the unsuccessful efforts after expression which lie in the experience and the hearts of all men and give vent to these, thereby affording a healthful relief and a new stimulus toward the difficulties of reality.

With all that the book reveals of these inward conflicts and repressions and the wide range of expression, particularly erotic expression, to which these have given rise, sufficient stress has not been laid upon the fact that the author is talking of the facts and elements which lie in the hearts of all men. It may be gathered that the writer did not intend to neglect this, but he has given the impression that he is taking particular traits and peculiarities of experience and desire and of repression which belong rather exclusively to the authors whom he discusses.

This tends to give the book an unwelcome flavor of a meddlesome prying into the inner life of these writers. Yet this is evidently not Mordell's intention. He has only failed to lay sufficient emphasis upon two factors which psychoanalysis may never leave out of account. One is the universality of all these impulses and repressions and to a large extent, allowing for variations of circumstances, of the recounted experiences in all men and women. So that any author when he writes of his own complexes speaks for that which is in all, only it may be more deeply unconscious in many others. True there may be a disproportion in some lives which is not in others and this many of these writers express, but there is no possession of that which is not shared by all men. Therefore they furnish a needed outlet also for others for that from which others would suffer were it not expressed for them. And this function of the liberation of these same impulses through sublimation of them is the thing that should have been given greater explanation and emphasis in this literary discussion.

L. Brink.

Robinson, Victor. The Don Quixote of Psychiatry. New York, Historico-Medical Press, 1919.

The history of neurology and psychiatry in America has yet to be written. A few reminiscent biographies or autobiographies have given some of the facts which group themselves around the lives of various leaders in such a histroy. These also represent the difficulties and problems which have confronted the establishment of actual public service through these branches of medicine, as well as the successes attained through the individual lives and their associates and the contributions that they have made to theory and practice. No volume has more definitely and vigorously fulfilled such a task than the present one.

The life of Shobal Vail Clevenger was a unique one in its versatility of interests and the variety of experiences it contained in the several capacities in which he served his country. He entered the medical profession at a somewhat late period in his life with a determination which won its way through all difficulties, none the least of these being the difficulty of securing an education in the pioneer days of medical instruction in Chicago. The chief interest and value which lie in the record of his life pertain to his earlier professional experience as a psychiatrist at Dunning and Kankakee as chief of the psychiatric work at these two institutions. This is anything but an honorable page in the history of the country, or at least of this particular section of it. Clevenger fought bravely in a losing battle against the forces of intrigue and corruption, all of which for once are presented fearlessly as his biographer reviews them.

Clevenger's varied medical and public experiences after being forced to leave the work in these institutions were of a varied order. He was

always an active public servant, a fearless advocate of reform and of progress in his own particular field of investigation and interest. He published widely, particularly in the Journal of the American Medical Association, and contributed to the JOURNAL OF NERVOUS AND MENTAL DISEASE from its early days. His special interest was in the anatomy of the nervous system but he covered also a wide range of subjects. Materia medica, medical jurisprudence, studies in evolution as related to physiology and psychology were among his many subjects and he prepared also a history of the experiences at Dunning and Kankakee. *Clevenger's fissure* was the name given to the sulcus occipitalis longitudinalis inferior because of Clevenger's pioneer description of it early in his medical career.

Since he had a wide association with the neurologists of the various parts of the country, the book contains almost as much history through the biographies of many of these as through that of the actual subject. The writing of the book is in a sprightly manner, somewhat too discursive and anecdotal to be perfect literature but it strikes a true and inspiring note in the right direction.

JELLIFFE.

Ritter, William Emerson. THE UNITY OF THE ORGANISM, OR THE ORGANISMAL CONCEPTION OF LIFE. In two volumes. Richard G. Badger, Boston, 1919.

An ambitious undertaking, ably foreshadowed, interestingly worked out and withal well worth while; such represents the reviewer's reaction to these two compact volumes, which ably portray a definite attitude of a philosophically trained zoölogist to the problems of human and all other animal behavior.

For man *is* an animal, no less than other animals. He is a product of a process, which in the current phrases of science, represents an evolution, which has come about by a steadily advancing and increasing integration. This integration, the author holds, as his main thesis, can be understood only completely when viewed in the light of its entirety. This thesis he develops consistently, and with much penetration, as well as with wide grasp upon the recorded data of science.

This attitude demands that man's activities can be interpreted only on the activities of a man; a dog's activities, because he is a compound which we call "dog."

To develop this thesis the author dwells upon an opposite concept which, he holds, is a mistake, namely the idea of elementalism. That everything is explainable on the basis of the protoplasm, or the cell, or upon an organ, say the chromosomes. Since the chief protagonist of this purely elementalistic hypothesis is Jacques Loeb, this author's book, The Organism as a Whole, and other studies in similar vein, are subjected to much critical analysis, and with considerable success.

This critique of the elementalist's conception of the organism occupies Part I and necessarily leads into a statement of this conception in which there appears a wide review of the present day knowledge of the composition of the living individual. Aristotle more or less starts the story and the author then discusses the composition of the simplest organisms, then those with germ layers, their development and the various hypotheses of germ layer development. Then he takes up the chemistry of living matter. Biochemical mechanisms are discussed in their relation to protoplasm, to cytoplasm and nucleoplasm, which leads him to cell problems. The cell theory is then shown to be inadequate to explain the organism. This leads to a discussion of the origin of cells, and the mechanism of heredity and the relationship of chromatin to heredity in terms of a physical substratum for the carrier of hereditary possibilities.

This completes the first volume and carries the reader well into volume II in which the author builds up the constructive side of his argument and shows how integration takes place and through what structures and by means of what environmental necessities. The neurologist can read to advantage the author's discussion of neural integration, especially in relationship to Loeb's tropism hypotheses, which still rest upon an elementalistic formula. This formula is so closely related to the usual medical outlook of independence of organ activities that it comes as a useful tonic to induce a keener appreciation of the interdependence of organ activities if disease processes are really to be understood and managed. The patient and not the disease is the slogan of the "organism as a whole" attitude; the liver, or the spleen, the pituitary or the spinal cord is the limited outlook of the elementalist.

The author, wisely, builds up his organism and is not content to stop at a biochemical level of activity; nor yet at a level of neural integration; he advances to the only sane position that can be held, namely, to a psychical integration, without which there is no "organism as a whole" and no real understanding of human behavior is possible unless all levels are held as interrelated and functionally operative.

All of this has been said by many students before, but each restatement of it advances upon its predecessors. As a zoölogical interpretation the present one is readable and quite sound. The author just about touches on the concept of the unconscious, which he terms by its older name, the subconscious; here his study of contemporaneous work in psychiatry has not put him into discriminative rapport with a decade's activities, but the trend of the whole argument is so distinctly in line with the work of the advance guard in psychopathology, it would be cavilling to expect the author to be in touch with its many observations. That his own work and activities provides a firmer genetic basis for these psychopathological hypotheses is enough to emphasize, especially as the author has been occupied in studying animals "lower" than man, and cannot be said to be "hipped" with these "new fangled" notions,

which is the usual name indiscriminately applied to anything not conceivable by minds that have ceased to integrate new matter into their functional activities.

JELLIFFE.

Herrick, C. Judson. AN INTRODUCTION TO NEUROLOGY. Second Edition. W. B. Saunders Company, Philadelphia and London. 1918. $2.00.

It is a hopeful sign when as good a book as this appears in a second edition within a comparatively short time, and the reviewer takes this opportunity of again commending it, hoping for it a still wider circle of readers.

The study of neurology is intrinsically difficult, involving as it does, a detailed consideration of an extremely complex series of mechanisms which have been built up in response to environmental stimuli during enormous periods of time. To these natural obstacles, as Herrick points out, there have been added a number of cumbersome terminological impediments which the slowly advancing science has had woven into its structure by different centuries of anatomists, who, working at times with incomplete data or uncorrelated hypotheses, have given it a nomenclatural patchwork that it is almost impossible to make a smooth working series of patterns. One of the great appeals that this little book makes is in the simplification of this type of difficulty, since the author has used to such telling advantage a wide and intimate grasp of the making of the nervous system throughout the phylogenetic series. His use of the historical method—comparative neurology—makes this almost a unique book, and hence its great value.

Furthermore the work is one following a genetic principle—this the author emphasizes in his opening paragraph—where man as an energy system, working in a series of other energy systems, is "a little world set in the midst of a larger world." "It leads in no sense an independent life, but its continued welfare is conditional upon a nicely balanced adjustment between its own inner activities and those of surounding nature, some of which are beneficial and some harmful. The great problem of neurology is the determination of the exact part which the nervous system plays in this adjustment." This adjustment in terms of tissues and organs and their capacities Herrick then outlines, first in terms of the simplest reflex arc elements, the receptors, connectors and effectors; the successive variations of which, their complex interwoven anatomical integrations, are dealt with in his introductory chapters, Biological Introduction, The Nervous Function, The Neuron, Reflex Circuits. He then goes into detail concerning the Receptors and Effectors in a succeeding chapter which is fully illustrated, and exemplifies the rich series of stimuli which the nervous system has learned to handle. "Children in the kindergarten are taught there are five senses. In reality there are more than twenty different senses," Herrick writes,

and it might be added, these are probably but a half of what we shall ultimately know when the various types of chemical receptors are more thoroughly studied. The embryological description of the developing nervous system is singularly clear in view of this most involved field of study, and the chapter on the spinal cord is also as satisfactory. Much as we would like to we would wish to comment on each of the chapters, but this is impossible.

A few points of divergence of opinion might be mentioned. Is it true there are no unicellular organisms with any trace of a nervous system? Is it true that the sensory equipment of the human race shows no "subsequent improvement in the peripheral physiological mechanisms, or any increase in the number of our senses during the advance of human culture"? While it may be admitted that the microscope has not demonstrated new types of receptors—the question may be asked what is a new type of receptor? How have new types of receptors arisen? Has it not been by gradual enlargement of the energy grasping field and then gradual differentiation within the scale? At first qualitative variations appear and then structural variation develops, at first so subtle in the new receptor capacities, as to escape any crude morphological criteria. But these morphological criteria must necessarily be extremely crude. Surely Helmholz's auditory receptors were different functionally from many others, even though structurally no one could recognize any such differences, for structural differentiation records functional differentiation only after many centuries of evolution and yet the differences are there. If we are to believe man is making no advances, is regressing or only standing still, then we will admit with Herrick, that no new structures are developing; for after all the cortical function cannot handle that which does not enter through the receptor and is not, from this point of view, the sole reason why the present race is better than his Aurignacian ancestor.

The sympathetic nervous system has not in our judgment been adequately dealt with. It seems to us that the purely physico-chemical tropisms of the lower animals developed primarily a system which has more analogues to the vegetative system than to the much more prominent and more easily analyzed sensori-motor system. That out of this more primitive system the sensori-motor system grew and even retained within it components of the visceral system. Thus within the optic system the vegetative arc handles light stimuli as pure wave length stimuli to serve the strictly metabolic functions of the receptor neurons; tropisms arose as effector responses in the unstriated muscle system which antedated the striated muscle system. Later receptor capacities enlarged the power over light differentiations or vice versa, and what we speak of as sight arise—sensori-motor—and the tropisms, or reflex and conscious behavior now utilize both the vegetative sarcoplastic substance and the sensori-motor anisotropic disc, of the combination structure we call striated muscle. The rich neurological experiences of

purely unconscious (vegetative) responses to external light stimuli which are made manifest within the vegetative components of the striped musculature (postural tensions, etc.) are pertinent in a discussion of this point of view. We would like to see a more truly biological handling of this chapter in order that it may keep up with the rest of this most excellent book.

JELLIFFE.

Rivers, W. H. R. DREAMS AND PRIMITIVE CULTURE. John Rylands Library Lecture. Longmans, Green and Company, New York and London, 1918.

This small and interesting brochure first appeared in the Bulletin of the John Rylands Library as a report of a lecture delivered in the library. Rivers has done extensive and excellent work in the field of anthropology and throughout the war took an active interest in the war neuroses, the results of which he has already embodied in an excellent monograph. It is not unnatural that he should have become interested in the dream problem. "The influence of dreams upon the lives of savage and barbarous peoples is a theme," he writes, "which has often attracted the interest of students of human culture. These phantom visitations of the night have done much to determine human beliefs concerning the nature of the soul and of its continued existence after death." It is not with this aspect of the subject that he here deals, the purpose of the present discourse is rather to compare the psychological characteristics of the dream with those of the ruder forms of human culture and he specifically sets himself the task to consider the psychological mechanisms by means of which the dream is produced and then to compare these with the psychological characters of the social behavior of those rude peoples who are our nearest representatives of the early stages of human culture.

He calls attention to the work of the psychoanalytic school who have taken up this same theme and deals especially with Freud's work in his Totem and Tabu, which work he in the main follows. Although he states his manner of treatment differs widely from Freud, yet the scheme of dream psychology which he adopts, he says, is in the main that which we owe to the genius of this worker. Wherein the treatment "differs widely," the reviewer does not perceive, for a careful review of this brochure fails to show a single item that has not received complete exposition and often monographic detailed discussion in the psychoanalytic literature, which apparently has only just begun to be sympathetically studied by Rivers.

He then takes up the dream mechanisms following Freud's well-known interpretation of dreams. He would substitute the word "Transformation" for Freud's "Distortion" in speaking of the modification of the manifest content of the dream and the dream work. He then follows closely the lines laid down under the descriptive terms symbolization,

condensation, displacement and secondary elaboration, first explaining them for his hearers, and then applies these mechanisms to the interpretation of human conduct in its rude cultural forms, of which he has himself made extensive investigation at first hand in his work as anthropologist.

He thus takes up the dramatization in the existing rites and ceremonials of existing barbarous peoples and shows how it closely follows the principles already unearthed in the human psyche of more cultural levels, as exemplified in the dream processes studied by psychoanalysis. Such dramatic representation he says goes far more deeply into the texture of the lives of these rude cultures than would appear if we attend only to its place in religious ritual. It shows itself in many of the practices of their everyday life, and Rivers gives a number of examples.

As for symbolization, he says that the importance of this character in the culture of savage and barbarous peoples stands beyond all doubt. Thus one of the most derided of the Freudian generalizations receives an almost unqualified support by Rivers. It may be recalled here that Bleuler, in his most searching critique of the Freudian psychology, the best critique that has ever appeared from many standpoints, has also come to the conclusion that the process of symbolization, whereby the deeper affective expression of the dream—the neuroses and the psychoses as well—comes to expression in symbolic form, is one of the best founded of the many features of the psychoanalytic discoveries.

Of the mechanism of condensation Rivers points out that, apart from slight variations in terminology, the psychoanalytic principle of condensation reads almost word for word with current anthropological doctrines concerning the interpretation of some elements of primitive culture. "Wholly independent of one another, two groups of students concerned with widely different aspects of human behavior have been led by the facts to adopt an almost identical standpoint and closely similar methods of inquiry." He then goes on to give numerous examples of this condensation process as seen in cruder peoples.

Displacement also, as a dream mechanism, has its phylogenetic roots in these early cultural levels. "Both dreams and savage custom seem senseless and absurd because in each case we are viewing the final and highly condensed product of a process leading back to times widely remote from our present standpoint, going back, it may be, in the one case to the infancy of the individual; in the other, to the infancy of the race."

Again the process of secondary elaboration, one of the acknowledged difficulties in psychoanalytic study, also shows itself in the making in the examples Rivers quotes.

Freud's principle of the censor Rivers finds paralleled in many customs. "The culture of rude peoples [and it may be added in those not so crude] abounds in features whereby those in power, especially priests and sorcerers, deliberately mystify the general body of the popu-

lation. This disguise and mystification reach their acme in the secret fraternities which are found in so many parts of the world. These are organizations possessing knowledge which is only allowed to reach the general body of the people in some distorted and misleading form, effectually disguising its real nature. The widespread distribution of such organizations suggests there is a tendency in rude society to act and react in a manner not far removed from that ascribed by Freud to his endopsychic censor." One is reminded of the saying of Shaw, that "every profession is a conspiracy against the public" as illustrative of the persistence—even if attenuated—of this general principle.

As to the principle of wish fulfillment it also holds good in the "rites and customary behavior of the savage, as of culture in general."

One more quotation and we shall have finished this interesting and scholarly brochure. "It is not necessary," he writes, "to dwell upon the opposition that Freud's views have aroused" except to say that they form the best possible witness to their originality and to the greatness of Freud's discovery if the future should prove him right. The fact that resemblances so close should have been found in another aspect of human thought and action might well be held to provide striking confirmation of the truth of Freud's interpretation of dreams. I do not lay any great stress on this argument, but if, as I hope to show later, his scheme in its main features affords the best interpretation of the dream, then the fact that certain kinds of human culture show such close resemblances, will add a cornerstone to the structure and thus contribute to its strength and stability."

JELLIFFE.

Bell, W. Blair. THE PITUITARY: A STUDY OF THE MORPHOLOGY, PHYSIOLOGY, PATHOLOGY, AND SURGICAL TREATMENT OF THE PITUITARY, together with an account of the therapeutical uses of the Extracts made from this Organ. William Wood and Company, New York, 1919.

It is a pleasant task to review this book. It is so well written, clearly expressed, systematically arranged and withal so embodies the best work done upon the pituitary not only by the author himself but by other as careful observers that one has a very comfortable sense of accomplishment after having completed its three hundred and some pages.

It is moderate and scholarly, clear cut and penetrating and like the author's work on the Sex Complex a real contribution to this most important of fields.

The work opens with a succinct, illustrated account of the embryology, histology and anatomy of the pituitary, comparative as well as human. The author uses the term hypophysis for that part of the pituitary which has been derived from the buccal ectoderm, the pars anterior and pars intermedia. The pituitary stands for the entire organ. The account of the comparative anatomy of the pituitary is an excel-

lent digest of the entire subject, with abundant and well chosen illustrations.

Part II deals with the physiology of the pituitary and is on a par with the preceding chapters. In one respect we miss a more complete discussion of the intrinsic innervation of the pituitary and almost no details concerning the pathways taken for incoming or outgoing stimuli. Apart from a brief note on the sympathetic innervation there are no indications how the neural integrations of the vegetative system utilize or are utilized by the pituitary.

Eosinophilia of the cells of the pars anterior is much dwelt upon as representing a gauge of the physiological activity of this part of the organ, and the author is inclined to view the various types of cells described, not as different organs but as different physiological phases of a more or less unified organ activity. He also takes the more or less obvious view that the secretions, whatever they may be, are carried away in the blood channels—some of them are stored and as stored products in greater or lesser amounts influence the tinctorial quality of the containing cells. At this point we should have been interested as to the author's suggestions concerning the action of the secretions on neural structures, being convinced that chemical receptors are contained in the organ, but of this no hints are to be found. Perhaps it is premature to expect it, but in an organism so highly integrated as the human body, the description of isolated organ activities is somewhat unsatisfactory. With reference to these cellular capacities the author says: the small chromophobe cells are exhausted cells; the eosinophile cells are the active secretory cells in normal circumstances; the basophil cells form the storage secretion; and the large chromophobe cells, which develop from the small exhausted chromophobe cells, or the young eosinophiles, are formed only when there is an urgent need for the secretion of the pars anterior." How the cells get information regarding this need, over what pathways such calls come, is left unenquired into.

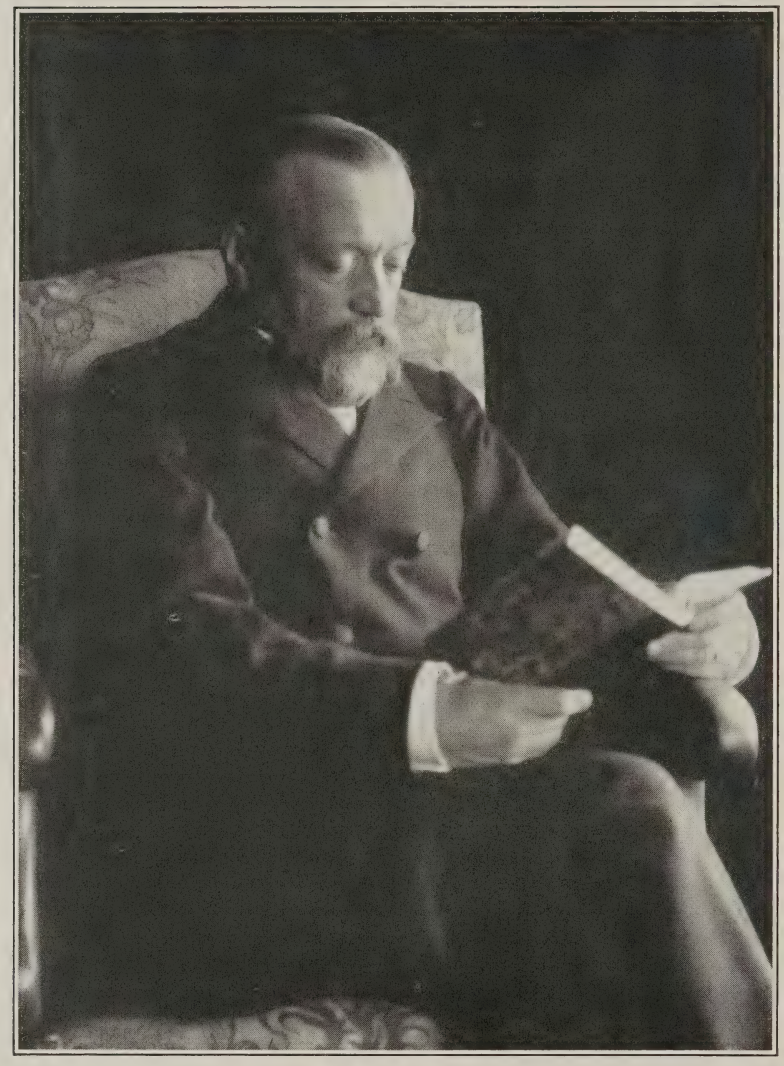
The secretion of the pars intermedia and of the whole posterior lobe is also, he believes, delivered into the blood stream.

The chemical chapter is as full as pure descriptive science takes us. Iodine, calcium, and phosphorus are in distinct evidence. Infundibulin is the hypothetical substance of the posterior lobe activity.

The pathophysiological discussion is most excellent from the purely descriptive side. In only one particular does Bell push the mechanistic interpretations of the various pathological syndromes further than what is current in our knowledge of these syndromes. In discussing the deficiency syndromes, generally subsumed under the generalization of the adiposogenital syndrome of Fröhlich, he holds that pressure on the stalk or destruction of the stalk is the essential lesion rather than disorder within the organ itself. How this works he offers no suggestions thereby missing, in the reviewer's opinion, the very point which would make the whole discussion pertinent; namely, the interruption of the

incoming and outgoing pathways of neural integration upon the relative integrity of which the activity of the structure intrinsically depends. This is the neural integrative aspect of the problem which a too elementalistic attitude vitiates. Thus how hyperpituitarism or hypopituitarism arises is only partially answered. So far as the discussion goes the account is remarkably excellent, but the author does not go beyond a purely elementalistic series of interpretations. The integration of the pituitary into the whole organism is not satisfactorily accomplished. He stops at a purely biochemical level, although he does maintain that the pituitary acts as a whole. There are enough observations to permit some sort of neural integrative interpretations, which would carry the account a necessary step further. Psychical integrations are still impossible in the present state of knowledge, even what hints which the observations recorded may have furnished are left unutilized. Apart from this, which may seem a hypercritical attitude, we know of no work which so well expresses, and amply illustrates, a group of verifiable observations upon the pituitary.

JELLIFFE.



PAUL DUBOIS

Obituaries

PAUL DUBOIS

The death of Paul Dubois occurred on the fourth of November, 1918, just on the even of his entrance into his seventy-first year. It marked the loss to neurology of a man of wide and indefatigable activity in the sphere which had been his from his student days and which he had done much to exalt to the importance which neurology holds to-day. His death marked also the passing of a man of sterling moral qualities, of alert progressive mind and attitude toward the practical human side of his work, and of a personal charm which won and held his friends closely to him.

His life was so thoroughly devoted from his early days to his scientific professional pursuits and he threw his personality so wholly into these that an account of his work must also be an epitome of his personality. He was born at Chaux-de-Fonds in Switzerland and at ten removed to Geneva where at his studies he early showed a preference for anatomical investigation. He began these studies in earnest at the University of Berne in 1870 under Lücke, Naunyn and Quincke. Naunyn influenced him particularly in his choice of medical studies, but it was with Quincke that he began his practical clinical work as assistant at the medical clinic of Strasbourg. He obtained his degree of doctor of medicine in 1874 and passed his state examination in Geneva in 1876 and the same year obtained his license venia docendi in internal medicine at Berne.

His desire for original experimentation and research led him first actively into the field of electricity as a therapeutic agent. He showed here the same interest in these problems as problems of human biology and therefore of human life which he later applied to psychotherapy. His interest lay in the resistance in the human body to electricity and then the physiological effect of its various forms of application to the body. His voltameter-galvanometer which he had constructed together with his determination of the use of this method of gauging the threshold of excitation in electrodiagnosis won him wide recognition both in Switzerland and abroad. He presented his theories and the practical results of his experiments both at the international congress of medical electrology in

Paris and at the second congress of medical electrology and radiology at Berne, at which he presided, and also at in a course at the university.

His attention was turned also to studying the effect of alcohol upon muscular force, but the growing demands of neurology upon his attention turned his activities more exclusively into that channel. He had not been idle in this sphere but had published already in 1888 a paper, "Ueber apoplektiformes Einsetzen neuritischer Erscheinungen," and his chief interest always in the field of the neuroses and of their treatment through psychotherapy. He laid emphasis always upon the psychic influence acting upon functional disorders and he early discussed gastro-intestinal disturbances in the light of their psychic causation. While he did not neglect certain physical measures, he combined these with a psychothrapy which was based on a broad and comprehensive attitude toward the mental factors involved and their influence upon function.

He had naturally a sympathetic understanding and an appreciation of the extent and multiplicity of psychic factors operative in any patient, which was combined with a sound judgment and a high moral sense. Because of this broadly comprehensive attitude he preferred to appeal to the whole mentality of the patient rather than to an only partial symptomatic manifestation through suggestion or hypnosis. He made use of persuasion and of dialectic in order to silicit the coöperation of the reason and judgment of the patient, through which he aimed to bring his patient to a higher ethical and moral conception of himself, this being to him both the therapeutic means and end. His little book, "De l'influence de l'esprit sur le corps," published in Berne in 1901, his "Les psychonévroses et leur traitement moral," which was published in Paris in 1904, and his more important work published in 1908, "L'Education de soi-meme," were all imbued with these psychical and moral principles and set forth the practical application of them.

His writings have appeared in many periodicals, representing at first chiefly his electrotherapeutical researches as well as his wide study and practice in neurology and the psychoneuroses. He also inspired the work of a number of other writers in the field of electrotherapy.

Professor Dubois was one of the founders of La Société Suisse de Neurologie and served as its president from 1911 to 1916. He was one of the chief promoters of an international congress of neurology, psychiatry and psychology to be held at Berne in 1914, to which however the war put a check. He devoted his interest

however to the establishment and inauguration of the new journal representing Swiss neurological advance, the Schweizer Archiv für Neurologie und Psychiatrie, of which he was one of the editors.

SMITH ELY JELLIFFE.

WILLIAM HANNA THOMSON, M.D.

EDWARD D. FISHER, M.D.[1]

NEW YORK

William Hanna Thomson, B.A., M.A., M.D., LL.D., was born in Syria, the son of a missionary. His father was the author of "The Land and the Book." He was sent to the United States for his education and received the degree of B.A. from Wabash College in 1850, that of M.D. from the Albany Medical College in 1859, M.A. from Yale in 1861 and LL.D. from the New York University.

Dr. Thomson was for many years an active member of the New York Neurological Society. He read many papers before it although his practice was in no sense limited to nervous diseases, being from the beginning of his career what we now term internist, but always interested in diseases of the mind and nervous system.

In his early life Dr. Thomson was too busy to write and it was not until later that he found time to publish works which immediately commanded attention. His large experience as a general practitioner and visiting physician at Roosevelt and Bellevue Hospitals and as a teacher at the New York University Medical College, eminently qualified him to summarize his ideas on medical and allied subjects. He had long been recognized as a leader in medicine in New York City and the profession gladly affirmed that opinion by electing him president of the New York Academy of Medicine. His writings represent the result of a mature, well-disciplined mind. They were as follows: "Brain and Personality," "Some Wonders of Biology," "Life, Death and Immortality," and "Clinical Medicine."

Dr. Thomson was primarily a clinician, as he so often said: "It is the condition of the living patient which demands exclusive attention. We begin, therefore, with symptoms before we go further in treatment." In my student days under him, he always emphasized infection by living microorganisms—that is, the germ theory. At that time, 1875–76, that theory was not established nor accepted.

[1] Read before the N. Y. Neurological Society, April 1, 1919.

Lister had just stepped into the arena and (a Scotchman) was opposed and ridiculed by the English profession. Just think of it: almost all abdominal operations were fatal at that time. In 1878, while in London, I was privileged to make the rounds with Lister in his hospital. There I saw the treatment of wounds without pus. Professor Thomson was indeed ahead of his time and generation. He was always an attractive personality. As a family friend I had known him from childhood and readily took him as my preceptor when I decided to study medicine. His office was a busy one. General practice and a large obstetric practice occupied him until late in the night. He had also two important hospitals to attend and at least three lectures a week at the New York University Medical College. We must not forget that he was much interested in religious matters, giving lectures Sunday afternoons at the Young Men's Christian Association which were largely attended for years. He was a scholar in the best sense; I know of no other in practice in New York City so well read extra-medically (except Dr. Herman Knapp). He was familiar with the Sanscrit languages and Hebrew from childhood and also with French. His association, however, with English literature, especially medical, made him essentially English in his line of medical thought. I do not think he ever escaped the influence of the London Lancet. Those who may know Tanner's "System of Medicine" (English) will recognize his unconscious following of English practice.

Dr. Thomson was most successful in winning the confidence of his clientele and most successful in relieving them and indefinitely prolonging their lives. In his position as professor of therapeutics (a dry subject) he held the largest classes in the college. A poor delivery, almost unintelligible at times, never kept the students away. His personality was attractive: florid, with a full head of hair, careful to the extreme in dress, he would come into the lecture hall as if just fresh from a walk over the hills. All the boys liked to look at him and he was always happy to see them.

Such was his life as I saw it in his earlier days while in the full exercise of his powers and activities. He reminded me of Hughlings Jackson and Jonathan Hutchinson, of the London Hospital, under whom I studied. He was essentially a thinker and to the last, at the advanced age of eighty-five, remained a thinker.

SARAH R. MEAD, M.D.[1]

CHRISTOPHER C. BELING, M.D.

NEWARK, N. J.

Dr. Sarah R. Mead was born at Newark, N. J., on April 23, 1847, and died on March 17, 1918, at the Mountainside Hospital, Montclair, N. J. Returning from a professional call she was struck by an automobile, sustaining injuries which resulted in her death the following day.

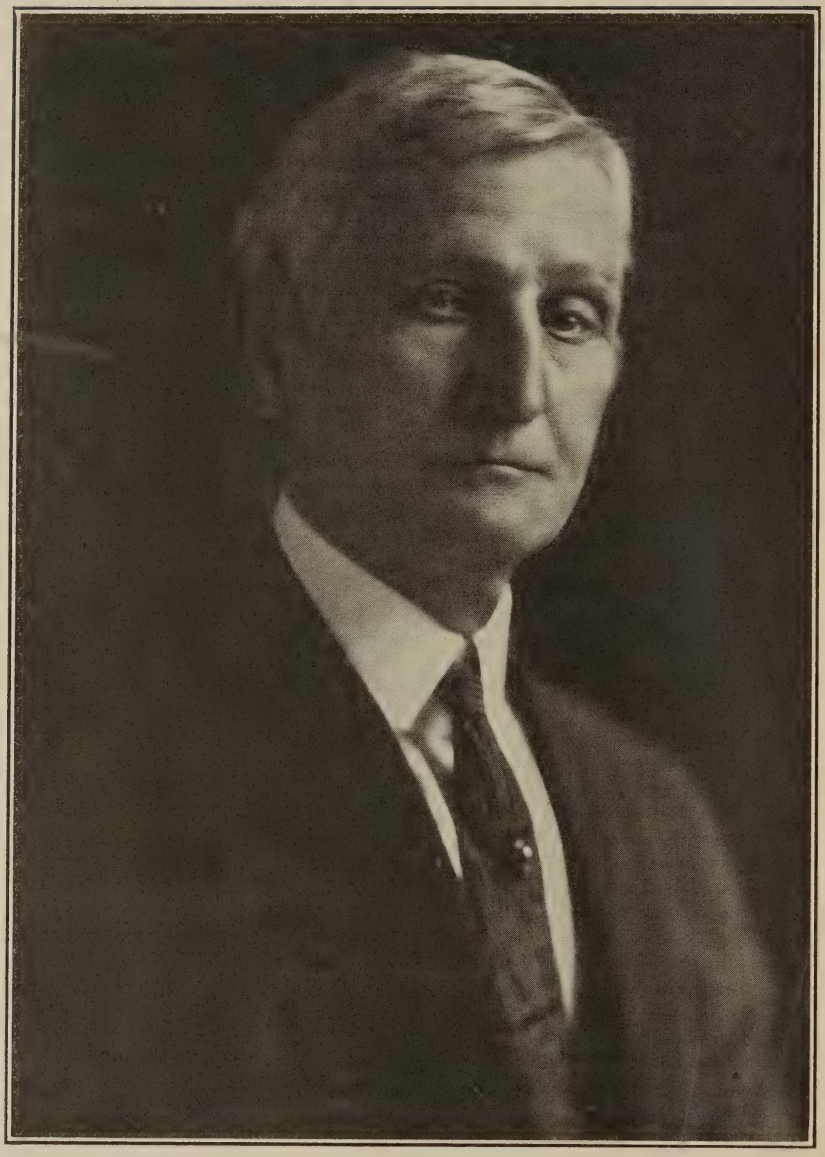
Dr. Mead was educated in the schools of Newark, and graduated in medicine from the Woman's Medical College of New York in 1883. She commenced practice in Newark, associating herself with Dr. Emma Edwards, and devoting her time especially to the study and treatment of nervous diseases. She was physician in charge of the Home for Incurables at Newark for over twenty years, and was instrumental in founding its hospital and training school for nurses. Her practice, which later became more generalized, was large and extensive. She was an indefatigable worker, thorough and painstaking in all she undertook, and extremely charitable, with a heart full of love and sympathy for all her patients without any distinction of color, class or creed. She continued in active practice up to the time of her death at the age of seventy-one. The secret of her good health and longevity was perhaps largely due to her unfailing habit of working in her garden from five to seven o'clock every morning where she cultivated flowers which she carried to her numerous charity patients.

Dr. Mead was a regular attendant at the New York Neurological Society of which she was a member for many years. She was well known and beloved by the medical profession in general.

CHARLES HAMILTON HUGHES

The JOURNAL assumes the privilege of turning back for a few years to record the passing of a figure in American neurology and psychiatry whose death should not go unrecorded. At the time of his death, which occurred in July, 1916, his colleagues located with him in the West failed to respond to the request of the JOURNAL for a notice of his life and work and the occasion passed in neglect, owing to the more pressing necessities due to the chaotic disturb-

[1] Read before the N. Y. Neurological Society, April 1, 1919.



CHARLES HAMILTON HUGHES

ances in many fields of activity. He was a unique figure whose early career, extending so far back in his western home, is little appreciated by many of us who came so much later.

He was a sincere and simple man of the people; he stood for all that was genuine and thorough and of direct service in the interests of science and its application to practice. He early maintained an interest in neurology in what was hardly more than a frontier trading post and where the existence of neurology was hardly dreamed of according of the canons of to-day. It was then a crude product but it was sincere and as he upheld it, it was a light in the wilderness. As St. Louis grew and began to feel itself this early lamp shone less brightly in contrast, but Dr. Hughes, although he may not have kept in touch with the latest advances, still maintained a vital interest and enthusiasm.

He was a native of St. Louis, where he was born, May 23, 1830. He was educated first at Grinnell College, Iowa, and graduated from the St. Louis Medical College in 1859. In 1867 he was elected superintendent of the hospital for the insane at Fulton, Mo., which position he efficiently filled for many years. He was also for many years professor of psychiatry and neurology at the Marion-Sims Medical College of St. Louis, which owed its foundation to him. He became widely known through the Alienist and Neurologist, which he founded in 1880 and which he made the medium for an open discussion of neurological and psychiatrical problems. It was received among European publications, though it never definitely stood for vigorous research and the vigorous pushing forward into, progressive lines which marks the neurology of to-day. Lombrosos found in him the clinical material which supported his once prominent theories of criminology and degeneracy. It was at Dr. Hughes' instigation that certain Italian psychiatric works were translated into English, which, while of a varied sort, may be mentioned an important one which was based upon his clinical observations and which was of special value at the time from the medico-legal standpoint as well as from that of differential diagnosis. This was a paper read before Section X of the International Medical Congress held in 1876 at the celebration of the centennary of the Declaration of Independence. This was an address on "Simulation of Insanity by the Insane," and it brought more strongly than before American clinical experience into connection with the point of view of European contributions.

Dr. Hughes was a member ex officio of the American Medico-Psychological Association, fellow of the American Academy of

Medicine, honorary fellow of the Chicago Academy of Medicine, member of the American Military Surgeons Association and of other American societies. Many of the continental medical societies made him a member in recognition of his work, as did also the British Medicopsychological Association. He also attended many of the International Medical Congresses as a delegate.

His chief published work is one on the Neurologic Practice of Medicine.

SMITH ELY JELLIFFE.

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Original Articles

A CONSTRUCTIVE POLICY FOR THE ADVANCE OF NEUROLOGY[1]

By Walter Timme, M.D.

Upon each occasion of accession of a president of the Neurological Society, it has been customary for him to present a more or less eulogistic discourse upon the past and present activities of the society with a prophecy of great deeds to follow. This character part now, unfortunately, falls to me—unfortunately, for the reason that, in looking backward, and comparing the work done then with that with which we are now struggling, I fail to see any marvelous or even more than a quite moderate advance in our special field of medicine. Of this moderate advance I desire to say nothing more than merely to make the bald acknowledgment. And once having made it, let us go back upon our track and view it critically to determine, if possible, the reason for our present mediocrity.

In our periodical addresses, we said little of our past misdeeds, of our sins of omission, of the dry-rot which infested us, of the controversial attitude which split on terminology rather than upon neurology, of the laissez-faire hebetude which refused to be stirred out of its lethargy, of the complacent self-sufficiency of conservatism, of all the thousand and one pettinesses inherent in such a body,—which should of right be busily traveling along the highway of modern advance. Much to my regret it becomes a painful duty to dwell upon these characteristics of our past—not in the sense of destruc-

[1] Address of Dr. Walter Timme before the meeting of the New York Neurological Society, February 4, 1919, on the occasion of his installation as President.

tive criticism—but in the hope that recognition of our fault and acknowledgment of our error will lead us into the light of truth and the path of advance. It is my earnest hope and belief that recognition will effect a cure, and constructive changes and plans will of necessity follow. Let me say that my remarks do not refer to any one or any group of us but to ourselves as a whole—a collective unit. But as even the best of us must bear a modicum of the blame, so shall we all share the praise to come—every saint has a past, every sinner a future.

My interest was awakened recently by reading over some old neurological transactions, including those of this society—old in the sense of years gone by, for they were of the vintage of one quarter of a century ago—and yet, to our confusion be it said, quite modern in content. Let me cite a few by way of example. Here, for instance, is a paper on exophthalmic goitre in which the author (Taylor) dwells upon the positive relation of the thyroid gland to the sympathetic nervous system. Another address, à propos of this very evening's discussion, on the specificity of nerves for the conduction of pain, by Marshall, might well be incorporated in any modern discussion on sensation. Then there appears a symposium on acromegaly, with an excellent description of the development of the conditions and a relationship between it and myxedema is predicated for the reason that both conditions are frequently seen in the same subject. On this basis, Starr advocated the use of thyroid extract in acromegaly—with occasional success. A few pages beyond this, we see a discussion on the "Treatment of Mental Diseases following la Grippe"—a paper akin to one on our last month's program.

In reading over these addresses and presentations, perhaps the first thought that comes to one is their lack of archaic quality. While they don't seem at all new, yet they are not of the mustiness and hoariness characteristic of quarter century old ideas. They give us an uneasy feeling that we have been asleep at the switch—that we have not made time tell. Another observation is the lack of verbiage, compared with our present day effusions. One can read them fairly rapidly—for they are rarely involved, they proceed rapidly to their goal, and they end with a period. To-day we say practically the same things, but as is always the case when novelty is wanting, we disguise our deficiency in a maze of qualifying phrases, limiting applications, and newly coined terms, which makes of the result a fortress with attack-defying salients, the content itself unassailable and of the critic a poor wretch impaled on the outer fortifications.

Another feature of modern neurology which is somewhat disconcerting though which perhaps is a little less in evidence to-day than it was a decade ago, is the reduction of our experience to statistical tables. Gentlemen, one resorts to statistics only when his subject is exhausted—it is in a measure an epitaph—it spells finis. When a very excellent gentleman tells me that he has seen one hundred and thirteen cases of disseminated sclerosis of which a certain per cent. were cerebellar, another per cent. bulbar and the remainder of 100 per cent. spinal; and then in another rearrangement on a percentage basis, the groups come in columns of paraplegia, scotomata and nystagmus; with a third and a fourth table of percentages, if you please, following closely, then I cannot help thinking that he realizes that this is the last word to be said of disseminated sclerosis —he has given its birth, and age and family connections and buried it. And this represents our attitude, more or less, toward our unfortunate patient. Once let the diagnosis of disseminated sclerosis be made, and all further interest in him is lost. We know in just which statistical table he fits, and "there's an end on't." And we pass to the next patient. And I might cite the same about many other organic neurologic conditions. It is this method of closing up a subject—saying finis—that has brought organic neurology to the present impasse—has led it into a box canyon from which there is no escape ahead, but all egress must be by retreat. It is this lack of real advance which is pictured in the comparative aspects of our presentations of twenty-five years ago with those of to-day—they might almost be interchanged. What a sad commentary! Will you find such a condition of affairs in other than medical fields? Will you find such a condition of affairs in other fields of medicine? Witness the introduction of serum therapy, of protective vaccines, of salvarsan. The discovery of the spirochete, the hemolytic reactions, the invention of the electrocardiograph furnish the answer. These advances are epoch making. What can neurology furnish to this list? Modern neurologic therapeutics are confined to the treatment of neuro-syphilis with salvarsan. It was a bacteriologist who demonstrated the spirochete in paresis, and a bio-chemist who introduced salvarsan, and we owe much more than perhaps we are willing to admit to these workers in extra-neurologic fields. Against these advances of our medical cousins, we can show nothing in the cure of poliomyelitis, although we had an enormous mass of material in several epidemics to work upon; nothing in the cure or prevention of such formal neurologic conditions as disseminated sclerosis, combined system diseases, syringomyelia, paralysis agitans and

I had almost said the epilepsies. As for the neuroses, we spend our time in classifying them and reclassifying them and become disputatious in the act. The psychoses likewise have become a field for terminology and statistics. In our extremity we see no outlet but to retreat and discover other paths for emergence into the light. But in doing this, we find the alternative roads already largely occupied by our brethren of other faith. Witness the inroads upon the dystrophies, the myopathies, the asthenias that have been made by our friends, the endocrinologists. The subject of visceral neurology belongs almost exclusively to them. Pediatrists and orthopedists vie with each other for the major slice of poliomyelitis. Even the genito-urinary specialist makes a plea for the inclusion of neurosyphilis in his domain. The dentist cures our spondylites, our neuralgias, and forsooth of late,—and this must be softly said—our insanities. And lest the psychoanalyst think himself badly treated by being the last mentioned in this category, let me make up for this neglect by accrediting him with heroic attack in every single field both touched upon herein, or left unnamed, and with frequent success. Gentlemen, our attitude is disintegrative; for we are passive and not active; we submit, we do not demand;—we complain but we do not alter;—we are losing our virility and fast approaching senility. And like the aged, we live in the past. And we still quote Charcot and Erb and Gowers as authoritative. Perhaps I am painting the night black when it should be at least starlit; but even were it black, the day will follow by revolution. Revolution is the order of the day—it is the spirit of the times—it is uncomfortable, but it brings rejuvenation—it is our necessity. Is it possible for us to revolutionize our methods? Can we, in a spirit of harmony and coöperation agree upon some plan, upon some form of action by which our work in neurology will take a definite course forward, and not as before, subject to every stray gust of wind, rudderless, our craft rode hitherward, thitherward, never arriving anywhere, and held for tribute by every passing sail.

Some such plan should not be difficult to formulate. Any plan is an advance. If you will go back a piece with me you will see the concrete difficulties that we must overcome. In the first place, one of the greatest sources of energy-waste, confusion and disturbance lies in the fact that although all advances must have a definite point of origin, yet we have no such starting point. That is to say, in order to carry a subject beyond its present status, its present status must be so well-defined in all its bearings that it will not be necessary for the investigator to go back decades and read up volume

after volume dealing with his theme. By the time he reaches to-day, if he is careful and painstaking, and covers every point, to-morrow will be upon him, and he will mayhap be aweary of his quest. Multiply the energy and time he has consumed by the number of brave men that have attempted similar feats, and is it a wonder that a paucity of results follows? This necessarily endless wearisome repetition is stifling to brilliancy, to initiative, to advance. The mere statement of the difficulty suggests the remedy. Therefore, let us consider now a constructive plan of action. Why cannot an authoritative body representing American neurology choose from among its numbers a member to whom will be assigned a specific neurologic disease or syndrome for treatment on the above basis? Each member of such a group might take a subdivision of the subject chosen and bring it up-to-date. Allow a year for the work. At the end of that time, we would have in compact accessible form, all that had been written upon that disease throughout the world to date. Two such groups a year would soon give to neurology a series of archives invaluable as starting-off places for investigation. One great source of consumption of time, confusion and dissipation of energy would thereby be eliminated. This appeals to me as a very concrete method of obtaining in a comparatively short time the best results. The process might very well be initiated by our society and collateral reviews or else collaborations undertaken by neurological units elsewhere in our country. The publication of such exhaustive reviews might then be properly within the scope of the American Neurological Association. Within a few years, with the resulting foundation from this plan, and with the intense stimulative value of the critical compilation of the data investigated by these groups of neurologists, American neurology will have made great strides. A second recommendation, a corollary to the former, might be of value in fostering a spirit of research and investigation. This would embody the award of a prize for the greatest yearly advance made in some neurological subject; or else a prize for the winner of a competitive essay, the subject to be chosen by a selected committee each year. If the subjects for these essays are well chosen, that is, if they will serve to conduct and direct research in definite channels for the determination of some limited, concrete question, this second method will go far to clear up, to complete, to round out our conceptions of neurologic entities. For this we need not necessarily wait upon the completion of the former recommendation for exhaustive reviews. I see no reason, here again, why our society should not take the first step towards establishing some foundation

for the yearly award of such a prize. The details might be left to the council for the final consideration of the society, or else to a specially designated committee.

By these two means, an immediate direct stimulus will be applied to American neurology which will give to it a dynamic character such as it has not had;—a stimulus which it badly needs and one which will be cumulative as it progresses.

My illustrious predecessor will have told you of the broadening scope of American neurology and possibly of the great desire for such a unification of neurologic interests in this city as will make it the center of neurologic thought and advance. The immense economic factor that problems in neurology and psychiatry have become in modern organizations has been made plain through the great war, and a hitherto unbelievable awakening in all branches of these sciences is already manifest. Gentlemen, ours is the position, and the power and the ability to encompass this great end. Let us find the will thereto.

AN ACUTE PRISON NEUROSIS OF THE ANXIETY TYPE[1]

By N. S. Yawger, M.D.

CONSULTING NEUROLOGIST TO THE PENNSYLVANIA EASTERN STATE PENITENTIARY, PHILADELPHIA

That convicts entering upon penal servitude should at times show nervousness, is what one would expect, but to be informed that these offenders may become ill from the prospect of release, is hardly within one's expectations.

It is recognized by all students of criminology that during the lifetime of these antisocial individuals many anomalous manifestations are shown, and while some of these exhibitions are distinctly psychopathic, others it appears pertain more properly to the sphere of behavior. Gleuck[2] has observed that in criminals the psychopathic expressions of common and early occurrence are: "Convulsions, somnambulism, stuttering, spells of rage, running away from home, crying in sleep, protracted enuresis, sex precocity, nomadism, sex perversion, periodic depression, dizzy spells, retarded walking and talking, hypersensitiveness, early alcoholic addiction and early criminality."

Perhaps some of these manifestations might be classed under aberration of behavior; and this recalls what Southard[3] in his practical grouping of mental diseases says—"Let us leave room for the existence of criminals that are not psychopathic." Under a group of aberration of behavior one might properly add as being of prognostic importance, noticeable disobedience to parents, undue quarrelsomeness, preference for bad companions and wanton cruelty to animals; also, pronounced untidiness, indolence, deceitfulness, lying, destructiveness and theft in the school-room.

Such manifestations are here emphasized since it is of the greatest importance that these individuals while yet school-children should be recognized as having wayward tendencies; therefore, the effort should then be made to bring them promptly under greater supervision.

[1] Read at the forty-fifth annual meeting of the American Neurological Association, Atlantic City, N. J., June 18, 1919.

[2] Gleuck, Bernard, A Study of 606 Admission to Sing Sing Prison, Mental Hygiene, January, 1918, Vol. 1, p. 85.

[3] Southard, E. E., Transactions American Neurological Association, 1918, p. 71.

Since the criminal, in a general way, constitutes a type that is prone to psychopathic experiences, it is not surprising that the placement of this anomolous individual in the unusual and restricted environment of a prison is occasionally followed by the development of a special group of disorders, so that, just as we have prison psychoses, there is occasionally manifested a more or less definite anxiety neurosis, which I shall describe, and which I believe has not heretofore been considered.

Among the insane, looking forward to the time of parole or discharge, almost invariably has a beneficial influence, since the thought of going home is consoling; but with the convict, who often has no home, just the opposite effect may be observed; that is, a prisoner anticipating an early pardon or parole, as a result of the strain incident to the period, becomes exceedingly anxious; as the hoped-for time of release approaches, the anxiety may increase to the extent of a pronounced nervous disturbance, and this condition is one which the individual has not previously experienced during his penal servitude. Occasionally, a further cause of anxiety is the fact that a detainer has been lodged against the convict; in this event, as the inmate emerges from the prison, he shall be again arrested and probably interned elsewhere.

Convicts are almost unanimous in the feeling that after having served the sentence imposed for their offense, upon their return to society they should be allowed to start life afresh; that no barriers nor obstacles of any kind should be placed in their way; that the public should permit them to take up some work unhampered as could any stranger who might come in their midst; but the prisoners, knowing that such shall not be their fate, fear the sting of public disapproval that awaits them, and, under the strain, become exceedingly hypersensitive.

Obviously, this neurosis is more common in penitentiaries to which, generally speaking, felons are sentenced, than in the smaller jails, where those only guilty of misdemeanors are interned.

My attention was first attracted to the disorder while examining a prisoner whose application for pardon was awaiting action. I was puzzled as to the cause of the symptoms presented and made this note: "The prisoner is restless, talkative and irritable; his skin and tendon reflexes are markedly exaggerated, but equally so; upon questioning him as to the cause of his nervousness, he states, 'I am upset because I am coming up for pardon.'" Further investigation disclosed that the prisoner's weight at the beginning of his sentence, April 15, 1916, was 140 pounds, and at the time of my examination,

January 5, 1918, was 116 pounds. A more liberal diet was allowed and a reconstructive tonic prescribed, and, though pardon was not granted, the individual's weight soon advanced to 120 pounds, with a continued rise for some time after. I concluded that the prisoner was right—that he had reacted badly under the strain of his anxiety.

About one third of the convicts coming up for pardon or for parole show this nervousness to a greater or less extent and approximately in one tenth of these offenders, the subjective symptoms are so suggestive, that is, when observed in a penal institution, as to be almost diagnostic; and the ones who escape the disorder, appear, for the most part, to be those who believe that favorable outside conditions await them.

Among the inmates the nervousness is jokingly referred to as "pardonitis" and "parolitis." Manifestations are more likely to occur in a first offender than in a recidivist and they may begin as long as three months or as late as ten days before the hoped-for time of release.

The symptoms are more pronounced in an individual hoping for pardon than in one looking forward to parole, since the former must produce convincing evidence why a pardon should be granted, whereas the latter has considerable assurance that he shall be released at the expiration of his minimum sentence.

Although hoping for pardon is productive of a more intense neurosis than is the approach of the expiration of the minimum sentence, upon obtaining freedom the pardoned individual recovers more promptly, since the granting of liberty with its attending restoration of citizen rights removes much of the strain, while with the paroled convict he shall remain out only while his behavior is satisfactory, hence the shadow of the prison is still over him. I was informed by a parole officer that noticeable nervousness has been observed in convicts for weeks after their parole.

It is a common experience that an individual who during the time of his sentence has hardly been upon the physician's list, through this anxious period makes demands upon his service and, in exceptional instances it is necessary to remove such an inmate from his cell to the prison hospital.

One may ask why, during this anxious period of prison life, does not an actual psychosis develop? I have never observed pronounced mental disturbance at such a time and this is probably largely due to the symptoms being so preëminently somatic and perhaps also because the strain does not last sufficiently long.

Symptoms

There is a facies which is sometimes observed in this individual and Darwin's description of the emotion of anxiety may be applied to extreme cases of this prison disorder. Naturally, facial expressions vary greatly with age, but one occasionally meets with a face that is long, an eye that is dulled and with skin corrugated in the central forehead; the drooping at the angles of the mouth makes this picture of extreme anxiety complete.

The subjective evidence of the disorders appears in the form of restlessness, decreased power of mental concentration, irritability, hypochondriacal and introspective manifestations, dreams of a disturbing nature often broken by a distressing insomnia, dyspepsia, genito-urinary manifestations, cardiac irregularity or respiratory disturbances; usually, there is an appreciable loss in weight and in smokers an increased use of tobacco.

Objectively, a tremor may be encountered also, generally and equally increased activity of the skin and tendon reflexes. Sometimes the strain falls more directly upon a particular part of the economy and the following is an instance where the cardiac symptoms were so alarming that the individual was twice ordered to bed in the prison hospital. There was no demonstrable disease of the heart, but intense attacks of pain which radiated into the left arm were experienced and associated with this was pronounced palpitation, tachycardia and arhythmia. The prisoner also showed involuntary twitching of the face muscles and shrugging of the shoulders; both skin and tendon reflexes were markedly heightened; the umbilical reflex in particular could be elicited over a very extensive area, even showing marked activity when the cremasteric reflex was being tested. Parole led to prompt subsidence of his symptoms.

My opportunity to observe female convicts has been exceedingly limited, since they but seldom receive a felonious sentence, but I believe the reactions due to this anxious state will be found more intense in their sex; certainly the most aggravated case I have observed was that of a female whose offense was first degree murder, but whose death sentence had been commuted to life imprisonment. This individual made an effort for pardon and I recall that three physicians, one a surgeon, made a careful study of her condition while in this state of nervous anxiety. She showed pronounced loss in weight, her somatic symptoms were mostly gastrointestinal and appendicitis in particular was considered. Being of a highly emotional nature, it was decided that her state was caused largely by

anxiety while she was awaiting the action of the pardon board. Pardon was not granted, but despite this her condition soon showed improvement.

As to behavior of convicts during this anxious period: Trustworthy and efficient prisoners occasionally become very irritable and frequent illustrations of this are afforded by their conduct in the prison school; those serving as instructors are sometimes rendered unfit for their duties, whilst among the pupils it is the rule that they lose their power of concentration, and become restless and irritable to the extent that they amount to disturbers in the school room.

Nature of the Disorder

It was Freud's belief that neurasthenia was typically represented by such symptoms as headache, spinal irritation, dyspepsia with flatulency and constipation, and that other symptoms, generally speaking, should be classified elsewhere. This led to his separating from neurasthenia certain manifestations which appeared to be definitely allied with each other and resulted in the establishment of what Freud termed the Angstneurose. Obviously, the chief symptom of the anxiety neurosis symptom-complex is anxiety, and around this others showing a definite relation thereto are grouped. Thus far the views of Freud met with rather general acceptance, but the great influence attributed by him to sex matters has of course been bitterly controverted.

The prison anxiety neurosis here described develops in an individual who, generally speaking, is of constitutional inferiority. As to the extent to which the responsibility for the disorder lies within the sexual sphere, this is difficult to determine.

The convict is usually a masturbator and some damage may be done by this unnatural and excessive relief of sexual tension; furthermore, a number are serving sentences for crimes of a sexual nature and in individuals with a strong appetite for venery, one would expect greater excitement and, therefore, greater indulgence, as the hoped-for time of release approaches. Prisoners sometimes become apprehensive as to the damage they may have sustained through masturbation and I recall their asking if they would again be able to have natural sexual intercourse.

Undoubtedly the reactions of this anxious period are the result of important factors aside from the sexual sphere.

The prisoner's mind is besieged by all manner of real and fancied reasons why he may not be released; again, a few prisoners

know that detainers have been lodged against them which of itself is very disturbing; but surely a frequent cause for this anxiety neurosis is the convict's thought that when released he shall perhaps be homeless, and his certain knowledge that he shall be an unwelcome member of society, which, after having served his sentence he feels is most undeserved.

DEMENTIA PRÆCOX IN TWINS[1]

(Case Reports)

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There is not much said in the literature about mental diseases in twins. On account of this fact it is thought interesting to present the following cases:

Case 1. J. S., 20 years old, November, 1917. This patient was brought to clinic at the Post Graduate Hospital by sister, referred by Dr. Louria of Brooklyn. It seems the patient went to see Dr. Louria of his own accord stating that his mind is confused—that he could not think, and feared he would become insane. The patient's sister was in the room at the time he was being questioned and he stated he did not wish to have her present because "he did not wish to make any trouble in the house." When she left the room he stated that when he was 14 years old he became very bashful, was not able to make friends and so never had any friends; that his bashfulness makes it impossible for him to concentrate his thoughts. The boy seems very much worried about his entire condition.

Q. When you are riding in the train, do people look at you in a queer way?

A. Yes, sir, I ride in the last car of the train so that people won't see me.

Q. Do they talk about you at home?

A. They only say I am quiet. They don't understand me. Lately they have been talking among themselves and would not let me hear about it.

Q. Do you think people talk about you?

A. They would speak of me because I would stay inside the house and not go out. They talk about my staying home all the time. Patient states that at times he would sit for a long time and stare into space. He cannot think out any definite plans because his mind wanders from one thing to another. When the sister is asked if he ever laughed aloud at the table for no particular reason, patient answered that he had done so a times. He further says that he had to give up night school because he could not stand the work and he could not concentrate.

[1] Presented to the Yorkville Medical Society on March 17, 1919.

Q. How long have you been complaining?

A. About 4 months but I was sick a year before that, but I did not complain.

Q. What did you feel? A. Headaches.

Q. How long is it since you are not working?

A. About four months.

Q. Why? A. I feel very bad. I could not think well.

Q. Do you suppose people mock you or make remarks about you?

A. I don't know, I suppose they do because at times I become nervous.

Q. What is your chief difficulty?

A. I got out of the swim and I am trying to get back into it.

Q. What do you mean by getting out of the swim?

A. I feel abnormal.

Q. What do you complain of?

A. I didn't get along steady and I got depressed, it seems sort of a sinking way, lowering.

Q. What do you do all day?

A. Stay in the house, go to my sister's sometimes, do some talking, go to the movies, read a paper.

Q. What do you think is the cause of your trouble?

A. When I was young, I was very nervous, wild, jumping around, sort of a nervous style of thinking. When I was young, I always thought somebody else was greater than I in the intelligence way—intellectually. In a world-way, I thought they used to do better. They would speak of my intelligence altho' I always kept myself low.

Q. What do you mean by "keeping yourself low"?

A. I am able to explain it, but just now I can't concentrate so very well. I didn't have a strong character.

The construction of the patient's sentences are loose and vague; his attitude is somewhat constrained and he talks with his hand in front of his mouth. With regard to masturbation, he admits having used friction to his private part. When asked how often he does this, he says it is not a habit. "I don't do it much, it is just according to my moods—a few times, about ten times a month."

In February, 1918, sister comes again to clinic with patient, stating that her mother attempted several times to come here with the boy, but when she got part way, he refused to go any further and went home. Sister states that he gets headaches and does not sleep. About a week ago he went to his married sister's house, threw himself on the bed and cried, stating that nobody cared for him, that he is not normal and he is to become a cripple. He worries of what will become of him. He sits all day with his fingers pressed in his ear or pressed to his nose. Patient questioned—states that he is

not better, "concentration weakens because of lack of effort—desire to stabilize the nervous system. Two days ago the nervous system was good, I was able to sit and enjoy it, but when I was trying to do anything where I have to concentrate, I can't do it. When I started out this morning the concentration was very weak. I can improve my concentration by having someone talk to me."

April 2, 1918.—Patient states that he cannot think, he cannot breathe and he cannot rest. States that his breath is spoiled and he has a choking sensation. Lately he says he has not slept. He worked one day and felt very badly, so quit. He says, "I have the worst thoughts come to my mind; I think I can't get well."

December 2, 1918.—Sister comes to-day and says that patient was sent to a boarding house and while there patient would not eat with the people in the house, wanted to be by himself. When he returned home he stayed alone and would remain in bed most of the time. When his mother spoke to him, he would use vile language. He becomes very much excited when spoken to and the other day upset the table when his mother spoke to him. He has been living away from home for the past three weeks.

December 15, 1918.—Patient is living home again. Sister states that since his medicine gave out he has been acting very queer. He would not stay in the room with any member of his family, shouting, "For God's sake, get out, how much longer must I suffer?" He would not eat at the table with the rest of the family and sat in his own room. He suddenly got up and went out. They found him in his sister's home with his hat, coat and sweater on, sitting in a bedroom all alone, while his sister and brother-in-law were in another room.

January 6, 1919.—Sister calls to-day, stating that patient is in a very excited state at the present time. He tells his mother, "I'll bust you in the face," and accuses his mother of being the cause of his sickness. He states, "Last summer, you made my father sick, and you won't make me sick." He goes to bed with all his clothes on. He has been referred to King's County Hospital for commitment to an institution.

Family History.—Father Harry, living, age 60 yrs. Is excitable. Temperate. Mother living, 60 yrs., healthy but nervous and excitable. Seven children.

1. Fanny, 33 yrs., married, 4 children, normal.
2. Nettie, 31 yrs., married, 2 children, normal.
3. Mollie, 28 yrs., single, unemployed, suffers from tuberculosis.
4. Charles, 26 yrs., is clerk. Inclined to be nervous.

5. Annie, 22 yrs., married, 3 children, normal.
6. Patient } twins. Condition similar to patient.
7. Isadore }

Mat. gr. mother died, age 86 yrs. Gr. father died 60 yrs. Unknown cause. Pat. gr. mother died 89 yrs. Gr. father died 60 yrs. Unknown cause. Parents married 35 years. No consanguinity. Family history negative as far as can be ascertained.

Status Presens.—Patient is fairly well developed. Musculature fairly well developed. No adipose tissue present. Thyroid gland enlarged, isthmus distinctly felt. Lymph glands somewhat enlarged. Epitrochlear glands distinctly felt. Lymph gland distinctly enlarged in inguinal region. Patient has marked flush in the face. Heart action very strong. Pulse beat 136. No murmurs to be heard. Lungs negative. Abdominal muscles very tense, palpation of organs impossible, but there does not seem to be anything abnormal present. Sex organs negative. Tendon and skin reflexes exaggerated. No Babinski. Pupils are dilated, respond sluggishly to light. Extrinsic eye muscles negative. The whole vasomotor system is very unstable. Marked dermographia and acute anserina present.

It is interesting to note that on January 9, 1919, the patient was committed to the Central Islip State Hospital from Bellevue as the following abstract of the history of the Hospital will show:

CENTRAL ISLIP STATE HOSPITAL

S. J. Admitted Jan. 9, 1919. From Bellevue Hospital. No. 14613. Age 20. Nativity U. S. Single. Cutter. Hebrew. Birthplace of parents, Austria. Heredity, Maternal 1st cousin, 1st attack. Duration one year.

Sister States.—For yast year patient has not worked. Stays about the house sitting and staring into space. Is afraid to go out. At times excited and threatening for imaginary grievances.

At Bellevue.—Physical condition good. Pupils equal, dilated and respond to light. Knee jerks hyperactive. Tremor of tongue and fingers. Patient is depressed, dull and indifferent. Shows no spontaneous production. When interviewed he is sullen and irritable. Says his people and neighbors talk about him; that they are against him. He remains seclusive, listless and inactive, apparently satisfied with the situation and shows no grasp on his surroundings.

At Central Islip.—Following his admission he was obstinate and resistive; would assume uncomfortable positions in bed and refused to converse spontaneously. He would not eat of his own accord and has to be coaxed when he permits of spoon feeding. No actual delusions

or hallucinations elicited at the time of the mental examination. He stated that where he worked the firm changed hands and following this, began to worry. During the interview he sat quietly in a chair, never took the initiative and most questions had to be repeated several times before he would reply. He was disinterested in the examination. He was approximately oriented and his memory showed no particular impairment. His judgment and reasoning were defective and he was without insight into his condition.

February 24, 1919.—For the past week or so, patient has been quiet and somewhat seclusive and does not associate with the other patients. He eats of his own accord. He is indolent and cannot be induced to employ himself. His general health is good.

Mental Diagnosis.—Dementia præcox—Catatonic type.

Case II.—I. S., twin brother of J. S., is also a patient at the clinic. He came to the clinic in February, 1919. He states he comes to the clinic, "Because I get too excited." As patient sits down, he tells examiner if stenographer will get out of the room, he will tell him something. When stenographer leaves, he states that he has a funny influence, he can influence anybody to do anything. He can make the doctor laugh and he can make him hold his hand to his face. When asked how he does this, he says, "I don't know, it is in me." Asked to use his influence, he says he feels too weak, but after a moment says, "Now I made you do it, you are laughing." States that he can influence people with his mind, his stomach, his kidneys and other parts of his body. He has had these influences all is life but did not know it. He says he understands his case, he has no delusionary ideas, he was one of the brightest boys in school, he has a plan for a new Utopia but he cannot tell what it is.

Questioned.—What is your trouble now?

A. Too excited, my blood pressure.

Q. Have you any friends?

A. No, now especially I don't want any, I might influence them. I read in the papers where a man influenced a woman to steal. If persons want to be bad to one another I can influence them to be good. If anyone excites me, I get equally excited and then I can influence them.

Q. Do you hear voices at night?

A. No I am not delusionary. I am too logical.

Q. What are your plans?

A. I cannot tell you, they are too important, my plans are better than Thomas Moore's, a new Utopia.

February 18, 1919.—Patient returns to the clinic, states that he has felt bad since yesterday, thinks he feels that way because his supply of medicine is exhausted. When asked about his influence,

at first the patient does not answer, but after some persuasion says, "I know what to say, but I don't know if I should say it, perhaps it would be better if I would not say it." He has been at home since his last visit, says he reads the newspapers a great deal. His eyes pain him; when he left here after his last visit, his eyes were so hard they felt like pebbles. "I can move every part of my body, I have studied this." Asked about his plans, says, "I am working on them now, they are not what you think they are, they are not delusionary. I should not tell you, because the last time I told you they were better than Thomas Moore's, and then you think I am insane, so now I take back that statement. I will work it out alone, I will say nothing more about my plans. I can't stand the cold air, it is too strong."

Status Praesens.—Patient is not shaven; sits in a chair with his hands to his face, explains that he does not wish to look at the examiner because it would make him too excited. He is poorly nourished, ears outstanding. Certain amount of blepharitis, right pupil larger than left, react to light. Teeth in poor condition in upper jaw, teeth in lower jaw fair. Throat negative. Patient is not scrupulous in his habits, his shirt sleeves are wet. Heart, lungs, negative. Knee jerks normal. Abdomen negative. Genitals normal. Reflexes not exaggerated. Station good. Wassermann negative. As you see even now, he is listless at times and excited at other times.

Summary.—History shows that patient's twin brother is suffering from dementia præcox, at present he is at Central Islip. It is evident that patient is also suffering from dementia præcox. As yet no institutional commitment seems imperative because the patient is rather quiet.

I am indebted to Prof. Max G. Schlapp for permission to present these cases.

616 Madison Avenue.

NERVOUS AND MENTAL DISEASES IN THE WAR

A Comparison of the Results of the Examination of Recruits in Two Army Camps

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The following data are of interest as showing the results of the neuropsychiatric examination in two army camps. These examinations were conducted not only to rule out men who were suffering from actual nervous and mental disorders, but also to eliminate those who showed any incipient evidences of the same.

We will compare the results of the work done at the Kelly Aviation Field, San Antonio, Texas, with Camp Travis, San Antonio, Texas. The number of men examined in each camp was nearly the same; twenty-four thousand four hundred in Kelly Field, and thirty thousand in Camp Travis. There was this difference, however, in the method of conducting the examination in the two camps: In Kelly Field every soldier was given a routine nervous and mental examination; whereas in Camp Travis only those men were examined whom the regimental medical and line officers thought required a special neuropsychiatric examination. So by the latter method, only those men were examined who exhibited some evidence of nervous or mental disorder to their own officers. While, of course, every man who might be a potential neuro- or psychopath would not be eliminated, in the hurried routine examination, nevertheless the trained observers who constituted the board, detected many cases who would otherwise have gone abroad to become members of the A. E. F., and who would probably have broken down under the stress and strain of actual warfare, especially when they had their own particular complexes added, as an etiological factor.

There were 416 rejected out of a command of 24,400 at Kelly Field; and 284 rejected of the referred cases, out of a command of about 30,000 at Camp Travis. Only a small percentage of these

soldiers were sick—they being eliminated before the onset of any illness in nearly all cases. The following table shows the causes and the number rejected in each camp:

KELLY FIELD, 24,400. STRENGTH OF COMMAND, 30,000. CAMP TRAVIS.

24,400 (routine)	Examined	(referred)	659
416	S.C.D.		284
.017 (about)	S.C.D.	(about)	.01

	Kelly Field	C. Travis		Kelly Field	C. Travis
1. *Nervous Diseases*	*93*	*113*	3. *Psychoses*	*42*	*57*
Arteriosclerosis, cerebral	1		Alcoh. psychosis		1
Chorea		2	Ac. Alc. Hallucin.	1	
Chorea, Huntington's		1	Post-Infect. Delir.		2
Endocrinopathy	5		Manic depr. insanity		12
Exophth. goitre	5		Dementia præcox	32	30
Epilepsy	39	62	Psychos. *c* Ment. Defic.		8
Facial paralysis		2	Psychos. *c* Con. Psych. Inf.	1	
Brain injury	2		Undiagn. psychosis	7	4
Fractured skull		1	Simple depression	2	
Migraine	6		4. *Inebriety*	*16*	*20*
Neuritis		5	Chronic alcoholism	14	
Progressive musc. atrophy		1	Morphism	1	14
Sciatica		12	Morphine *c* other drugs		6
Tic	2	4	Cocainism	1	
Tic and stammering	8		5. *Mental deficiency*	*107*	*47*
Syphilis, cerebral		2	Imbecility	6	31
Syphilis, cerebro-spinal	28	1	Moron	98	13
Tremor, congenital		1	Moron and chronic Alcohol.	1	
Brown-Séquard syndrome		1	Moron and enuresis	1	
Congenital absc. pectorals		1	Borderline Cond.	1	3
Organic brain disease	2		6. *Constit. Psych. States*	*66*	*4*
Paralysis of extremities		17	Paranoid personality	7	
2. *Psychoneuroses*	*92*	*43*	Inadequate personality	56	1
Psychasthenia	46	7	Emotional instability		2
Neurasthenia	3	11	Sexual psychopathy	2	1
Hysteria	33	18	Criminalism	1	
Somnambulism	4				
Torticollis		6			
Enuresis	6				
Tachycardia, paroxysmal		1			

The board at Camp Travis further subdivided some of their diagnoses as follows: Epilepsy, 62 cases,—58 idiopathic, 3 traumatic, 1 Jacksonian; 5 cases of neuritis,—1 post-infectious and 4 traumatic; paralysis of the extremities, 17,—7 of the upper, 7 of the lower, 3 combined; 18 cases of hysteria,—major 13, traumatic 4, and aphonia 1; manic depressive insanity, 12 cases,—manic type 3, depressed type 7, interval cases 2; dementia præcox, 30 cases,—paranoid form 8, katatonic 4, hebephrenic 17, simple 1. The board at Kelly Field did not make these subdivisions.

One notices in the above table that there were no rejections for

chorea at Kelly Field; none for any endocrinopathy in Camp Travis. No cases were rejected for migraine,—and an unusual feature, none for alcoholism in Camp Travis. No cases were diagnosed as manic depressive insanity in Kelly Field. Of course, all these figures refer only to the time that this particular board sat.

The following diagnoses, not on the official classification, were made: Brown-Sequard syndrome—1, congenital absence of the pectorals—1, paralysis of the extremities (cause not stated)—17, torticollis—6, and paroxysmal tachycardia—1, all at Camp Travis. At Kelly Field the following nonofficial diagnoses were made: Organic brain disease (form not stated)—2, somnambulism—4, enuresis—6. Of these diagnoses, with organic brain disease the cause, or at least the type, should have been noted. So also the diagnosis paralysis of the extremities should have been qualified by the cause or form; as peripheral, spinal, or central; or following acute anterior poliomyelitis, etc. The diagnoses of torticollis, somnambulism, enuresis, and paroxysmal tachycardia are not good, for the reason that any of them may have been a component of a particular syndrome, for example of a conversion or an anxiety hysteria.

There was a marked disproportion in the number of cases rejected in the two camps for the following conditions, the two camps having almost the same number of troops:

	Kelly Field	Camp Travis
1. Nervous Diseases.		
Paralysis of extremities	0	17
Sciatica	0	12
Syphilis, cerebrospinal	28	3
Epilepsy	39	62
2. Psychoneuroses.		
Hysteria	33	18
Psychasthenia	46	7
Neurasthenia	3	11
3. Psychoses.		
Manic depressive insanity	0	12
Psychosis with mental deficiency	0	8
4. Inebriety.		
Chronic alcoholism	14	0
Morphinism	1	20 (alone and combined)
5. Mental Deficiency.		
Moron	100	13
Imbecility	6	31
6. Constitutional Psychopathic States.		
Inadequate personality	56	1
Paranoid personality	7	0

Of the nervous diseases the rather unusual fact is to be noted that there were 12 cases of sciatica, and 17 of "paralyzed extremities" rejected at Camp Travis, and none of either of these conditions at Kelly Field. One is at a loss as to how to explain this

discrepancy. The advantage of the routine examination over the method of merely examining the referred cases is shown in the rejections for cerebrospinal syphilis, for which cause 28 were rejected at Kelly Field, and only 3 at Camp Travis. The explanation is that the diagnosis being chiefly made on the physical signs found, of course, many cases would thus not be referred for examination.

In regard to epilepsy, if 39 at Kelly Field be taken as a normal number of rejections for this cause, then relatively 27 would be a more equitable number for rejections from Camp Travis; whereas they had 62,—or 2⅓ times as many as you would have expected to find. But Camp Travis had half as many psychoneurotic rejections, no rejections for chronic alcoholism, and only one sixteenth as many rejections for psychopathic states as Kelly Field. These facts might furnish food for reflection for a critic, as we well know that in the latter conditions epileptic or epileptoid phenomena are common. Cases rejected for hysterical manifestations were not very unequal,—33 to 18,—whereas 33 to 23 would have been an exact ratio.

But the rejections for psychasthenia showed a marked difference, 46 in Kelly Field to 7 in Travis; whereas Travis should theoretically have had 32. And one would also suppose that if any cases should have been selected by line and other officers for a special examination, cases of psychasthenia should certainly have been picked out by them. The same reflection holds true for neurasthenia, the rejections for this cause being 3 in Kelly Field, to 11 in Camp Travis; whereas if 11 be a proper number for Travis, one would have expected at least 16 rejections at Kelly Field. Probably one reason for the discrepancy lies in the fact that to many physicians the syndrome of neurasthenia includes many other things than a pure fatigue neurosis. As for psychasthenia, many physicians hold Janet's views on the subject, while others adhere to the views of Freud and his school, who teach that the larger number of so-called psychasthenics are really cases of hysteria. In fact, as we all know, many authors do not use the term psychasthenia at all. So we must conclude that with different boards, you are apt to get a great deal of dissimilarity in the results of the causes for rejections, especially in the cases of the various psychoneuroses. Personally I believe that the larger number of cases diagnosed at Kelly Field as psychasthenia were cases of anxiety hysteria, with a few cases of neurasthenia. It is not my intention to go into the question of the so-called relation between hysteria and malingering. But I certainly do not believe that all hysterics have necessarily even an element of malingering in the causation of their neurosis.

In looking over rejections for various psychoses, one notices immediately that while no cases were rejected at Kelly Field for manic depressive insanity, at Travis they rejected 12. The latter to me seems high, for it would mean that one out of every twenty-five of all their neuropsychiatric rejections were because of this condition. This is much higher than one regularly sees, or than one expects to find. The designation "psychosis undiagnosed," has to be made at times, because of lack of opportunity to fully study the case. So too the diagnosis psychosis with mental deficiency is not complete.

When we come to inebriety, the fact that no chronic alcoholics were found at Camp Travis, and 14 were rejected at Kelly Field is quite surprising, when one compares the status of troops at the two places,—Kelly Field having one of the finest bodies of men in the army. So too the fact that 20 were rejected for morphinism, alone or in combination, at Travis, compared to 1 at Kelly Field is rather notable. It goes without saying that it is much easier to detect a chronic alcoholic than an ordinary morphine habitué, in the rapid routine examination given in a camp or cantonment.

Taking up mental deficiency, there were 100 morons and 6 imbeciles rejected at Kelly Field, compared to 13 morons and 31 imbeciles rejected at Travis. The only explanation I have to offer why more cases of mental deficiency were not found in Camp Travis, is that in the ordinary routine military work, the moron could readily adapt himself to his simple problems, and hence would not be selected by his officers for a special examination. Whereas by the routine method, which was the one followed out at Kelly Field, where all soldiers were examined, the trained observers of the neuropsychiatric board rejected many whom the line officers might not think even needed an examination. So too in England, later in the war, I have seen morons whom we thought unfit and dangerous, and yet whose line officers thought were fairly good men. This again substantiates the view that in examining a division the routine method is far preferable to the examination of only certain selected cases. The number of imbeciles,—31, rejected at Travis would ordinarily be high compared to Kelly Field, if one went by ratios, but two things are to be considered: the troops at Kelly Field were intellectually on a higher plane; again some examiners in a quick field inspection and without a special psychometric test, might call a certain case a moron, *i. e.*, intellectually between the ages of 7 and 12; whereas another might feel that he was under 7 and therefore an imbecile. The distinction, being one of degree, is not so important, especially

where the difference in intellectual rating is only one or two years. For after all the native ability is the important factor, and one must not fail to take into consideration the socio-economic features in each case.

When we come to the constitutional psychopathic states it is almost impossible to make a comparison between the results in these two camps. Kelly Field rejections numbered 66 and Travis 4. Yet one would have expected as many if not more psychopaths in Camp Travis. Certainly there is a great relative disproportion in the two camps, as far as these conditions are concerned. Seven were rejected from Kelly Field for having a paranoid personality and none at Camp Travis, and 55 were rejected at Kelly Field for having an inadequate personality, and only 1 at Travis. This is quite inexplicable. For no matter at what camp or hospital where I have examined troops, whether in the United States, England or in France, cases of inadequate personality were quite common.

It is at times interesting to compare the work of different neuropsychiatric boards. Many physicians make little or no distinctions between psychiatry and neurology. And yet we all know that there is a great difference in these two specialties, and it has been duly impressed upon me not only in my work in the camps and hospitals in the United States, but also in the A. E. F., that a man may be an excellent neurologist and a poor psychiatrist; or again he may be a highly trained psychiatrist and an indifferent neurologist. It is usually the head of a neuropsychiatric board who really makes the diagnosis. If he is a neurologist, pure and simple, he might be more or less indifferent to the finer shades of diagnoses when they concern psychoneuroses, psychoses, feebleminded conditions and constitutional psychopathic states. However, his neurological diagnoses would show perfection. If he is primarily a psychiatrist the contrary would often hold true. It is rare to find perfection combined in both of these specialties. The rejections noted above were made in the early part of the war. It will be noted that endocrinopathic conditions are notable for their absence, especially in one camp. This is in marked contrast to the number of endocrinopathies—especially thyroid—that we found at Camp Mills, L. I. There we examined the Rainbow and Sunset divisions, a total of about 55,000 men. One regiment, coming from the neighborhood of the Great Lakes, had an especially large number of thyroid cases. We also rejected more cases for chronic alcoholism than in the two camps noted above.

In one camp where I was a member of the board, we had some young men who had taken a short neurological course, and then

began their examinations. Most of them were very efficient. But I remember one or two who had learned that increased reflexes, tremors, and absent abdominal reflexes might mean multiple sclerosis. Anyone who has examined large numbers of troops is well aware that tremors and increased reflexes are almost the rule. And again when you examine corpulent soldiers in a freezing tent, and try to elicit their abdominal reflexes, you very frequently fail to do so. So these men would refer from five to ten cases a day as possible cases of multiple sclerosis,—not one of whom really had the condition. Later on, with experience, they improved along these lines.

As we noted above but very few of these soldiers rejected were ill. Most of them, however, would have made inefficient soldiers. And without doubt had they been sent overseas, a large number of them would have broken down. For a man who finds difficulty in standing the stress of civil life, would have found it doubly hard to have stood up under the strains and worries incidental to this war.

220 Brooklyn Ave.,
Brooklyn, N. Y.

Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

THREE HUNDRED AND SEVENTY-THIRD REGULAR MEETING, HELD AT THE ACADEMY OF MEDICINE, MAY 6, 1919

The President, DR. WALTER TIMME, in the Chair

PRESENTATION OF CLINICAL MATERIAL

DR. I. ABRAHAMSON presented six cases recovered from epidemic polioencephalitis and showed several photographs of the patients taken during the active stage of the disease. They all gave a history of epidemic influenza a short time before the development of the polioencephalitis.

Case I. Present illness dated back five weeks. Patient showed Parkinson face, attitude and gait, typical tremor of paralysis agitans, and cogwheel phenomenon. The condition had recently decidedly improved.

Case II. The status showed a typical Parkinson face, attitude and gait, tremor mainly on intention, cogwheel phenomenon, rigidity of the extremities, and bilateral facial weakness. There had been marked and constant improvement.

Case III. Epidemic polioencephalitis one month ago. Patient showed a lack of facial mobility.

Case IV. Encephalitis four weeks ago. Left the hospital almost well, but recently his head was commencing to move involuntarily, breathing felt hampered, head and neck felt rigid, head bent forward to the right, and there was a beginning masklike face and attitude of a Parkinson. Wassermann of blood and spinal fluid was negative.

Case V. Six weeks ago had influenza. Since then had dizziness, tinnitus, altered speech, diplopia, drowsiness, mental confusion, confabulation, spasmodic cough, and hoarseness. There was present an external ophthalmoplegia, partial drowsiness, deviation of tongue to the right, weakness of right face, and tremors. Had grown very stout since the onset of the illness. There was marked bulimia, polyuria, polydipsia, loss of ejaculatory power, and impairment of taste. There had been a slow improvement.

Case VI. Initial symptoms in January, 1919; headache, vertigo, gastric distress, weakness of extremities, especially left, herpes labialis, fever; at first languid, then somnolent, eyes staring, pains in extremities. There developed in the left leg a loss of control, then a tremor, and then control of left arm was lost and tremor developed. Following this his face became masklike, shoulder swing in walking was lost, he perspired freely, lost weight, there was difficulty in turning around quickly, retropulsion, marked slowness of all voluntary movements, and twitching of right toes. On examination he presented all the signs of a typical Parkinson syndrome; masklike face, attitude and gait, tremor, rigidity, and lack of associated movements. The course was progressive at first but recently there had been steady improvement.

Dr. C. C. Beling, of Newark, presented a recovered case of epidemic encephalitis which showed the following sequelæ: a general Parkinsonian attitude without muscular rigidity; fibrillary tremors of the tongue, face and lips; a highpitched voice; drooling of saliva; slowness and monotony of speech; paralysis of accommodation of ocular muscles; and double facial palsy, more marked on the right. The patient had suffered from epidemic influenza and pneumonia in October, 1918, from which he apparently recovered. On March 4 he again had influenzal symptoms, followed suddenly by diplopia two days later. On March 8 he developed a spontaneous nystagmus on both sides, more marked on looking towards the right. On March 10 he became somnolent and lethargic and went into a stuporous, semiconscious condition which continued for about three weeks. During this period several lumbar punctures showed normal cerebrospinal fluid but under increased pressure. On March 29 the outstanding symptoms were a cerebellar attitude; bilateral facial paralysis, more marked on the left; increased knee reflexes, the right more than the left; tendency to hyperextension of big toes on stimulation of the soles, more marked in the right; slight clonic movements in the left ankle and a well-marked Oppenheim reflex on the right; all sorts of irregular movements of the eyeballs without any definite isolated nerve palsy; slight ectopia of pupils to inner sides; abdominal reflexes absent except for a slight left epigastric response; marked retardation of speech; general motility; and anterograde amnesia for events of the previous two weeks.

CLINICAL EXPERIENCES WITH EPIDEMIC CENTRAL OR BASILAR ENCEPHALITIS

Dr. B. Sachs read this paper which was based on his experience with about thirty cases at Mount Sinai Hospital and fourteen cases seen in consultation. There were only three fatalities in the former group which was not a high percentage, but out of the fourteen cases five died with symptoms of marked bulbar involvement, which made the prognosis in these cases ominous.

The term *lethargic encephalitis* was ill advised; as Bassoe said, "it was not the encephalitis but the patient who was lethargic," and if one considered the predominance of central or basilar symptoms, a more appropriate name was not far to seek. The clinical symptoms were very striking; broadly speaking, after a brief period of drowsiness, headache, vertigo and general malaise, the patient passed into a state of lethargy associated with symptoms pointing to involvement of the cranial nerves. Meningeal symptoms were not obtrusive. The ptosis, ophthalmoplegia externa of the nuclear type, abducens paralysis, facial palsies which are often double, cerebellar attitude of the head, difficulties of phonation and deglutition, fibrillary tremors of the tongue, double spastic paraplegias, all suggested an encephalitis that might involve the brain stem from the larger ganglia to the pons and medulla oblongata. In addition to these symptoms, the forced attitudes, katatonic states, occasional impulsive laughter, masklike expression of countenance, even atrophies of the interossei muscles, led to the inference that the anatomic processes might involve the thalamus at one end and the cervical ganglionic cells at the other.

While awaiting definite proof of the nature of the virus, a study of which was being conducted by Strauss, Hirshfield and Loewe, one might lay stress upon the fact that in many of the cases and in the majority of those seen in consultation practice there had been a distinct history of influenza preceding the onset of the lethargic disorder by several weeks. If this sequence was not a mere coincidence, this epidemic encephalitis bore a resemblance to the postdiphtheritic palsies in its occurrence weeks after the initial infection. If this was a postinfluenzal infection, it was curious that previous epidemics of influenza had not been followed more frequently by similar disorders. The condition was so different from anything that had occurred before that it was impossible that it should not have been noted. The stupor was not the ordinary kind; the patient lay inert with closed eyes and expressionless face but was apparently aware of what was going on about him and readily responded by nodding to questions that were put to him in a low tone of voice.

There was as yet no proof that the course of the disease was influenced by treatment, but it was a fact that the cases that recovered had received careful nursing and feeding. The treatment was eliminative and purely symptomatic in the absence of a specific remedy.

The prognosis of the disease was determined largely by the site of the lesion. All the fatal cases in this series had been bulbar forms. The patients had not succumbed to the toxicity of the disease but from the fact that the cardiac and respiratory centers had been the site of predilection.

Many authors had been inclined to note a resemblance between the poliomyelitis virus and the virus of epidemic encephalitis, but it was a

point to remember that there was extreme toxicity and rapid development of the disease in fatal cases of poliomyelitis, while the fatal cases of epidemic encephalitis ran a course lasting from one to seven and eight weeks. The laboratory and experimental investigation would have to furnish conclusive evidence on this point.

REPORT OF THE COMMITTEE ON EPIDEMIC POLIOENCEPHALITIS (LETHARGIC ENCEPHALITIS)

Dr. I. Abrahamson, chairman of the committee, read this report, which embodied the number of cases and seasonal incidence of all known epidemics of this disease up to the present time. An important difference between the epidemics in foreign countries and in the United States lay in the fact that the lymphocytosis so common here had been the exception abroad. Various names had been given to this disease: epidemic encephalitis, lethargic encephalitis, influenzal encephalitis, pontobulbar encephalitis, epidemic stupor, epidemic botulism, etc. The name polioencephalitis was preferable for three reasons: The brain was mainly affected in most cases, the nuclear involvement dominated the pathologic picture, and it was a companion disease to poliomyelitis. It was recommended that the term lethargic be dropped principally because lethargy characterized only a minority of the cases. It was pathologically and experimentally established that epidemic polioencephalitis was a distinct disease and one which until recently had escaped differentiation and recognition. Reasons were cited which would seem to indicate that there was no direct relationship between influenza and epidemic polioencephalitis. The differential diagnosis between epidemic poliomyelitis and epidemic polioencephalitis was equally demonstrable. As to the clinical manifestations of epidemic polioencephalitis, syndromes of all kinds could be established. This was an infectious encephalitis, the infection originating in the nasopharynx, proceeding by the lymph streams to the basilar cerebral vessels, and then spreading through the brain stem, ganglia and cortex and also involving the upper cord, the meninges and the nerves. Those portions of the brain immediately supplied by the cerebral and basilar arteries suffered first and most severely in the majority of cases.

Dr. M. Neustaedter suggested that the best way to differentiate epidemic encephalitis from poliomyelitis would be to make the poliomyelitis neutralization test. A mixture of a one to ten serum of a convalescent patient and true poliomyelitis virus injected into a monkey would certainly show if the condition were poliomyelitis or not. If the disease were poliomyelitis the serum ought to promptly neutralize the virus and the animal remain well. This suggestion was made in view of the report by the reader of the paper that encephalitis had been produced in monkeys by injecting them with a filtered suspension of the scrapings of the nasopharynx.

Dr. Simon Rothenberg (by invitation) said that he thought that the most interesting phase of this disease was the variety of neurological syndromes that these cases presented. Although he had had eighteen or twenty cases, very few had shown identically the same picture. One simulated meningitis, another polioencephalitis with double facial palsy, a third was a cerebellar case, a fourth was of the dyssynergic cerebellar type of Hunt, a fifth was blind and showed marked choreiform movements, and finally two other cases developed a picture of encephalitis during an attack of influenzal pneumonia. These last two cases were seen at the hospital where the first symptoms of the encephalitis were observed. In these cases the Pfeiffer bacilli were found in a culture from the throat, showing what was believed to be a connecting link between influenza and encephalitis.

Dr. Smith Ely Jelliffe recalled a family in which three patients were taken ill apparently with influenza, one with influenza pneumonia who died, another with herpes, and the third with a typical mesencephalitic affection. That incident had been duplicated three times in his experience and it would be interesting if it could be shown that another type of encephalitis had now been isolated which could be differentiated from an influenzal encephalitis. The first case of lethargic encephalitis he had seen was in 1890, and it was fascinating if a new type of encephalitis might be differentiated from the others, pathologically differentiated, as might enable still further the separation of types. From the year 1400 on writers had accentuated the extreme variability of the different epidemic clinical manifestations which seemed to follow what were apparently clearly defined influenzal forms. It would be a great advance if one could get findings that would enable the separation of a new type producing mesencephalic manifestations.

Dr. J. Arthur Booth said that during the influenza epidemic of 1889 he had seen two cases complicated by eye symptoms in both of which there was an ophthalmoplegia externa, there being a bilateral ptosis and a paresis of the external recti muscles. There was an entire absence of undue somnolence and lethargy. In contrast with these he had seen three cases during the past winter in whom, with almost exactly the same eye conditions, there was the symptom of lethargy and in one a marked katatonic condition.

Dr. William M. Leszynsky referred to six cases that he had seen; one died at the end of two weeks; another was a physician whose particular symptom was twitching of the muscles in the extremities, but he made a complete recovery. Out of this small series only one died, all the others completely recovering. He had seen two or three cases which had been at first difficult to differentiate from that catatonic type of dementia præcox. In most of the cases grippe had occurred within a month previously.

Dr. Elbert M. Somers, of Brooklyn, referred to the reports of forty

cases of what were called central neuritis in the 1908 and 1909 issues of the New York State Hospitals Bulletin. These cases had presented various stuporous states, muscular tension, jactitations, and focal and mental symptoms. They were found after grippe, cancer, tuberculosis, and infective exhaustive conditions. Thereafter, central neuritis was accepted as a cause of death by the health department of the state.

OBSERVATIONS ON GUNSHOT INJURIES OF THE HEAD

Major Karl Winfield Ney, M.C., U. S. A., who was senior officer of the Neurosurgical Unit No. 1, A. E. F., in France (by invitation), read this paper, in which he emphasized the value of several procedures which experience in military cranial surgery had shown to be the cause of the immense reduction of mortality statistics.

The necessity for early surgical intervention had been as pronounced in the cranial field as in others and primary suture was the ideal treatment of all wounds. It had been found possible to effect this if all devitalized tissue could be excised before infection became established, and not only this, but certain wounds could be closed even when it was not possible to practice complete excision, and it was in this class that gunshot wounds of the brain had been placed. The surprising absence of sequelæ—meningitis, brain abscess, hernia cerebri, brain fungus, etc.—in these cases was most significant.

The two surgical principles of profound importance in this war, early and complete excision, gradually having found their places in the treatment of cranial injuries insofar as scalp and skull were concerned, the problem that then presented itself related to the removal of devitalized brain tissue. It was solved by Colonel Harvey Cushing who combined the two principles just mentioned, and removed the disorganized brain substance by catheter suction and irrigation, completing the operation by primary closure of the dura and scalp.

In the endeavor to do a speedy operation, in the early part of the war, the procedure was often incomplete and frequently subdural adhesions were torn and the subarachnoid space opened to infection. The necessity for speed was due to the profound effects of general anesthesia on these septic patients, and realizing this the speaker became convinced that the same operative procedures were possible under local anesthesia. With the use of the same he succeeded in avoiding the shock associated with general anesthesia and was able to pursue a more deliberate technic without pain to or interference from the patient, thereby insuring greater gentleness in manipulation as well as a more careful toilet of the wound.

A 1 per cent. novocain solution with a few drops of adrenalin chloride was used and complete anesthesia was produced in less than ten minutes, which was a saving in time over general anesthesia. The

infiltration of the scalp so reduced the bleeding that when the excision was made much time was saved in that only the larger vessels required clamping, and very often the field was bloodless. The hemostatic effect of the infiltration lasted always through the operation, or sufficiently long for clotting to take place in the constricted vessels, and in no case in this series did later hemorrhage occur. So satisfactory was local anesthesia in head operations that when there was a complication of other wounds the head operations were done under local anesthesia, and a general anesthesia given later for the debridement of other wounds. This applied not only to work at the front where complete operations were done, but it proved to be just as successful at the base hospitals where operative procedures were done for brain abscess and other infective conditions associated with retained foreign bodies, cerebral hernia, fungus, etc. Another great advantage in the use of local anesthesia was the possibility of coöperation by the patient in asking him to blow his breath or cough; by thus increasing intracranial pressure it was possible to quickly remove the disorganized brain tissue, blood clots and often foreign bodies. In brain abscess it had proved most valuable, not only as to location but as to the area through which it might be approached.

Local anesthesia was *par excellence* the method of choice in cranial surgery. There was no pain in the bone, the dura was insensible to cutting though it would not stand traction or rough handling, and the manipulations of the brain itself never reached the threshold of consciousness. The operative technic, however, was of the greatest importance. After shaving the head and making as complete a neurological examination as possible, the following procedure was adhered to by Neurosurgical Unit No. 1: complete excision of the scalp wound, avoiding contact with the lacerated edges; removal of the bone injury *en bloc;* evacuation of disorganized brain substance by having the patient blow against his closed lips or by coughing and also by catheter suction and irrigation; the detection of foreign bodies and bone fragments by catheter palpation and, after their removal, the instillation of dichloramine-T; and primary suture of dura and scalp. If the scalp defect was too large to permit suture without tension the defect was covered by some plastic procedure. This was in many essentials the technic advocated and used by Colonel Cushing. In ventricular penetrations it was found possible, after removing the disorganized brain substance, to remove foreign bodies from the ventricles by direct inspection, using small retractors.

Observations had been made on a series of seventy-nine cases, thirteen of which were fractures with intact dura, the remaining cases representing all degrees of brain injury associated with lesions of venous sinuses, ventricular penetrations, and combined lesions with frontal sinus or mastoid complications. Nine of the thirteen fractures with

intact dura were complicated with either extra- or intradural hemorrhage, producing compression symptoms of varying degree. The total mortality was represented by five deaths. Judging from reports on hand and from many cases personally examined by Major Ney, he did not believe that the late complications would be many. In the examination of about two hundred cases not a single one of abscess or cerebral hernia had been observed in any having had the complete early operation.

Dr. Alfred S. Taylor expressed his appreciation of the privilege of listening to Dr. Ney's splendid paper in which there were two things that impressed him particularly; the very great interest of the intrinsic material of the article, and the complete lucidity of the presentation of a complicated and difficult subject. The application of cranial surgery as performed in the army to civil life was plain, and it was also clear that one should apply local anesthesia more than one had been accustomed to do.

Dr. Harold Neuhof (by invitation) said that Major Ney had presented the best results that had been obtained in gunshot wounds of the brain of the American Expeditionary Forces. The earlier mortality figures in dural penetration were about 50 per cent. With the improvement in technic, as advocated chiefly by Cushing, this was reduced to about 30 per cent. and most of the surgeons were satisfied to have it at that low figure. Major Ney's was therefore a remarkable achievement. The technic he described was one that was followed, with a few variations, by all the teams under Cushing's command with parallel results. The principle had been to permit dural defects, even if large, to remain as such.. Dr. Neuhof himself believed that some form of dural repair was indicated and, when the tear was too large, he employed transplantation of fascia. Fascia lata was employed and entered into the dural defects. The results were satisfactory, both immediately and as later reported upon. Dr. Neuhof stated his belief that local anesthesia for operations on the head not only proved the method of choice for war wounds but would similarly prove the anesthesia of choice in head operations in civil life. Since his return he had done several operations on the head under local anesthesia, among them a bilateral suboccipital craniotomy as well as an osteoplastic flap in the parietal region, with results that encouraged its further use in head surgery.

Colonel Edwin Beer (by invitation) added a few words from his personal observations confirming Major Ney's statements. He declared that there was no doubt that these results were the best attained, but whether credit was due more to Major Ney's own skill than to the use of local anesthesia there was some question. Dr. Du Martell of Paris told the speaker that he did all his civil skull and brain surgery under local anesthesia and had even removed a cerebello-pontine tumor, which was a difficult procedure. The most remarkable thing, proven by Ney and others, was the discovery that the brain should be able to stand so

much contamination without disastrous effect. One could not possibly get absolute sterility in these war wounds, and yet the dura could be closed as well as one could close up the knee joint, showing that the vital processes could be trusted to cope with the residue of infectious material which could not be removed.

Dr. Sachs considered that the two most impressive points about this address were, first, the observation that local anesthesia acted as a hemostatic of the scalp; he had often thought that the large number of deaths in children following cranial surgery was due to loss of blood. Secondly, he was interested to learn that the surgeon's finger was not in future to be brought in contact with the brain substance and hereafter only the catheter would penetrate the depths of the brain. It would also be a great aid to the recognition of the presence of abscess on the operating table if the patient himself under local anesthesia could assist by exerting intracranial pressure through blowing out his cheeks, indicating the exact site and thus doing away with so much of the indiscriminative puncturing of the brain tissue that had been necessary in times gone by. It had been a delightful privilege to listen to this clear exposition of such valuable experiences and remarkable results as Major Ney had attained.

BOSTON SOCIETY OF NEUROLOGY AND PSYCHIATRY

Regular Monthly Meeting, March 20, 1919

The President, Dr. George A. Waterman, in the Chair

EXCLUSION IN DIAGNOSIS "SOUTHARD"

Dr. L. G. Lowrey commented on Dr. Southard's scheme of psychiatric diagnosis, which had erected eleven diagnostic groups for psychiatric material. Dr. Lowrey suggested the use of statistical inquiry as being of value in differentiation, but it lacked uniformity and hence was objectionable in those instances where static generalizations were desirable. Etiology he believed offered a better field for grouping. Southard's groups syphilopsychoses, hypophrenoses, epileptoses and pharmacopsychoses, made a reasonable appeal to him; he would reverse Southard's order of 5.6 as being more convenient for teaching purposes.

ENCEPHALITIS LETHARGICA

Dr. C. A. McDonald presented a case in brief with the signs as described by other observers. The lethargy was the beginning symptom and persisted until death. The oculomotor signs, diplopia and ptosis,

were pronounced. There were deep reflexes, but at no time was there any disorientation. There was moderate leucocytosis 10,000, but no spinal fluid anomalies. On autopsy there was marked cerebral vascularity but no meningitis. Histological examination is under way.

RECURRENCE AND DURATION IN MANIC-DEPRESSIVE PSYCHOSIS

Dr. John B. McDonald considered the very practical problems of recurrence and probable length of attacks in this group on a basis of the statistics in the Danvers State Hospital, analyzing case histories of 450 patients.

Thirty-six males and eighty females were under 25 years of age, *i.e.*, 25 per cent.; 44 males and 132 females were of mature years, between 25 and 40, 47 males and 100 females were between 40 and 60, 10 individuals were over 60. In the vast majority of cases the patients suffered from depression in the initial attacks, the average being two to one for both the mixed and manic attacks.

With initial manic attacks the average recurrent period was about six years, with initial depressions the recurrent period was longer, about ten years. The depressed attacks were uniformly longer than the manic attacks. When the initial attacks came on after forty years of age the prognosis was bad. These patients rarely recovered, for they rarely seemed to be able to realize they were incapable of adaptation and had really developed to their limit.

Recurrent attacks had occurred in 295 of the 450 patients. One interesting fact was that in 100 patients the recurrences were all of one type, namely depressions, whereas in 128 all of the attacks were manic. There were no alternations nor cycles obtained in the anamnesis of these patients. The complete cycle was comparatively frequent. To demonstrate this the author had 100 complete and satisfactory case histories at his disposal. In 78 of these alternation or variation of the attack occurred in one or more of the recurrences. In twenty-two the type of recurrent attacks was more or less uniform, two thirds of these were depressions. In these depressed attacks the extremes of interval between the attacks was extreme and there were no uniform principles that he could present to predicate these. Some women patients went as long as forty-four years between attacks—some two. After initial manic attacks the largest interval was twenty-eight years, the shortest two years. These were in women, for men the extremes were thirty-nine and one year respectively.

Dr. Stedman inquired relative to recurrent paranoid conditions.

Dr. E. B. Lane mentioned a case with a complete double cycle of one year's duration.

Dr. E. E. Southard raised the question whether one were consider-

ing a disease or a group of diseases and asked if heredity threw any light upon the problem.

Dr. MacDonald in closing said he considered the condition a group rather than an entity.

PHILADELPHIA NEUROLOGICAL SOCIETY

Regular Meeting, March 28, 1919

The President, Dr. J. Hendrie Lloyd, in Chair

HEMIHYPERTROPHY

Dr. J. W. McConnell presented an infant, born at 7 months, who, after average development up to two months of age, began to show an hypertrophy of the entire left leg. Careful examination showed that the leg, the buttocks, the labium, arm and face of the left side were larger than the corresponding parts of the right side. The tissues were firm, not edematous, the color and texture of the skin was natural and there was no venous engorgement. Neurological psychiatric status was normal. Heredity was negative. X-ray examination showed the hypertrophy to be limited to the soft parts entirely.

TRANSVERSE MYELITIS IN CHILD

Dr. Alfred Gordon presented a case of transverse myelitis in a child with the absence of the toe-phenomenon by Babinski's method but presence by other methods. Remarks.

Boy, aged nine, presents evident signs of rickets: scoliosis; one scapula larger and thicker than the other; curved tibia with convexity forward on both sides, more pronounced on the right. Prior to December, 1918, he was apparently in good health. At that time he complained of stiffness of the neck, became languid and apathetic. Rapidly he developed a weakness in the legs and had difficulty in walking. At the same time difficulty of micturition made its appearance.

At present the paralysis is not complete, as the patient is able to stand up when supported and to move his limbs when in bed, more on the left than on the right side. The knee-jerks are increased on both sides. Ankle-clonus is present and very marked on both sides. Babinski is absent on both sides, but the paradoxical reflex is present and distinct on both sides. Oppenheim's reflex was also distinct on both sides, but presently is obtainable only at times. Shäfer's sign is persistently present. Sensation to touch and pain, also temperature, is diminished from the toes up to the knees. The cremasteric reflex is much diminished on the left side.

The sphincter of the bladder is disturbed: from retention the condition changed to imperative micturition.

The patient is an illegitimate child. His mother is insane and her father was of violent disposition, having committed murder for a very slight offense.

The literature abounds in examples of this kind. There are cases in which irritation of the plantar surface produces extension of the great toe, but pinching of the thigh and abdomen produces flexion of the same; cases of paraplegia, such as reported by Almeida and Espozel, in which Babinski's sign is positive, but negative after Esmarch's band had been applied and then removed; cases in which at first there was flexion and immediately afterwards extension of the big toe. This phenomenon was observed in cases of cerebrospinal meningitis, of Brown-Séquard's paralysis, in cases of a lesion at the level of the seventh cervical vertebra. Guillain and Barré observed flexion in the ventral position and extension in the dorsal position of the patient. London in a recent contribution (Presse Médicale, 1917) reports a large series of cases in which the above mentioned variations of response in the great toe or all the toes have been evident. He concludes with the following remark: "The procedure of producing extension of the great toe is not single; not only it varies from one individual to another, but it may happen that while all methods may be positive in one individual, only one may be present in another. In one case Gordon's method may give extension, while all other methods may be negative, etc. One cannot say that the toe-phenomenon is absent unless all methods have been used."

A CASE OF DISSEMINATED SCLEROSIS (?) WITH ASTEREOGNOSIS

Dr. Alfred Gordon presented the case of a man, 23 years of age, laborer, who commenced to feel various paresthetic disturbances, also developed a tremor in his four limbs. The tremor disappeared at the end of several weeks, but the paresthesia remained. Six months ago he commenced to suffer from headache and diminution of vision, also from pain in the legs.

Examination reveals a fairly well advanced secondary optic atrophy in the right eye (the left eye was enucleated in childhood). Pupil is normal. Visual activity 8/200. The visual field is not contracted (Dr. LeFever). The gait is somewhat spastic. Ankle-clonus on the left. Babinski on both sides. There is occasional incontinence of urine at night. Sensations: Superficial sensibility (touch, pain and temperature) is intact. The deep sensibilities are intact with exception of compass sense and stereognostic sense: at a distance of about two inches the two points of the compass begin to be distinguished as separated points;

below that space—as one single point. Astereognosis is distinct and marked, especially for small objects, in the left hand and sometimes there is difficulty of recognizing objects placed in the right hand. The senses of position and pressure are recognized by the patient. It seems therefore that stereognosis is not dependent on superficial and other deep sensibilities, but it is a sense apart. Moreover, the patient is fairly well able to recognize the form and consistence of objects, but is unable to name them. Asymbolia therefore must be dissociated from astereognosis, which deals only with form and consistence of objects. The patient gave no history of venereal infection and the Wasserman reaction is negative.

As to the diagnosis, in spite of the absence of nystagmus and staccato speech, multiple sclerosis forces itself. We probably deal here with disseminated foci of sclerotic nature in various portions of the central nervous system. The optic atrophy, the astereognosis (pointing to the parietal lobe), the spastic paraplegia—all indicate the probability of the disseminated sclerotic processes.

NEUROSYPHILIS WITH SEVENTH AND EIGHTH NERVE INVOLVEMENTS

Dr. J. Hendrie Lloyd presented Case 1 through Dr. Lewis Fisher. A bilateral facial palsy in a colored man of 23 who had a chancre six months previously which had been treated by two doses of arsenobenzol approximately a month after infection. The latter part of December, 1918, he began to have headaches which were severe and continuous and also tinnitus and vertigo. In January he developed a bilateral facial palsy, more marked on the left side and he noted he staggered. The facial palsy was peripheral in type involving all branches. Other cranial nerves, save the vestibular and auditory were intact. There was some deafness and loss of vestibular response to turning and caloric tests, but definite vertigo after turning. The knee-jerks were unequal, the left Achilles jerk absent. The blood and spinal fluid Wassermann were positive, cell count of fluid 780 per c.mm.

Case 2. Male, 48, with chancre in September, 1918. Mixed treatment and five doses of arsenobenzol with refractory chancre and lymphatic enlargements. In March, 1919, patient's gait became staggering, with tendency to fall to the left. Deafness of the right with later deafness in the left ear, preceded by troublesome tinnitus. There was a double optic neuritis, beginning and some paresis of the left facial upper branches. The right vestibular was markedly, the left slightly involved. Both turning and caloric tests were unresponded to. The knee reflexes were active, $l > r$, the left Achilles, as in Case 1, was absent. The gait was ataxic and there was a Romberg. The blood Wassermann was negative, the spinal fluid $++++$.

Dr. Fisher referred to the anomalous vestibular reactions. As a result of experiences in testing some 60,000 individuals for aviators it had been established that a nystagmus and vertigo persisted some 25–30 seconds aften ten revolutions in the turning tests. Here two reactions usually coincide because of the movement of the endolymph against the receptors within the labyrinth. The pathways to the ocular muscles unto the cortex pursue different pathways only within the brain stem. Hence he was inclined to regard the lesion in Case 1 as possibly not entirely peripheral because of the dissociation of the vertigo and nystagmus reactions. Such dissociation has been noted for peripheral lesions, however, he stated. Furthermore a third dissociative factor was the intact hearing, which in peripheral (meningeal pressure) lesions is apt to impair both auditory and vestibular functions. Hence possibly a central involvement of the pathways near Deiter's nucleus might better account for the findings in Case 1.

In Case 1, the implication of all types of reaction argued for a peripheral lesion. In response to Dr. Gordon's inquiry relative to the utility of the Babinski galvanic reactions. Dr. Fisher said he considered the electrical tests too diffuse in their action, involving receptors, connectors and even the central synapses in the midbrain possible. In testing out labyrinthine and retrolabyrinthine functions these tests were useful.

Dr. Mills believed the lesion could be at the juncture of the fibers with the brain stem. Dr. Lloyd suggested the same conclusion.

CEREBELLOBULBAR POLIOENCEPHALITIS

Drs. Chas. K. Mills and George Wilson reported six cases in this paper, three of which occurred during or after recent influenza prevalence with influenzal symptoms preceding the neurological syndromy. Three were observed during the time of a poliomyelitis epidemic. In five the encephalitis was focal, in one the cerebellum and medulla were simultaneously involved. The authors commented upon the paper of Batten in Brain, 39, 1916, which covered most of the clinical features observed by them.

Case 1. A three-year-old child, with influenza, followed by pareses in the lower extremities. Three months later a renewal or reinvolvement with cerebellar signs, asynergia of both extremities, alternating strabismus and nystagmoid movements. Gradual recovery.

Case 2. A thirty-year-old man with influenza and vomiting, headache, diplopia, cerebellar gait. Paralysis of right sixth and seventh nerves, horizontal nystagmus. After one month recovery.

Case 3. A girl eleven years of age was febrile, for a week, had headache, cerebellar (?) gait and stance, paresis of the muscles of abduction of legs, with steppage gait, and neuritic pains in the legs,

trunk, arms and head. Recovery took place in a few weeks. The diagnosis seemed poliomyelitis of cerebellar and neuritic type.

Case 4. A thirty-year-old woman who was suddenly taken faint and became numb in the right side of the face and in the right arm and leg, with slowly developing hemiparesis with increased reflexes of the right side. After six weeks there was added left-sided external rectus and facial palsy, paresis of trigeminus, and left-sided deafness. Corneal sensibility was diminished. There was also vertical nystagmus, loss of lateral movements of the eyes, artereognosis and loss of position sense. Right-sided impairment of touch, temperature, pain and postural senses. Right-sided ataxia in both extremities. Right-sided facial hypidrosis. Gradual improvement for years save right-sided facial palsy more marked in frontalis and orbicularis. Diagnosis was involved but authors resolved it to poliomyelitis of cerebellar bulbar type. No Wassermann record is reported.

Case 5. Five-and-half-year-old boy with sudden afebrile (?) attack with nausea, vomiting persisting several days. There then developed right-sided facialis paresis, diplopia, awkward station, and some implication of the fifth and eighth (vestibular). Right-sided tremor, adiadokokinesia and dysmetria, with increase in deep reflexes. Left-sided foot clonus and Babinski; tumor suspected. Not found. Fatal; no autopsy.

Case 6. Girl seventeen years of age who suddenly began to see double with headache and vomiting. She became lethargic with slight rigidity. There was paralysis of left rectus. Motor behavior slow and deliberate. Febrile course and death on tenth day. Microscopical examination showed signs typical of the lethargic encephalitis cases.

LETHARGIC ENCEPHALITIS

Dr. P. N. Bergeron presented the case of a man of thirty-four, who for the past eight or nine years had some attacks of rhinitis and pharyngitis. In October, 1918, he had a severe attack of influenza lasting 10 days, from which he made a good recovery. In March, 1919, he woke and found his vision was impaired. Examination showed 20/40 vision in both eyes with congested fundi. He was a little heavy but otherwise not sick. He began to get weak and in a few days was confined to bed, very dull and apathetic. He apparently slept all of the time, responding intelligently to questions, but sinking back into his lethargy. A slowed pupillary reflex, temp. 100° F. and pulse 86, with slow movements of the muscles of eyes, eyelids, face and tongue were the only signs five days after inset. Incontinence of bladder and rectum was thin, added with anesthesia to these next day. The lethargy deepened, involuntary general tremors occasionally took place. Rigidity of the limbs began to be prominent. Irregular pupils and a right internal

strabismus developed. In about ten days there seemed to be some lessening of the lethargy, the rigidity of the arms and legs was more marked, the temperature rose to 103° F. the pulse to 160. Respiration 60 and 14 days after the initial symptoms the patient died. Blood examinations showed a slight leucocytosis, 12,400. Otherwise entirely negative to culture or other positive signs. Spinal fluid was clear, 13 cells only. No Wassermann and no growths.

INFLUENZA AND INTRACRANIAL LESIONS

Dr. S. F. Gilpin reported two cases of brain lesion from influenza. (1) Male of 57 who had had influenza in October, 1918, from which he made a good recovery. During December he had pains in the back of the head and across the forehead and back of the neck. He had five osteopathic treatments after the last of which he became dizzy, vomited, was unable to walk and went to bed. Diplopia then persisted for a week. At time of examination he had unequal pupils, which reacted slowly to light, some ptosis of right eyelid, diplopia had disappeared. Some difficulty in swallowing. Negative blood and fluid to Wassermann, 5 cells.

Case 2. Male, 25, who had influenza in October, 1918, followed by much prostration. He then developed headaches, booming noises in the ears and beginning dimness of vision which was due to an optic atrophy. Blood and fluid tests were negative for syphilis.

Dr. Spiller spoke of three cases of lethargic encephalitis with characteristic symptoms and expressed the opinion that lethargic encephalitis could be of influenzal origin, without any necessary gastrointestinal or pulmonary symptoms.

Dr. Dercum said that lethargic encephalitis was probably a sequel of the grippe. The recovery of the patient from the initial attack was probably incomplete and insufficient immunization having occurred, a new phase of the infection begins later.

Dr. Gordon reported three cases of lethargic encephalitis and expressed the belief that this was not a new disease.

CHICAGO NEUROLOGICAL SOCIETY

Regular Meeting, March 20, 1919

Hugh T. Patrick, President, in the Chair

EXPERIENCES WITH THE AMERICAN RED CROSS IN ITALY

Dr. Ralph C. Hamill, who had served several months, gave some interesting personal experiences of the work and the opportunities.

TWO OPERATED CASES OF EXTRADURAL TUMOR COMPRESSING THORACIC PORTION OF CORD

Drs. Carl B. Davis and Peter Bassoe presented first a case of paraplegia of two years standing in which there was loss of all sensation below the level of the fifth thoracic segment. At the same level of the back a subcutaneous tumor could be both felt and seen. Upon operation there was found and removed an hour-glass-shaped lymphosarcoma, partly intraspinal and connected with the external tumor through two intervertebral foramina.

The patient was a female of 49, who three years before she was first seen by Dr. Bassoe had complained of pain in the scapular region and radiating around the chest. This pain increased and some months later disturbances of walking manifested themselves and gradually grew worse. There was first merely unsteadiness of gait, then weakness of legs. Walking grew more difficult, so that crutches had to be used and at last the patient became bedridden. An ascending numbness of the toes set in about this time. Sphincter control was lost when patient became bedridden. The soft tumor in the back was accidentally discovered about six months before Dr. Bassoe saw her.

Examination revealed in the lower extremities total paralysis with marked knee and ankle clonus and positive Babinski sign. There was also extreme rigidity with an involuntary movement in response to the lightest touch. There was also complete paralysis of the abdominal and lower thoracic muscles. Below the level of the fifth rib all sensation was lost. There were no disturbances of the upper extremities. None of the cranial nerves. The palpable tumor in the back muscles lay 1 cm. to the left of the fourth and fifth thoracic spines. Roentgen ray showed no abnormality of the spine. The spinal fluid was under low pressure and clear. Cell count was 10. Nonne-Apelt globulin test was weakly positive; so also was the Lange test (0112211000). The patient's appearance was anemic, but the blood count showed hemoglobin 81 per cent.; red blood cells, 4,540,000; white cells, 9,100; systolic pressure, 120, diastolic, 80. No glands were palpable. Visceral, rectal and vaginal examination negative, except for a slight rectocele.

Operation, which was performed Jan. 27, 1919, revealed the observed tumor as of a glistening appearance, 6 by 3.5 cm.. It was followed to the intervertebral foramina above and below the fourth thoracic vertebra, the laminæ of the upper five thoracic vertebræ, when the tumor was found to be continuous in growth with an extradural growth on the left posterior of the cord. This was 4.5 cm. long by 1.7 cm. wide by 1 cm. thick. It separated readily from the dura, leaving a smooth surface.

The tumor both in its intraspinal and its extraspinal parts was found to be lymphoid in character and to belong to the class of lymphosarcoma described by Kundrath and later by MacCullum. Recovery did not take place and the suspicion of other such tumors could not be dismissed, as no necropsy was performed. Bedsores could not be avoided and also after a few days all reflexes below the level of the lesion were completely lost, the rigidity of the legs had disappeared and there was a complete picture of a total transverse lesion. Bronchopneumonia developed and the patient died March 7, 1919.

The second case reported was one of paraplegia of a year's duration with extensive remission. There was loss of all sensation below the eighth thoracic vertebra. The legs were spastic and there was little pain. An extradural fibroma was removed after which motion and sensation returned.

In the summer of 1917 the patient, a boy of 15, had developed an almost complete paralysis of both legs, which lasted about a month. In the spring of 1918 the symptoms had gradually returned until in October both legs were again paralyzed and spastic. There had been at the beginning pain in both sides of the lower chest. Later the pain was only slight. There was no sphincter disturbance.

Examination was made in November, 1918. Both legs showed a spastic paralysis with great rigidity when handled. The upper thoracic muscles contracted. There was bilateral Babinski sign, ankle and knee clonus and Beevor's sign. The abdominal and cremasteric reflexes were wanting. There was complete loss of touch and pain sensations below the costal margins and partial loss below the level of the sixth rib. Roentgen ray gave no spinal abnormalities. Spinal fluid showed a cell count of 7, weakly positive Nonne-Apelt and Lange (0112110000). Wassermann was negative. A brief antisyphilitic treatment was without result.

Laminectomy was performed and an extradural tumor, as large as the end of the thumb, was removed at the level of the seventh thoracic vertebra. This was found to contain a cavity partly filled with clotted blood which, it was thought, might explain the separate attacks of paraplegia. The tumor proved to be a fibroma. Sensation soon returned and after three weeks slight voluntary motion in the left toes. At the last report the patient was still unable to walk and the legs remained spastic, though there is continued improvement.

Dr. Bassoe also reported the recovery of two patients operated on for extradural fibroma compressing the cord (Jour. Nerv. and Mental Dis., 42: 736, 1915). Case 1 had recovered without incident. Case 2 with a large hour-glass tumor partly external to the spine was operated upon again four years later because weakness of the legs had developed. All visible portions of the tumor were removed and the patient completely recovered.

Dr. H. N. Moyer reported a similar case of an exostosis at about the same level. It was about the size of the thumb and had pressed itself against the cord. The symptoms had been similar and very gradual. They had begun with weakness of the legs, which had after three or four years progressed to a final complete paraplegia. The tumor was removed and the compression of the spinal cord corrected. The patient after fifteen years still showed a distinct spastic gait, a slight tilting to the toes, but no fatigue symptoms and the clinical tests showed no incoördination or sensory disturbance. This stationary condition had been reached after about a year and a half of improvement following the operation. The patient had since married and born a child.

THREE CASES OF GLIOMATOUS CYST OF CEREBELLUM WITH PRESENTATION OF SPECIMENS

Dr. George B. Hassin presented first a case of a boy of 17 who had suffered with continuous headache for six weeks in the occipital region before admittance to the Cook County Hospital, April, 1917. There had been vomiting many times a day for three days associated with dizziness. The headache, vomiting and vertigo were the chief symptoms on admission. Examination showed normal mentality, reflexes, general sensi and a well nourished boy physically. The abdominal organs, chest organs and genital organs were normal. There was no disturbance of the reflexes nor general sensibility. The pupils and ocular motor apparatus were normal. The right disk was slightly blurred; the left was normal. There was slight paralysis of the lower right half of the face and the tongue deviated to the right. Examination of the urine and serums gave negative results. So also with Roentgen-ray examination. The posture was confined to the lying on the left side with the legs and head bent, as vertigo and vomiting accompanied any other position. The patient died about five weeks later.

Necropsy revealed a small encysted glioma about the size of a bean, very vascular and hemorrhagic, in the left cerebellar hemisphere. In the cyst there was about an ounce of sterile hemorrhagic fluid. The left cerebellar lobe was largely destroyed, the vermis pushed to the right and compressed. The right cerebellar lobe was normal. There was no hydrocephalus and the cerebral tissue was unchanged. This

glioma must have been of much longer duration than the symptoms of illness. It probably existed in a harmless state until a hemorrhage took place into the growth and the cyst was formed. The seventh and twelfth cranial nerves were also involved in this, as in the other cases reported.

Jackson, Smith, Gordon and others have described forced position in cerebellar lesions as being due probably to release from pressure of the fourth ventricle and of the opposite healthy side.

The second case was that of a young man of 21 who had suffered for five months from frontal headache, dizziness and vomiting before seen by Dr. Hassin. The patient had been totally blind for two months and suffered also severe pain in the neck, was unable to walk and there had been two convulsions with unconsciousness.

Examination revealed a semiflexed fixed position on the right side with the neck rigid and very painful on movement. The mental state was normal and speech unaffected. There was no ataxia nor tremor. There was paralysis of all the muscles of both branches of the third nerve except the levator palpebræ superioris, and paralysis of the right sixth nerve. The pupils were rigid to light and accommodation. The fundi showed marked bilateral papillodema. Walking was rendered impossible partly because of the blindness and also because of the great weakness. The right patellar and Achilles reflexes were wanting. The pulse ranged from 96 to 160. A decompression operation a month later was followed by death.

Necropsy revealed a glioma in the left cerebellar hemisphere and a cyst which involved the vermis and extended to the opposite hemisphere. There was no hydrocephalus nor any other abnormality of the brain tissue otherwise. The cyst did not communicate with the fourth ventricle.

The third case had had headache for one year and for a month dizziness, gradual loss of eye sight, difficulties in walking and in talking, the latter complicated by a recent marked salivation. He had had several severe convulsions. Examination showed some exophthalmos with ptosis, and a bilateral edema of the disks. There was dysarthryia and nystagmus. Other cranial nerves were intact. In the upper extremities there was some ataxia and in the lower a marked Romberg, swaying gait, and active patellar and Achilles reflexes of the left side. The superficial reflexes were unchanged.

On autopsy there was found a glioma and a cyst of the left lobe of the cerebellum in its lower half, and some hydrocephalus of the left ventricle.

The author commented on the fact that in all three patients there was an absence of the usual cerebellar signs insisted upon by Babinski as characteristic of lesions of this organ. There was no dysmetria nor adiadokokinesia. Ataxia and nystagmus were slight, even in the one patient in which the phenomena occurred.

Dr. L. L. Meyers, to whose work upon the cerebellum Hassin had referred, said that some of the symptoms were undoubtedly indirect ones and should be so interpreted. The first patient who lay upon the left side showed a modified form of the rolling motions known to be an indirect symptom of cerebellar disturbance, rather than a distinct cerebellar symptom. The vestibular system was uniformly involved, either the nuclei, the nerve or the posterior longitudinal bundles, rather than the cortical stations in the cerebellum itself.

Critical Digest and Review

WAR NEUROSES AND PSYCHONEUROSES

By Drs. Charles R. Payne and Smith Ely Jelliffe

(*Continued from Volume 49, page 238*)

Visceral Disorders. The visceral complaints which may result from emotion are extremely varied and there is no system of the human body in which emotion may not find expression. Those most often affected are the digestive, cardiac and respiratory systems.

Vomiting is a frequent symptom particularly at time of onset of the neurosis. This type usually disappears after a few days or weeks. A more persistent type is the chronic hysterical vomiting which has a much deeper etiology.

Tachycardia is a common symptom in the circulatory system. It is usually accompanied by other psycho-neuropathic manifestations. *Tracypnea* and other respiratory symptoms are of less frequent occurrences.

Enuresis is a fairly common urinary symptom.

One of the most radical and important of the studies on war injuries lying within the domain of our review is that of Babinski and Froment. By reason of its striking character we purpose giving an extended résumé of this study, making comments from time to time as the material seems to offer the opportunity.

The earlier chapters of the book are taken up with Babinski's concept of pithiatism—the distinctions between it and what heretofore has been termed hysteria. There is little need to review this section of the work as Babinski's conception has been placed before neurological readers for many years. In the ten or more years in which the Babinski formula has been used, "pithiatism is a disease caused by suggestion and cured by persuasion," there has been no advance in his position and up to the present time no satisfactory dynamic definition has come from Babinski as to what is meant by "suggestion." As a pure static formula it means nothing, and it is chiefly because of its purely superficial attitude that it has not re-

ceived the support of workers not satisfied with a statement, without any energic content behind it. It is because of the essentially dynamic character of the Janet-Freudian developments that psychopathology has so profitably followed the lead of Janet and then pursued the lines opened up by Freud.

Turning from this concept of hysteria to Part II of this interesting book,[1] the author's own discussion of the reflex nervous disorders is here given verbatim.

"Among the nervous phenomena observed in the neurology of war we must isolate," say Babinski and Froment, "a group of fairly numerous cases which present special clinical characters and which possess a definite autonomy. They include contractures, paralyses or paretic states which develop after traumatism. The motor disorders are not accompanied by any of the signs which are characteristic of typical organic affections, such as lesions of the central or peripheral nervous system, or lesions of the large vessels. They resemble in some features hysterical manifestations, inasmuch as the lesion which has caused them appears sometimes very slight and out of proportion to the resulting disturbance of function; they tend to spread beyond the limits of any known anatomical area; they show little response to treatment, and, unlike pithiatic phenomena, resist the influence of counter-suggestion.

"They are distinguished from hysterical manifestations by various symptoms, all of which may not be present at the same time. In addition to contracture and paralysis, which may be associated though usually situated in different segments of the limb, the complete syndrome presents: muscular atrophy, exaggeration of the tendon jerks, changes in the cutaneous reflexes, which may amount to actual loss, hypotonus, mechanical hyperexcitability of the muscles with slowness of the muscular contraction, quantitative changes in the electrical excitability of the muscles (increase or diminution in excitability without R.D.), mechanical and occasionally electrical increase in excitability of the nerves; disturbance of objective and subjective sensibility (anæsthesia and pain); disturbance of thermotaxis (especially hypothermia) and vasomotor control (cyanosis, salmon-pink tint, diminution in the amplitude of the oscillations at the periphery of a limb when the atmospheric temperature is low); secretory disorders, and, lastly, trophic disorders of the bones, skin, hair and nails.

"These various symptoms form combinations which differ ac-

[1] Babinski & Froment, Hysterie, Pithiatisme et Troubles Nerveux à Ordre Reflex. Masson et Cie, Paris, 1918. English translation available. D. Appleton & Co.

cording to the number, mode of association, and actual importance of each of the constituent elements. They give rise to various clinical types which, in spite of their differences, apparently belong to the same family and represent a nosological species. But while admitting that the pathogenesis is still unsettled, the disorders in question, whatever names they may receive, constitute a special group, halfway, as it were, between organic affections properly so called and hysterical disorders.

"These phenomena may be entitled *physiopathic*—a term intended to express the idea that, on the one hand, neither hysteria nor any other psychopathic state can produce them, and, on the other, that while indicating a physical and material disorder of the nervous system they do not appear generally to correspond to any nervous lesion which can be detected by the methods at our disposal."

This is the preliminary statement of the views held by these authors. They follow this by a sketchy discussion of the work of Hunter, Charcot and Vulpian on reflex contraction, as bearing in some manner upon their own further studies. Then follow their "new ideas."

"They were induced to take up the study of reflex disorders and to add some observations of their own under the following circumstances. Attention had first of all been directed to this study by the following case: In August, 1915, a soldier came to the out-patient department at La Pitié suffering from a very marked limp with outward rotation of the foot following a wound of the upper and outer part of the right thigh. Muscular atrophy of the thigh, without obvious disturbance of the electrical reactions was found. Examination of the hip showed a slight limitation of the movements of flexion and internal rotation of the thigh on the pelvis, which did not appear to be related to the motor disorder. The X-rays showed no lesion of the joint. The right knee jerk seemed to be a little more brisk than the left, but the asymmetry was doubtful. The tendo Achillis reflexes were normal and equal. There was no ankle or patellar clonus. On the other hand, the affected limb showed marked and persistent vasomotor disturbance and a very definite hypothermia.

"Owing to the severity of the vasomotor disturbance we thought that we were justified in asserting that these symptoms were not due to hysteria and were probably connected with the so-called reflex phenomena. But the tendon reflexes in the affected limb were not remarkably exaggerated, and therefore the most characteristic sign

was missing. There were reasons for supposing that the vicious attitude and muscular rigidity might be due to mere tendinous contractures.

"To settle this question we thought it advisable to put the patient under chloroform. It was all the more justifiable in this particular case to employ any method likely to establish an exact diagnosis, as the patient had been considered by several medical men as guilty of exaggeration and even of simulation. Examination under chloroform showed the existence of a slight tendinous shortening, but it also enabled us to see that the vicious attitude and stiffness were due, in great part at least, to a contracture.

"Moreover, during the stage in which the muscles were completely relaxed, after all the other tendon reflexes and the cutaneous reflexes were abolished, the affected side showed a very definite exaggeration of the tendon reflexes and even a patellar clonus which lasted for an hour after the patient had recovered from the anæsthetic.

"Since then we have examined under the same conditions a certain number of wounded men presenting symptoms of the same kind, and we have several times noted *during narcosis this peculiar exaggeration of the tendon reflexes in the affected limb.*

"We were thus placed in possession of a new symptom, or, at any rate, of a method which enabled us to detect increased excitability of the tendon reflexes under normal conditions.

"In some of the patients the symptoms which we have just described was absent, but others equally significant were found: *the contracture disappeared during deep anæsthesia only;* it was still present at a period when the conjunctival reflex was abolished, and stimulation by pricking the sound limb did not cause any reaction; the return of the contracture was simultaneous with that of the tendon reflexes, and sometimes preceded the first signs of returning consciousness by twenty to twenty-five minutes. Moreover, *the effort at reduction during complete anæsthesia and after disappearance of any conscious reaction produced a spasmodic movement* which exaggerated the vicious attitude; this was particularly the case in several instances of flexor contracture of the leg.

"After making careful investigations into the changes in the reflexes and muscular tonus at different periods of chloroform narcosis, we directed our attention to the reflex nervous disorders following traumatism of the limbs, which were so often misinterpreted at the beginning of the war.

"They showed that a close examination should be made before

attributing nervous symptoms to hysterotraumatism, and that the absence of an exaggeration of the tendon reflexes in the waking state by no means justified such a diagnosis.

"At the time when we were pursuing these researches numerous cases of difficult interpretation presented themselves, and these gave rise to a series of publications.

"H. Meige, Mme. A. Benisty and Mlle. Lévy gave the name of 'congealed hand' to a puzzling form of functional impotence, and also drew attention to the existence in these cases of a peculiar psychopathic state which became grafted on an initial organic condition. Claude described side by side with hysterical phenomena 'some similar manifestations which it is very difficult to classify,' consisting of painful contractures which were localized and very persistent. Were they hysterical or reflex contractures? 'We think,' he writes, 'that the contracture is of reflex origin, being caused by a nervous lesion or a sort of defensive movement, and that this attitude has subsequently become fixed and rendered permanent by a psychological mechanism resembling that of hysterical manifestations.' Sicard gives the name of 'acro-contractures' or 'acromyotonus' of the upper limb to contractures of the hand in various positions which resist all treatment, are aggravated by massage and electricity, and show only a slow and partial improvement as the result of very gentle procedures. 'The pathogeny of such contractures,' he writes, 'remains obscure. . . . Hysteria is not concerned in their production.' We may also mention the publications of Duvernay, dealing with post-traumatic 'psychopathic and reflex contractures,' which present the same characters; of Léri and Roger, and of Ducosté, on contractures following lesions of the peripheral nerves.

"The impression derived from all these studies is that in a large number of centers of military neurology observers have been struck by the frequency of certain conditions, such as fixed attitudes and contractures which differ from the usual run of cases and which it has been impossible to classify.

"Are they examples of hysterical manifestations, or are they phenomena of another kind? Such is the question which interests all these writers, and which they answer in different ways. It is quite obvious that they have no conclusive criteria to support their impression. Most of them have been surprised by the persistency of the symptoms and their great resistance to psychotherapeutic measures. Although some for this reason reject the hypothesis of hysteria, not one of them compares these cases with the descriptions given by earlier writers.

"The study of a patient presenting a type of paralysis hitherto undescribed gave a new direction to our researches. The case was met of a man suffering from flaccid paralysis of the hand and fingers following a bullet wound of the second dorsal interosseous space. Vasomotor disorders and a pronounced hypothermia were found. There was a little diffuse and non-systematized atrophy of the muscles of the hand, forearm, and upper arm without R.D. The tendon reflexes on the affected side were preserved. The hypothesis of an organic affection of the centers or peripheral nerves had to be abandoned in the absence of any sign characteristic of such lesions. Were they, then, to be regarded as hysterical or simulated phenomena, as some had supposed?

"On subjecting the patient to a methodical examination, in the search for some sign which would help us to solve the problem, we were struck by the following symptoms: a remarkably intense *hypotonus* (especially of the wrist), which equalled if it did not actually exceed the hypotonus seen in paralysis following lesions of the deep nerves; very marked *mechanical hyperexcitability* of the muscles of the hand and forearm, with *slowness of the muscular contraction,* and lastly *electrical hyperexcitability of the muscles with premature fusion of the faradic contractions.*

"Objective signs which were independent of the will had thus been discovered, and consequently we felt convinced that these disorders were not due to hysteria.

"On making a fresh examination of the patients whom we have already discussed, and in whom observation during anæsthesia had shown the undoubted existence of a disturbance of the spinal centers, we found the signs which we have just described, especially mechanical hyperexcitability with slowness of the contraction. They were also found in several patients who presented those peculiar types of contracture which had attracted the universal attention of neurologists (congealed hand, acro-contracture, and accoucheur's hand).

"The existence of the mechanical hyperexcitability of muscles, described by us in this group of cases, has been confirmed by later observations made by Marie and Foix and by Sicard.

"On comparing these various groups of paralyses and contractures with one another, whose common attributes were that they were of traumatic origin and could not be attributed to an organic affection of the nervous system or to hysteria, we were led to establish a close connection between them. As some seemed undoubtedly to be due to a disturbance of the spinal centers, there were reasons for supposing that the others were of the same nature.

"Lastly, we noticed that vasomotor and thermal disorders usually occupied an important place in the symptomatology of all these cases, and that they were practically constant, although there might be differences in their degree of intensity. We showed that the affected limb was abnormally sensitive to the influence of the atmospheric temperature, which implies a *local disturbance in the mechanism of vasomotor and thermal control.*

"Sphygmometric and oscillometric investigations, which were chiefly carried out in collaboration with Heitz enabled us to detect the existence of a vascular spasm, which was specially marked towards the periphery. These phenomena had hitherto escaped attention.

"We were also impressed by *the connection of vasomotor and thermal disorders with disturbance of the mechanical excitability of muscles,* as shown by muscular hyperexcitability and slowness of the muscular contraction. These last modifications formed the object of a minute enquiry by means of the *graphic method* in collaboration with Hallion.

"It is clear from the account which we have given that these various forms of contractures and paralyses, as to the nature of which there had at first been some doubt, are accompanied by objective signs of which we have endeavored to estimate the value in our description. We have given them the name of 'reflex' paralyses and contractures, because they resemble the amyotrophic or so-called reflex paralysis of which Charcot and Vulpian have given such an excellent description. Moreover, some of the phenomena which we have mentioned (observations during anæsthesia and character of the vaso-motor disturbances) supply new arguments in favor of the 'reflex' pathogeny. In any case, our researches prove that there undoubtedly exists a *group of motor disorders of physiopathic nature,* which must be distinguished both from organic phenomena properly so called and from hysterical or pithiatic phenomena.

"The pathological topic which we are studying formed the object of a general discussion at a special meeting of the Neurological Society on April 6, 1916, following a report made by one of us dealing with the characters of so-called functional motor disorders. The neurologist present accepted the essential parts of our opinion, as is shown by the conclusions adopted unanimously in closing the discussion:—

"'*Regarding the matter exclusively from the standpoint of a medical board we have to distinguish among so-called functional motor disorders (i.e., motor disorders with none of the objective*

signs characteristic of organic affections of the brain, cord, or nerves, or of vascular lesions)—

"'1. Hysterical or pithiatic disorders properly so called.

"'2. Nervous disorders quite distinct from the preceding which are associated with real physiological disturbances of which the mechanism is still a matter of discussion, but which may be grouped with the reflex disorders observed after osteo-arthritic lesions.'"

Babinski believes that such a nosological description avoids the confusion which followed upon the older conceptions which might be attributed to hysteria, exaggeration of tendon reflexes, vasomotor disturbances, thermic and trophic disorders. He fails however to consider that the same psychic causes which are operative in hysteria as he defines it may be those operative in producing these disturbances, only through other pathways than those which have long been obvious, the sensori-motor ones. Or in other words it may be stated that the psychical factors at work to produce the symptoms have at their command still lower reflex arcs than those of the sensori-motor reflex system. The reflex vegetative arc has not been sufficiently considered although this is possibly older in development than the more easily recognized sensori-motor reflex arc and its response and even the often observed reactions of the latter type really take place over such arcs. His contention that the contracture does not yield even in profound anesthesia merely adds weight to a fact that we are dealing here with a reflex which lies below the surface of stimulation of the sensori-motor reflex. The persistence of the reaction during chloroform anesthesia is in this way also no proof that we have not to do with hysterically, or better psychically, determined reactions. For it is not the entire self with its grades of psychic stimulus taking place on different levels of interest and active through the unconscious, which has been checked in its activity through an anesthetic. Anesthesia, even if profound, is only relative. It is not completely lethal but compatible with many forms of activity essentially vital and otherwise. Therefore even the exaggeration of the reflexes during narcosis would be due probably to the removal of distracting interests and therefore to greater dynamic expenditure along these deeper pathways still open to the energy discharge which is blocked elsewhere. And it is in such activity that the vegetative arc functions.

The fact moreover that ordinary suggestive or persuasive means, used with the more easily recognized hysterical disturbances, as these authors use the terms, have no effect upon these disturbances is also only further testimony rather than a denial that they, in part

at least, are still psychogenically conditioned. Of course they are not reached by the mental factors which deal only with the recognized conscious processes and interests. Hence the need for investigation and also for interpretation and clinical approach from the point of view of unconscious mentality. This is the reason that in many instances, as MacCurdy and others have reported, the discovery of unconscious mental factors and treatment through these has reached the very conditions or similar ones to those which Babinski and Froment cannot reach by their superficial psychotherapy.

Furthermore one might also criticize this work of Babinski and Froment from the standpoint of their failure to recognize the fact that real organic disorders may be limited to the vegetative pathway connections, and thus give rise to a number of their "trophic" syndromes. It has become a commonplace of war neurology to recognize that high explosive discharges give rise to a vast group of minute hemorrhagic or gas embolic lesions. These have occasioned atrophies, for instance, of the chronic poliomyelitic type (Aran Duchenne), etc. Similar microscopical lesions of the central gray matter and of the vegetative nuclei in the lateral recess have been seen and the symptomatology of vegetative syndromes has been extremely rich and baffling. We cannot find that Babinski and Froment have taken these types of lesion into account in their preconception that they must dismember the hysteria group.

A study of acute poliomyelitides has already emphasized this feature of the problem of spinal cord pathology, for many vegetative pathway disturbances, which have been called "neurotic" or hysterical for years are now readily recognized as a regular part of the picture of poliomyelitis, existing either alone or intermingled in the medley of spinal and sensori-motor pathway disturbances.

After speaking more of Babinski and Froment's symptom pictures relative to muscle alterations, we shall recur to the somatic vegetative muscle disturbances which these authors do not seem to be aware of.

Babinski and Froment enter upon a clear and full discussion of the syndromes which present themselves clinically in these cases. Sometimes these symptoms appear immediately after the injury, sometimes after removing the dressing of a wound or the missiles or even after some weeks have passed. Sometimes disturbances lighter at first are afterward aggravated suddenly or slowly by fatigue. Most of the patients were those attacked by these disturbances when evacuated from the surgical hospitals and trans-

ferred to the neurological centers at the rear. There was therefore little opportunity to observe them at the front.

The motor disturbances are of diverse aspect, paralytic and hypertonic states, paretic or simple meiopragia, mixture of pareses with contractures. Whatever the form the disturbance is more often incomplete, partial, limited. It is more discrete than that which these authors call the pithiatic form and it frequently affects more severely a part of a limb, particularly the extremity. It may involve a complete or almost complete loss of function of a portion of the limb.

In the lower limb there is a classic reflex atrophy of the quadriceps such as follows a femoral-tibial arthritis, but here it follows also wounds situated at the thigh in the region of the knee. Sometimes there is a paralysis of the quadriceps along with the atrophy accompanied by an extreme hypotony. Usually the knee jerk is exaggerated.

Following upon injury in the region of the hip there is contracture of the pelvic-trochanter muscles associated with a paresis of the foot. In the recumbent position upon the back the lower limb executes an extreme rotation. The passive movements of the thigh are limited and involve the movement of the pelvis more than is normal, owing to a contracture of the pelvic-trochanter muscles along with certain fiber contractions. The paralysis of the foot manifests itself in the weakness of the active movements of the plantar flexion and especially those of the dorsal flexion.

There is almost always marked claudication in which the affected foot lags behind the other and in moving describes an arc with an internal convexity, while the foot hangs in the attitude of equinus varus and the sole tips to the edge.

Narcosis reveals here a hyperreflectivity of the knee-jerk, though this is not always noticeable when the patient is awake. Vasomotor disturbances and mechanical hyperexcitability of the muscles are usually very pronounced in the leg and especially the foot. There is more or less amyotrophy and sometimes a hypothesia of the foot with absence of cutaneous reflex.

(*To be continued*)

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

Rogers, Fred T. On the Stimulation of the Vago-Gastric Medullary Centers by Drugs. [Proc. Am. Soc. Pharmacol., XI, 2.]

In the turtle with the spinal cord sectioned at the level of the third cervical vertebra, but the circulation through the head and both vagus nerves intact, the injection into the carotid artery of 0.5 c.c. to 1 c.c. of a 1 : 1000 solution of picrotoxin leads to a powerful tetanic contraction of the stomach. This effect does not follow the injection if both vagi have previously been sectioned. This contraction is followed by a prolonged refractory stage of the gastric musculature to vagus stimulation. Electric stimulation of the floor of the fourth ventricle causes a similar contraction. In the dog, with splanchnic nerves previously sectioned, the injection of apomorphine, in doses too small to cause vomiting, leads to a marked diminution in the tonus of the stomach and to a cessation of peristalsis, so far as can be detected by the balloon method of recording gastric contractions. Vomiting caused by apomorphine is not preceded by any gastric contractions so far as this method will indicate. In the dog, picrotoxin caused the same changes in the gastric contractions as did apomorphine.

Campbell, H. Neuro-Visceral System. [Medical Press, Oct. 9, 1918, et seq.]

The author gives a condensed account well illustrated of that portion of the nervous system which controls the activities of gland cells and unstriped muscle fibers to which he applies the name—the neuro-visceral system. He does not believe this system to be the homologue of the primitive nervous system of the invertebrates. The neuro-visceral system is intimately bound up with the central nervous system, and the visceral ganglia and nerves constitute an outflow from that system. The neuro-visceral system thus consists of a central and a peripheral portion. The peripheral portion pervades the whole body. So extensive, Campbell says, are the visceral nerves and ganglia that, were all other tissues to disappear, there would remain a kind of gossamer scaffolding, so close in texture as scarcely to admit the passage through its interstices of a single ray of light. That visceral connec-

tions exist in the *cortex cerebri* is shown (*a*) by experimental stimulation, which produces alterations in pulse-rate, and so on; (*b*) by the bodily accompaniments of sensations and emotions. It is as certain that intermediary levels exist. The peripheral system consists of ganglia and nerves; and though part and parcel of the central system, connected by afferent and efferent strands and developed from the same embryonic ectoderm, it is nevertheless capable of a considerable degree of independent activity, thus, intestinal peristalsis persists after section of the vagi and splanchnics. The efferent strands of the peripheral system consist of at least two consecutive neurons, the primary "connector" neurons of Gaskell, connecting central nervous system with ganglia, and secondary neurons, leading from ganglia to viscera. The afferent strands are made up of single neurons which establish various central connections. Two functionally distinct portions enter the composition of the peripheral system, namely, the thoracico-lumbar or sympathetic and the craniosacral or parasympathetic. The parasympathetic ganglia are all situated in or near the tissues they supply, while the sympathetic ganglia are usually at a distance. The germ of the sympathetic system is represented low down in the animal kingdom by "chromaffin cells," which yield adrenalin and play an essential part in the maintenance of vascular tone. In the efferent sympathetic system, the neurosomes of the primary neurons are situated in the intermediolateral portion of the spinal gray matter, their slender axones constituting the fine preganglionic fibers. These leave the spinal cord by the ventral roots of all the thoracic and the first two or three lumbar segments. Having reached the corresponding mixed nerves, they issue from them by the white *rami communicantes* and enter the gangliated cords of the sympathetic. These ganglia consist of the proximal, vertebral or lateral, the intermediate, prevertebral or collateral and the distal or those of the segmental-duct organs. From these three systems of ganglia non-medullated post-ganglionic fibers proceed to their several destinations. In general terms the ganglia of the gangliated cords provide fibers for the cranio-spinal nerves; the intermediate ganglia for all the viscera save those of the segmental duct; the distal ganglia for the organs of the segmental duct. The entire body receives sympathetic fibers. The limbs and body wall are supplied by the sympathetic alone. The following regions receive both sympathetic and parasympathetic fibers: the orbital contents, the glands of the nasal fossæ, naso-pharynx and mouth, the thoracic and abdomino-pelvic viscera and the cloacal cutaneous system. Involuntary muscle fibers may be excited or inhibited by visceral nerves. The action of the vagus in slowing the heart, of the *chorda tympani* in causing dilatation of the arteries supplying the submaxillary gland, and of the pelvic nerve in bringing about relaxation of the bladder, are instances of inhibition. In the case of all organs which are furnished with antagonistic muscles

(heart, pupil of the eye, bowels, etc.), the sympathetic and parasympathetic act antagonistically, affording an admirable instance of reciprocal innervation, *i. e.,* innervation which causes contraction of one set of muscles and relaxation of their antagonists. The neuro-visceral system also acts on gland cells, supplying them with fibers which control their secretory activity. These fibers actually end in the gland cells, and their severance causes atrophy of the cells in which they terminate; thus division of the *chorda tympani* causes atrophy of the submaxillary gland.

Langley, J. N. Persistence of the Central Somatic Effect of Strychnine after a Large Dose of Nicotine. [Proceedings of the Physiological Society, Dec. 14, 1918.]

It is known that nicotine causes violent muscular contraction in vertebrates. This action in anesthetized animals is due to stimulation of the various segmental motor centers though in the mammal the effect is fairly readily suppressed by excess of anesthetics. In the skate Langley found that whilst local application of nicotine to the spinal cord caused purely local strong contraction, liberal application of nicotine did not prevent reflex contraction being obtained, though the contraction might be less than normal. Thus the ordinary reflex mechanism was not paralyzed by a considerable amount of nicotine. Similar results of local application of nicotine were obtained by Dixon in the frog, but apparently with a more distinct diminution of reflexes. Langley made some further experiments with a view of determining whether in the mammal nicotine paralyzes any part of the central mechanism involved in somatic reflexes. The experiments were made on the cat. The blood vessels of one limb were tied, nicotine injected intravenously and a variable time after this, 2 to 5 mgms. of strychnine were injected. In no case did the injection of nicotine, even up to 100 mgms., prevent strychnine from causing clonic contractions in the leg with ligatured vessels. It follows then that nicotine has no specific paralyzing action either on the anterior cornual cells or on the commissural cells on which strychnine is generally supposed to act. The central somatic mechanism, however, soon ceases to be capable of stimulation by nicotine—just as is the case with the peripheral autonomic nerve cells of certain animals. Up to a certain concentration of nicotine there is stimulation with each increase; with further increase there is no stimulation, but if the concentration is allowed to fall below a certain level, increasing it again will stimulate. On the theory of the existence of receptive substances the facts may be accounted for as follows: Stimulation occurs as long as nicotine is combining with the receptive substance; when complete combination has occurred there is no stimulation; whether stimulation is followed or not by paralysis depends on whether the completely combined substance retains its conductivity or loses it.

Vincent, S. VAGOTONIA AND SYMPATHICOTONIA. [Endocrinology, Vol. 1, p. 459.]

An editorial writer in the B. M. J., Feb. 8, 1919, commenting on this communication says a good deal has been written lately about vagotonia and sympathicotonia, terms introduced by Eppinger and Hess to account for and describe nervous symptoms caused by abnormal activity of the vegetative nervous system. These names are somewhat impressive and require some explanation; by vagotonia is meant increased tonicity of what Hess and Eppinger called the autonomic (parasympathetic) system, namely, the cranial, medullary, and sacral outflow of the vegetative nervous system. Langley originally introduced the words "autonomic system" for what was formerly spoken of as the sympathetic, and it is unfortunate that Eppinger and Hess should restrict its use to a part only of the whole, thus causing some confusion. Sympathicotonia refers to increased tonicity of the sympathetic or the remaining part of the vegetative nervous (old sympathetic) system, and is supposed to depend on an increased continuous secretion of adrenalin into the circulation, vagotonia being regarded as the result of an excessive amount of a hypothetical substance, autonomine, the counterpart of adrenalin. Normally there is an equilibrium between the autonomic and the sympathetic systems, but when from any cause this balance is disturbed, the action of one becomes predominant and symptoms result. By means of drugs which act on the two divisions of the vegetative nervous system these disturbances become more pronounced and the diagnosis of the respective conditions is facilitated; thus, the subjects of vagotonia are sensitive to pilocarpine and physostigmine, and the manifestations thus produced are counteracted by atropine, whereas the patients with sympathicotonia are made worse by adrenalin, and although they are benefited by atropine it does not act as an antidote to the same extent as in vagotonia. Two papers bearing on the subject may now be briefly referred to. In a destructive criticism of the whole theory Swale Vincent urges that as there is no proof of a continuous secretion of adrenalin into the circulation the grounds for the imaginary existence of autonomine are based on a false analogy, that Eppinger and Hess have evolved this hormone out of their inner consciousness, and that the whole conception is highly speculative and has little or no experimental or clinical evidence in its favor. Matsuo and Murakami (Arch. Int. Med., 21, 1918, p. 399), of the medical clinic of the Kioto Imperial University of Japan, accepting with some modification Eppinger and Hess's views, investigated enteric fever in which there is sometimes an unexplained slowness of the pulse. In 46 cases of bacteriologically proved typhoid fever injected with atropine under the same conditions as Marris's cases, they found that atropine was quite effective in quickening the pulse, especially those with bradycardia. Marris, as is well known, found that atropine did not quicken the pulse

in enteric fever to the same extent as in healthy persons or in patients with diseases other than enteric; and for the divergence of their results the Japanese observers cannot offer any explanation. From examination of the vegetative nervous system in 38 cases of enteric fever by means of injection of atropine, adrenalin, and pilocarpine they concluded that 14 cases corresponded to vagotonia and 11 to sympathicotonia, so that the majority of the cases showed one or other condition. In many of the cases with well marked slowing of the pulse vagotonia was present and may therefore be the cause, whereas many of the cases without a slow pulse showed sympathicotonia. The 5 fatal cases out of the 38 all showed sympathicotonia, and as this state is often accompanied by a rapid heart, which has long been recognized as a bad prognostic in typhoid, the existence of sympathicotonia may be of significance in the prognosis of the disease.

Jackson, D. E., and Pelz, M. The Distribution and Function of Certain Nerves in Chelonians. [Proceed. Am. Soc. Pharmacol., XI, 2.]

In the turtle the intrinsic muscles of the lungs are controlled by two sets of nerve fibers. One of these sets runs in the vagus nerve for at least a part of its course and perhaps throughout its entire length. Stimulation of this set of fibers causes contraction of the lung. The second set of fibers are apparently sympathetic and emerge from the cord in the region of the anterior thoracic nerves. Stimulation of these fibers with a weak tetanizing current causes relaxation of the lung. It seems probable that some constrictor fibers run in the same nerves as those which carry the dilator fibers. We have not been able to follow the course of the dilator fibers completely but have obtained evidence of their existence and action by stimulating the main sympathetic trunk in the anterior thoracic region. Stimulation with a weak current at this point causes the lungs to relax. In many specimens we have failed to obtain this result, and in these cases we have considered our failure to be due either to poor technic, seasonal variations in the response of the nerves and tissues of the animal, or to anatomical variations in different species and specimens. This last feature is especially noticeable, and in snapping turtles we have not been able to identify some of the nerve fibers in the other common species. In box turtles the sympathetic fibers emerging from the thorax give off a branch which passes forward and joins the vagus in a large ganglion. If this branch of sympathetic fibers be stimulated with a *strong current* below the ganglion, *i.e.*, before it has joined the vagus, a contraction of the lung will be produced. It seems probable in this case that some constrictor fibers pass through the sympathetic to the ganglion on the vagus and thence through the vagus to the lungs. The records obtained in these experiments were produced as follows: The animal is

pithed thoroughly, both brain and cord. The plastron, viscera (except the heart and lungs) and as much as possible of the skeletal musculature is removed, after which a cannula is placed in the trachea and connected with a recording tambour having a bowl about two inches in diameter. A considerable magnification is used and the lungs are inflated to about half their capacity or less. This pressure in the lungs is counteracted by the pressure in the tambour. When one lung is being used for experiments the bronchus to the opposite lung is clamped off. The drug responses of the turtle lung varies considerably from that of dogs. Nicotine, pituitrin, lobeline, and veratrine cause marked contraction, which is feeble or absent in dogs. Codeine, pilocarpine, etc., act as in mammals.

Voisin R., and Benhamon. Oculocardiac Reflex and Therapy. [Paris and Méd., Mch. 8, 1919.]

These authors report that pressure on the eyeball had relieved two patients with paroxysmal tachycardia. Pressure for two minutes in one patient ensured a permanent result. The author's analysis of the mechanism is not fundamental.

Gallotti, O. Vegetative Nervous System and Hormones. [Arch. Bras. de Med., January, 1919, 9, No. 1.]

The harmonious action of the vegetative functions is due to the hormones influencing the autonomic and the sympathetic nervous system. Gallotti takes up one by one and rather hastily summarizes the action of the different endocrine glands that the interactions between the various hormones and the vegetative system must be carefully analyzed before an intelligent opotherapy is possible. It is not enough simply to think in terms of an increase or a diminution of this or that gland, but the relationship between autonomic and sympathetic innervation must be analyzed.

Brown, W. L. The Vegetative Nervous System in Disease. [Lancet, May 17, 1919.]

In this Croonian lecture on the rôle of the sympathetic nervous system in disease the lecturer first pays a warm tribute to the memory of Gaskell, who first showed that the nerve fibers which flowed from the spinal cord into the sympathetic chain were of a smaller caliber than the nerves to the skeletal muscles, and that there are fibers with visceral functions in the cranial and the sacral nerves which subserve the functions of organic life and are not under the control of the will. Such visceral fibers are now usually included under the term autonomic nervous system, introduced by Langley. The visceral or involuntary nervous system may be classified as (1) the sympathetic (thoracicolumbar outflow); (2) the para-sympathetic: (*a*) cranial outflow; (*b*)

sacral outflow. The essential parts concerned in a reflex action are the receptor and effector elements. The former in most cases does not connect directly with the effector, but there is an intermediate neuron, bringing the two into relationship, for which Gaskell suggested the name "connector element." The connectors need not simply associate receptors and effectors of the somatic nerves in the same level of the cord; they may run up and down in longitudinal tracts, bringing neurons of different levels into relationship. [One of the still unwritten chapters in neurology is this on the pathways of the vegetative systems to the cortex, present-day neurology being only a myelinated (sensorimotor) neurology. Ed.] In the autonomic system there is a connector preganglionic medullated fiber and an excitor postganglionic nonmedullated fiber, and just as the connector element of somatic nerves may run longitudinally in the spinal cord, so the connector element of visceral nerves may run longitudinally in the sympathetic chain; and as in the process of evolution the receptor cells have been withdrawn from the periphery into close proximity to the spinal cord, so the effector cells of visceral elements have migrated out from the cord into outlying ganglia. The purpose of this different arrangement in the two systems is found in the different functions performed: the sensori motor nerves are for localized accurate reflexes, the visceral nerves are for widespread diffuse effects. The results of sympathetic stimulation serve to activate the body for a struggle and to increase its powers of defense; and since the mechanisms for self-defense which we now possess were developed in the course of vast periods of time, it is to be supposed that some are not suited to our present needs. The pilo-motor fibers are an example of this. Some emotional responses, like some of our bodily structures, are vestigial remains. There are certain features of general resemblance between the sympathetic and parasympathetic. They both control functions of organic life and act apart from the will. They are both composed of small medullated connector fibers and conform to the rule that efferent autonomic impulse runs from the central nervous system to muscle or gland without having a nerve cell on its course. In the sympathetic, the fine medullated preganglionic connector fiber springs from a cell in the lateral horn; it passes out in the anterior root, which it leaves by a white ramus communicans, to enter the sympathetic chain. It ends by forming synapses round cells in the lateral or in the more outlying sympathetic ganglia, such as the superior cervical and mesenteric ganglia. Thus a single connector fiber may stimulate a number of cells. From these cells start the nonmedullated postganglionic excitor fibers, which pass to their destination, mainly along blood vessels to the deeper parts and along spinal nerves to the more superficial parts, being distributed to the latter by the gray rami communicantes. In the parasympathetic the postganglionic fibers are distributed direct to the peripheral tissues,

branching as they go. They have their cell station close to their destination and their effects are more localized. The function of the cranial portion of the parasympathetic may be regarded as anabolic, while the sacral division, which consists of the pelvic visceral nerve, is mainly a mechanism for emptying. It was Gaskell who pointed out that when the sympathetic and parasympathetic are distributed to the same structure, the effects are antagonistic. In pain, fear, rage, and intense excitement the sympathetic neurons are brought rapidly into play, and the action of the cranial division of the parasympathetic is inhibited; the anabolic activities of the body are in abeyance and the katabolic activities go on unchecked. The one exception to the rule that connector fibers are not distributed direct to muscle or gland is the adrenal nerves, which are preganglionic. Phylogenetically, and functionally the adrenals and the sympathetic are in the closest association. The chromaffin cells appear to originate in the central nervous system, and when in evolution the sympathetic cells emigrate into outlying ganglia they are accompanied by the chromaffin cells. This explains why in the adrenals alone the connector fibers end and why, as Langley pointed out, the effect of adrenalin on any part is the same as stimulation of its sympathetic nerve, for the chromaffin cell represents the excitor element. In the adrenals we have a most interesting example of the correlation of nervous and chemical stimuli. The sympathetic excites a secretion of adrenalin, and adrenalin increases the sensitiveness of the response to the sympathetic. Emptying of the adrenal reservoirs occurs not only in direct stimulation of the splanchnics and in strong emotions, but also in trauma and acute infections. This mobilization of adrenalin lowers the threshold to sympathetic stimuli, increases the blood sugar, hastens the clotting of blood by increasing the amount of prothrombin and diminishes muscular fatigue. The thyroid is another endocrine gland which has close relations with the sympathetic nervous system, and like the adrenal, it can be thrown into increased activity by the sympathetic, and in turn increases the response to the sympathetic. The main thesis of this lecture is that the stimulation of the sympathetic and its coadjutors, the adrenals and the thyroid, means the spending of reserves in the supreme struggle for survival. The quickening of all the vital processes may produce, for a time, a feeling of exaltation and well-being. This may be regarded as a physiological justification for Nietsche's injunction to live dangerously. But exhaustion lies in wait if the struggle is unduly prolonged. A vicious circle is the pathological equivalent of a prolonged struggle. Next, under physiological conditions the sympathetic acts as a whole, while one of the phenomena of disease is dissociation. Sensory dissociation is seen, for example, in tabes and syringomyelia. Sympathetic dissociation may play a part in diabetes and in disorders of digestion and circulation. Evolved at the unconscious plane, the sympathetic remains forever beyond the control of the

will. The higher centers of the brain show their influence on the lower chiefly in the direction of inhibition. The highest organism is the most self-controlled, but the sympathetic cannot be thus controlled. Though one may deaden the emotion, the response to an emotion once evoked cannot be prevented. To regulate this one must trust to reserves, inherited and maintained through generations of stable and equable ancestors. The lecturer concludes with the remark that we might modify the dictum that the war would be won by the nation with the strongest nerves and say that it would be won by the nation with the strongest adrenals, for just as character is revealed in the instinctive response which occurs quicker than thought, so the great powers of tenacity and endurance may be clearly foreshadowed in the original emotional response. [Med. Record.]

2. ENDOCRINOPATHIES.

de Castro, A. Paraglandular Organs. [Ann. d. l. Fac. de Med. d. Montevideo, July, 1918. Jl. Am. Med. Assoc.]

De Castro applies this term to the formations which accompany the endocrinous glands in the human body. They are of the same embryonic origin, and attain a certain degree of differentiation in their development, but they are generally regarded and classed as supernumerary accessory glands or aberrant glandular nodules. He is convinced that they represent a regular system, and are not merely anatomic curiosities, morphologic accidents, anomalies or rudimentary organs, as they have hitherto been described. They form what he calls the paraglandular system, an annex to the system of the glands of internal secretion. They represent an organic system in full evolution. This allows the interpretation of a number of contradictory facts which have hitherto baffled observers, and explains many phenomena in the human economy. Each of the endocrinous glands is liable to have its paragland, as also possibly the epiphyses. There are also abdominal paraganglia, such as the organs of Zuckerkandl and the cardiac paraganglia described in 1906 by Wiesel nd Wiesner. The carotid gland is not exceptional but occurs bilateral in nearly every one. Other paraganglia with chromaffine tissue are found along the sympathetic. Luschka's coccygeal gland is not chromaffine and hence does not belong to the paraglandular system. He reviews each member of the system in turn, with evidence from comparative anatomy and physiology to sustain his views.

Hartman, F. A. Location of Adrenalin Vasodilator Mechanisms. [Proc. Am. Soc. Pharmacol., XI, 2.]

Destruction of the brain does not interfere with the adrenalin vasodilator mechanism for the intestine. Pithing of the cord in the thoracic region often decreased the amount of intestinal dilation from adrenalin.

However pithing of the whole cord did not completely destroy this reaction of the intestine. Loops of intestine perfused with Ringer's solution, but with intact nervous connections, dilated when adrenalin was injected into the external jugular, even though all splanchnic fibers were cut. Occasionally the dilatation was preceded by slight constriction. It seems from this that adrenalin produces dilatation of the intestine by stimulation of the sympathetic ganglia supplying them. The adrenalin vasodilator mechanism for the hind limb must be below the thoracic cord because destruction of the whole central nervous system that far down does not prevent its action.

Nuñez, P. E. Typhoid and the Suprarenal Glands. [Ann. de la Fac. de Med. Mont., Sept., 1918.]

In this infectious disease the adrenals are involved early. He attributes the marked prostration, the low blood pressure, the dicrotic pulse, the hypocholesterolemia and the dissociation of the temperature and pulse curve to the action of the diseased adrenals. The symptoms just enumerated indicate the need for daily injections of adrenalin.

Fournier, J. C. M. Sergent's White Line. [Bull. d. l. Soc. Mèd. d. Hop., Mch. 7, 1919.]

In a case of acute Addison's disease in a young woman who began with pain in the lumbar region and a marked and persistent Sergent's white line, a regular adrenalin treatment gave immediate relief. In a study of some two hundred or more patients he found Sergent's white line only in some severe influenza patients with marked asthenia, and pronounced low blood pressure.

Motzfeldt, K. Addison's Disease. [Norsk. Mag. f. Laeg., Ap., 1919.]

The absence of bronze discoloration does not negative Addison's disease, as is well known. The author calls renewed attention to this point and describes in detail the illness of a woman of 43 who had had spondylitis for twenty years who has been treated for pains in the abdomen. Gastric ulcer and stenosis in the bowel were suspected, and she had lost weight. She developed headache, nausea, vomiting and diarrhea with sudden asthenia. The back of the hands were slightly bronzed; the pulse was fast and small. The temperature was subfebrile. Subcutaneous injection of epinephrin gave pronounced transient improvement. After her death two months later the suprarenals were found tuberculous. He advocates the use of the suprarenal cortex given continuously.

Comby, J. Hypernephroma. [Arch. des Mèd. des Enfants, Mch., 1919.]

The author discusses the subject of neuroblastoma in general and calls attention to the differential diagnosis of sarcoma of the suprarenal, especially in its separation from hypernephroma of neural origin.

Satre and Gros. Suprarenal Insufficiency in the Troops. [Prog. Med., June 15, 1918, 33, No. 24, p. 205. J. A. M. A.]

Satre and Gros give a number of examples of what they call war hypoepinephric syndromes. Supplying the lacking epinephrin cured the disturbances when they took the form of diarrhea resembling cholera, as also in grave gastro-intestinal toxic infections. The men thus affected had led a sedentary life before the war, and the functioning of their damaged suprarenals had sufficed for their regular indoor life, but under the stress of campaigning the insufficiency of their endocrine system soon made itself manifest. The symptoms reveal the inability of the antitoxic functions to cope with the excessive amounts of poisons generated by the waste from muscular work. Whether there is merely functional suprarenal upset or organic damage, the fundamental symptoms are the same, vomiting, dizziness, asthenia and hypotension—just as in seasickness. There may be also small brownish spots on the skin, symmetrically distributed. When the solar plexus is irritated, there are liable to be apoplectiform coma or pseudomeningitic symptoms, vasomotor disturbances, etc. The blood pressure is low in all the forms. Arsenic, mercury and iodid are violent poisons for the suprarenals; nicotin is also injurious for them. Large and fractioned doses of epinephrin are called for, with ingestion of the total extract of the suprarenals. The epinephrin and extract of the capsule have a tonic and cardiovascular action, remarkably effectual, promptly raising the blood pressure and acting energetically to promote diuresis. If the epinephrin can be given by the mouth, from 8 to 10 mg. can be taken during the twenty-four hours, fractioned and well distributed. It should never be given in syrup, but the drops should be counted into sweetened water just as the dose is to be taken. The digestive intolerance usually makes it necessary to give the epinephrin by intramuscular injection.

Kramer, D. The Adrenalin Content in Infants' Blood. [Monatsschrift für Kinderheilkunde, XIV, Nos. 8 and 12, 1918.]

In his researches, the author used cadavers. They revealed the fact that in intoxications due to feeding or other conditions, there was an absence of adrenalin in the suprarenals. This was likewise the case in premature infants, or at least the amount of adrenalin was below the normal. It is to be supposed that this lack of adrenalin in the suprarenals is due to hypofunction of these glands and not to a larger proportion of adrenalin entering into the circulation.

Dietrich, A. The Suprarenals in Diseases Resulting from Wound Infection. [Zbl. f. Path., 1918, Vol. 29, No. 6.]

Changes in the suprarenals, the writer states, are regularly shown in acute and chronic diseases, following upon wounds, which end fatally in soldiers. They seem to appear early and seem to be due to an inflammatory reaction in the cortex and this perhaps is related to the function of the suprarenal bodies as toxin agglutinants (giftbindend). There are revealed disintegration and disappearance of the lipoids, vacuolization of the parenchyma cells of the cortex, infiltration of leucocytes and appearance of granular cells in the corter, fatty degeneration of the capillary endothelium and thrombus formation in the medullary vessels. Lipoid resorption and disappearance especially are evident in chronic aërobic sepsis while all these changes are present in marked degree in cases of gas gangrene, malignant edema and acute aërobic sepsis. In acute peritonitis they begin a few hours after the injury. [J.]

Hutinel, V. Bony Syndromes and the Endocrine Glands. [Arch. d. Mèd. d. Enfants, Nov., 1918.]

Hutinel here discusses in broad manner the relations of polyglandular syndromes to bony development in children. Athrepsias, atrophies, bony malformations, rachitis and the lymphatic constitution are specially dwelt upon. The review is general and contains little new.

Naegeli. Consideration of the Symptomatology of Osteomalacia as Disease of the Glands of Internal Secretion. [Münch. med. Woch., 1918, No. 22.]

The writer reports findings concerning the involvement of the organs of internal secretion in this disease. One patient, a man, manifested hypophyseal obesity with dwarfism, although no changes in the hypophysis had been anatomically proved. Hyperthyroidism has not been sufficiently proved. The parathyroid glands are frequently hypertrophic. A case of diabetes suggests pancreatic disturbance. The marked pigmentation evident with patients points to suprarenal involvement. Hyperfunction of the gonads is evident. Metabolic disturbance is evident as regards minerals and in advanced cases as regards albumin and fat. Usually it is thin people who are affected. Disturbance of blood formation manifests itself in changes in the bone-marrow in which there is hyperplasia with diminished function. Polyglobulin is noticed in the earlier stages, severe anemia later. Some cases show leucocytosis often with abundant myelocytosis. Eosinophilia and lymphocytosis are present with changes in the serum in the relation of globulin and albumin with an increase of globulin. It will often be

found that chlorosis has existed earlier. The skeletal system shows constitutional weakness, hyperplasia of the bone-marrow, decalcification, softening and curvature of the bones, exaggerated sensitiveness of the periosteum. Dystrophy is evident in the muscular system with functional weakness and finally an almost complete lipomatosis through fatty degeneration. In the nervous system there are exaggerated reflexes, spasms, tremors, rapid pulse, disturbances in the temperature center in the medulla, paresthesias and sweating. [J.]

Citelli, S., and Caliceti, P. Pituitary Deficiency in Connection with Adenoids. [Pediatria, May, 1917; Policlinico, 1918, p. 245.]

Citelli's psychic syndrome encountered in persons with adenoids or other affections of the nose or sphenoid sinus consists of mental backwardness, poor memory, a tendency to drowsiness or insomnia and inability to concentrate the attention. Three cases are described in soldiers all presenting feminine characteristics along with Citelli's syndrome. The case histories were as follows:

Case 1.—Soldier, twenty-five years old. Intellectually deficient, with marked hypotrichosis. There were traces of gynecomastia; pelvis was very large; the patient presented typical signs of adenoids (facies adenoidea), but none were found. Injection of endohypophysin (whole gland) caused a rise of temperature and headache, and was without any success.

Case 2.—Soldier, twenty-two years old, with diminished intellectuality; mouth always open; forgets easily; some adenoids still present; hypotrichosis; pelvis large. Injection of endohypophysin was followed by no improvement, but with rise of temperature.

Case 3.—Corporal, twenty-one years old. Was always markedly forgetful in school. Sexual powers very weak; adenoid facies; hypotrichosis. Injection of hypophysin caused rise of temperature. The rise of temperature after injection of pituitary extract in these three cases suggests the hypophyseal nature of this symptom complex.

In a later communication (Pediatria, March, 1919), Caliceti discusses the mechanism by which the pituitary may be damaged by adenoids. The resulting set of symptoms was described by Citelli and Caliceti here reports two new cases and reaffirms the immense importance of prophylaxis, removing adenoids before they have time to injure the pituitary and entail, secondarily, disturbances in development both of body and mind. The body assumes a feminine aspect and there is more or less tendency to feeblemindedness. This can be arrested in some cases by pituitary treatment, but removal of the adenoids is indispensable also. Adults with the syndrome are rendered more alert and dependable by pituitary treatment.

Strauch, August. Hypophysial Dystrophy in Hydrocephalus. [Journal A. M. A., June 14, 1919.]

Strauch gives an account of a girl, 8 years, 10 months old, previously healthy, who, in the beginning of the winter of 1917–1918 began to suffer from inability to hold urine. She had daily attacks of supra-orbital headache, sometimes with vomiting and with occasional dizziness. She drank much water and had a ravenous appetite, and in the month of February gained rapidly in weight. After first irritable and "nervous," she became apathetic and sleepy, began to fail in her studies, had difficulty in keeping her balance in walking, and tired very easily. Her upper extremities became weak, tremulous and ataxic. There was a marked enlargement of her head. The roentgenographic examination revealed a greatly enlarged sella turcica, and reduced clinoid processes. There was incontinence of the bowels and at the end of November there was bilateral optic neuritis. She succumbed finally to measles, otitis media and bronchopneumonia. She grew three centimeters in height while in the hospital, but lost somewhat in body weight the last few weeks. The calvarium, after death, measured 3 mm. in thickness, and the brain was 16.1 cm. wide, 20.3 cm. long and 10.1 cm. high, and weighed, with its contained fluid in the ventricles, 2,190 gm. The convolutions were markedly flattened, and there was shifting or dislocation of parts of the brain, especially in the occipital region. The right hemisphere of the cerebellum was decreased in size, and the aqueduct of Sylvius was closed. The pathologic findings in the pituitary body have not yet been worked out. Harvey Cushing has remarked that pituitary changes probably occur in every case of extreme intracranial tension, and Strauch, in his comments on this case, says that, while the characteristics of hypophysial dystrophy were marked, they should be separated from those of hydrocephalus. The causal agency of the latter cannot be ascertained clinically, the differential diagnosis considering an "idiopathic hydrocephalus, or rather the exacerbation of a previous hydrops ventriculorum, and a possible distant obtrusive tumor without focal manifestations." The presence of the hydrocephalus explains the dystrophy, but the assumption of a tumor of the hypophysis itself is not altogether warranted. The radiologic findings are accounted for by the increased general tension. The polyuria and thirst have been frequently observed as temporary symptoms of hypophysial dystrophy, though marked polyuria has been observed in cases of tumor near the hypophysis. Pressure on the various cerebral districts is sufficient to account for the other symptoms, the polyphagia, rapid growth, etc., and we may possibly have had here a functional activation of the anterior lobe of the gland, combined with posterior lobe insufficiency. The supervening optic neuritis would have made surgical procedure inevitable, had the patient lived. The intercurrent disease, however, prevented it.

Froboese, C. Tuberculous Affection of the Hypophysis, Especially the Primary Form. [Zbl. f. Path., 1918, Vol. 29, No. 5.]

The author discusses in detail the differential diagnosis which would separate such affection from gumma. He reports a case of a 32-year-old woman in whom necropsy revealed complete destruction of the hypophysis through chronic tuberculosis. Death had occurred within a few days after the sudden onset of coma with slight stiffness of the neck and excessive vomiting. There were no other signs of tuberculosis throughout the body. He calls attention to the fact that the few cases of tuberculosis of the hypophysis so far reported have been generally of the female sex. He believes that other previous lesions predispose to the infection. [J.]

Oehme, C. Familial Acromegaly. [Deut. m. Foch., Feb. 20, 1919.]

Four girls in one family are here described all showing symptoms at puberty consisting of a diminished development of the secondary sexual characters, an excessive growth in width of the bones of the limbs, particularly of the forearm and legs, with a moderate hypertrophy of the soft structures of the limbs as well. There were no facial changes nor X-ray changes in the sella turcica.

Bergh, C. Etiology and Treatment of Hyperthyroidism. [Norsk Mag. f. Læg., March, 1919.]

The author is strong for a tonsillar, nasal or pharyngeal infectious source for the beginning of exophthalmic goiter. He cleaned out 11 throats and the goiter subsided. Quoting from the J. A. M. A., he cites Salling's report on 97 cases of exophthalmic goiter in 13 of which the disease had followed immediately on an infectious sore throat, and he has found 42 on record of a similar briefly preceding infectious disease. In 3 of Salling's cases an acute infectious disease caused the flaring up of the apparently cured exophthalmic goiter, and in 20 others the exophthalmic goiter became much worse after an intercurrent acute infection. No less than 60 of the 97 displayed a tendency to infectious sore throat. In 62 of the 97 cases the exophthalmic goiter began evidently as a local process in the thyroid. These data sustain Bergh's assertions that chronic catarrh of the nasal mucosa is not a superficial harmless thing, but may spread along the lymphatics to the thyroid. Migraine and cephalalgia have been frequently traceable to rhinopharyngitis, in his experience, and now he adds exophthalmic goiter to this group, and sustains his assertions by the success of treatment of the rhinopharyngitis. As clinically normal conditions are restored in the nasal mucosa, the secondary affections subside. He treats the mucosa with massage, and commends the efficacy of this absolutely harmless treatment. It removes the chronic source of the infection, and the process in the thyroid

then dies out. The outcome is better in the cases of soft goiter. About thirty-five applications of massage were required in his cases, to never over forty-two.

II. SENSORI-MOTOR NEUROLOGY.

1. PERIPHERAL NERVES.

Price, G. E., Feiss, H. O., Terhune, W. B. Peripheral Nerve Injuries in War. [Arch. of Neur. and Psychiatry, Vol. 1, No. 5, J. A. M. A.]

The purpose of this paper is to place on record the methods used in caring for peripheral nerve cases in the American Red Cross Hospital No. 1, formerly the American Ambulance, and to report the results following nerve suture. There are available for statistical purposes 857 histories of peripheral nerve injuries, with the records of 205 reparative nerve operations, 151 of these having been followed during convalescence for at least six months after operation. An analysis of these records shows that the musculospiral was the nerve most frequently injured in war; the ulnar nerve was involved nearly as often. Following operation, the musculospiral and sciatic nerves make the best recoveries, the results in the case of the sciatic being equally as good as those of the musculospiral. The condition of an injured nerve, when examined by sight and touch at the time of operation, is invariably worse than the previous clinical findings would lead one to expect. When at the time of operation, having utilized all the methods to determine whether simple liberation or excision and suture is the best procedure, if doubt still exists, excise and suture. Repair of an injured nerve as early as possible should be the aim of every surgeon. For this reason the authors urge that in time of war neurologists should be stationed close to the front, so that the wounded may be examined for nerve lesions before going to the operating room. This, by increasing the number of primary nerve sutures, will unquestionably lead to a higher percentage of recoveries. Patients convalescing from nerve reparation should be encouraged to use the extremity affected because volitional effort plays a part in the return of the function. The more respect the surgeon shows nerve tissue when repairing an injury the better will be his results. The nerve should be stripped and handled as little as possible and the ends should be approximated so as to place in apposition corresponding fasciculi of the cut nerve.

Kennedy, R. Operative Procedure of Nerve Injuries. [Brit. Journ. Surgery, October, 1918.]

Initial wounds and sinuses should first be allowed to heal and then the cutaneous scar dissected out. The separated ends having been found, conductivity is tested with an interrupted current, a sterilizable electrode being used. All scar tissue surrounding the nerve is excised and care

taken to avoid the nerve being confined to a narrow space. Therefore, in lesions of the ulnar nerve behind the condyle it must always be displaced forwards so as to lie in front. Posture will help coaptation, *c. g.*, in sciatic nerve lesions, by flexion. Stretching of the nerve trunks is also of value where there is shortening. This may be done by grasping the nerve trunk with gauze or by using a special nerve stretcher, such as the one Kennedy has devised. Displacement forward of the ulnar nerve gives an increased length. It may be done by passing the distal end of the nerve through an opening in the muscles, or by incising and later re-suturing the ulnar head of the *flexor carpi ulnaris*. If coaptation is still impossible and the lesion involves only one of two neighboring nerves, such as the ulnar and median, the sound nerve may be incised transversely for one-third of its thickness at two points widely separated. Into these gaps the distal and proximal ends of the injured nerve are inserted. For suturing Kennedy uses a special curved needle, flattened from side to side, with a cutting edge both on the concavity and on the convexity, the eye being in the same plane as the cutting edge. The nerve is transfixed by a single suture which passes through the whole substance of the nerve. Fine, specially-prepared chromic catgut is recommended.

Corner, E. M. Nerves in Amputation Stumps. [B. M. J., May 24, 1919.]

In this Harvey Lecture, the lecturer pointed out that the subject selected—nerves in amputation stumps—was the continuation in a special domain of the more general lecture (Arris and Gale) delivered at the Royal College of Surgeons. Nerves, as contrasted with other structures, have, he says, the peculiar power of regenerating. They grow again so as to re-innervate, or neurotize, a part that has been de-innervated. In the case of amputations the de-innervated portion has been removed by operation, robbing the regeneration of its object. The result is that the growth is wild, and it invades every contiguous structure, such as bones, vessels, muscles, etc., like a malignant growth permeates them. The growth exhibits a pseudomalignancy, and, by growing between the cells, defeats all methods devised to arrest the progress of regeneration.

1. The immediate pain consequent on an amputation is due to the injuries inflicted on the nerves at that operation. It passes away in a few days.

2. The early pain after an amputation is due to the ends of the nerves, if not cut short, taking part in the general repair of the wound. If the repair is infective there is an infective neuritis, such as was exhibited in the sections shown at the Royal Society of Medicine in April, 1918. If precautions are taken to cut the nerves short and close their open mouths in a simple way, as by the swing-door method, the interior of the nerves are not infected from the wounds.

The three practical points arising from this are:

1. Cut short the divided nerves.

2. Close the mouths of divided nerves.

3. Avoid all wound infection, such as by avoiding handling and manipulation, which are the great causes of low-grade infections such as are not necessarily suppurative.

The healing of a wound by first intention in clinical work does not preclude the presence within it of low-grade infection. Nerve anastomoses mean much manipulation and are therefore banned. The swing-door method is the best and simplest method. Nothing is left behind in the wound which has been touched.

The causation of remote pain is more complex. Three factors are now known:

1. Infective inflammation and its results, islands of fibrous tissue, within the nerve. Cultures have been obtained from nerve endings three years after complete healing of the wound.

2. The presence of foreign bodies, much insisted upon by Marinesco. This includes metal, silk, and, if the words "foreign bodies" are given a large sense, all material such as fibrous tissue in the interior of a nerve ending.

3. The mental factor, due largely to illness, prolonged hospital stay, lost jobs, inability to take up new ways and interests, etc. It is a very large factor, probably larger in people who have lost limbs than in others.

There may be still more factors, such as that due to vessels trying to expand or contract in tissues permeated by fibrous tissue, but at present their clinical importance is unknown.

Three items of practical value stand out in this:

1. Do not use silk in infective wounds.

2. Do not keep men herded together in homes and hospitals longer than necessary.

3. Get them back to some kind of work, which will absorb their attention and take it off their condition, as soon as possible.

Under the saw-divided end of the bone there is and must be a "dead space" which gets filled with such scar tissue as is formed by the repair of the deeper parts of the wound. If this heals quickly and well, there are very few organisms in this internal scar. If, however, there is deep suppuration, the "dead space" is filled with irritant infective scar tissue. This irritates the bone, causing new bone formation; irritates the muscles causing their reattachment; and gives rise to pains in the stump which cannot bear pressure, slowness in healing with local edema, and inability to encapsulate surely foreign material (silk and iron). This infective scar tissue is slowly sterilized by the fluids of the body, but if it remains irritant the new nerves formed by regeneration grow into it and the equation of nerve *plus* inflammatory focus equals pain becomes satisfied. It was also suggested that sensations, perhaps short

of pain but responsible for phantom limbs, might result if a new ill-protected nerve fibre came in contact with a focus of repair. Reference was made to such a man who had a well marked focus of repair on the internal saphenous nerve in his Hunter's canal. When this was removed he recovered slowly. Be this as it may, the clinical fact remains unaltered that operation often fails to relieve such pains immediately. Such is to be expected. The very operation itself will lead to repairs in nerves amongst other structures, and the patient will have stored up memories of past operations, pains, and phantoms. With such a combination any hope of immediate cure is futile, but operation often causes some alteration, as in the phantom which has become immovable, then there is hope. The branching and anastomoses of the new nerves must lead to many complicated stimuli arriving at the brain for interpretation. This must lead to frequent variations in the quality and quantity of the sensations and symptoms so produced. The very great difficulty which the nerve encountered when trying to progress through actively proliferating scar tissue was shown by the nerve spirals and the button-shaped nerve ends. The latter was an exaggeration of the former, the nerve filament having yet greater difficulty in advancing. This teaches a very practical lesson in nerve suture. The ends of the nerves must be so approximated that little scar tissue can be formed for the nerves to grow through. Apparently the nerves grow easily through muscle, but they make little headway through connective tissue. The scar in the skin gets innervated by the regeneration of the nerves.

2. CRANIAL NERVES.

Malling, B. Rhinogenic Optic Neuritis. [Norsk. Mag. f. Laeg., Ap., 1918.]

The author presents an extensive review of the literature of this condition and describes a new case in a woman of 40 who after the removal of a nasal polyp developed an acute inflammation in the nose and left ear. Vision became impaired two or three months later and in six months there was a beginning of optic atrophy. After the use of potassium iodid, vision improved, but it remained 6/18 in the right and 6/60 in the left eye. The ethmoidal cells then were found diseased and were cleared out. Vision improved in a few days. The scotoma disappeared. The pathologic finding was a chronic ethmoidal sinusitis.

Menninger, K. Argyll-Robertson Pupils and Alcohol. [Am. Jl. Syph., April, 1919.]

Argyll-Robertson pupils are most frequently a syphilitic symptom, but not always, and the author here reports a case of acute alcoholic pseudoparesis, with this phenomenon. There was also a speech defect, a paretic facial expression, tremor of the tongue and hands, irregular and unequal knee and ankle reflexes, and defective memory.

Fernandez, J. S. Old Optic Atrophy. [Cron. Med. Quir. d. l. Habana, Sept., 1918.]

The author, describing some cases of optic nerve atrophy of long standing, gives his reasons for recommending that even in these old cases treatment should be instituted, because there is always the chance that they may improve somewhat.

Terrien, F. Eye Symptoms in Cranial Wounds. [Paris Méd., Oct. 12, 1918.]

Diplopia, restriction of the visual field, and choked disk as diagnostic of severe head injuries are here discussed by this observer. They usually subside after lumbar puncture if the hypertension can be thus relieved. Hence when present lumbar puncture should be practised early.

Kerrison, Philip D. A Case of Abducens Paralysis Complicating Mastoiditis. [Med. Record, Nov. 30, 1918.]

Miss P. S., a girl of 11 years, two years previously had been operated upon for mastoidectomy, left, and had made a satisfactory recovery. Some five weeks previously she had developed acute purulent otitis media of the right ear for which she had been under treatment by an out-of-town aurist. While the acute symptoms had subsided, the aural discharge had persisted. The drum membrane also had fared badly, the membrana tensa having undergone rather extensive disintegration. Some ten days before she had suddenly developed distressing diplopia from abducens paralysis with resulting incompetence of the external rectus muscle.

The nerve may be compressed within that vessel in cavernous sinus thrombosis or disease; that it may be subjected to pressure in the posterior fossa by a thrombosed and inflamed inferior petrosal sinus (Page's case); that it may be involved in disease of the apex of the petrous bone (Gradenigo); or that the nerve sheath may be involved in a meningitis originating in a focus of infection over the mastoid roof (tegmen antri) and extending inward along the floor of the mid-cranial fossa; or that the nerve may suffer indirectly through a suppurative labyrinthitis, this giving rise to infection or inflammatory changes in the meninges in the posterior fossa.

Perkins collected from the literature 29 cases of mastoiditis with abducens paralysis in which the mastoid was operated upon, and 31 similar cases which were not operated upon. Of the former group, there were 1 death, 1 failure (*i.e.*, of recovery from the paralysis) and 27 complete recoveries. Of the 31 cases not operated upon, there were 4 deaths, 3 failures, and 25 (sic) recoveries. From these figures, the logical deduction would seem to be as follows: In mastoiditis associated with abducens paralysis, the mortality is much greater and the percentage

of 6th nerve recoveries is much less in cases not operated upon than in those in which the mastoid is operated upon. Therefore the occurrence with suppurative mastoiditis of paralysis of the external rectus occuli of the same side should be regarded as a positive indication for the mastoid operation.

Should the 6th nerve lesion be merely coincident and unrelated, the mastoid operation will serve only in eliminating the middle ear or mastoid disease. On the other hand, should the abducens involvement be the result of a spreading infection from the mastoid, a mastoid operation may be absolutely necessary not only to bring about restoration of the nerve function, but also to save the patient's life.

Mardellis, A. Oculomotor Paralysis After Fracture of Petrous Bone. [Lym. Chir., Sept., 1919.]

This patient had a fracture from being hit on the head with a log. The fracture at the apex of the petrous bone was followed by unilateral and isolated external oculomotor paralysis, paralytic convergent strabismus. The patient recovered in six months.

Hallez, G. L. Double Facial Paralysis of Traumatic Origin. [Rev. d. laryngol., XXXIX, 1918, p. 25.]

Facial diplegia from nonsurgical causes is seldom met with in the isolated state. Sainton in 1901 devoted a comprehensive work to this subject, but the authors state they have never encountered a case. Traumatic facial diplegia seems to be of still rarer occurrence, and Sainton in his work cites only the three cases of Gama, Romberg and Calowski. To these are to be added that of Bayer of Brussels and two observations published since the war, the one by Chatelin and Patrikios, the other one by the writer and R. Oppenheim.

III. PSYCHOSES, PSYCHONEUROSES.

1. PSYCHONEUROSES.

Kenyon, Elmer L. Stammering and its Solution. [Laryngoscope, Sept., 1918.]

Kenyon states that stammering is a serious disorder distinguished by emotional disturbance, accompanied by a distressing spasmodic abnormality of action of the peripheral organs of speech. While lay efforts at teaching in such a condition cannot be entirely depended upon, because of the narrowness of the desired knowledge, medical efforts sometimes also fail for the same reason. Only through the combined efforts of physicians, especially educated and trained for the undertaking, and of well educated laymen can the problem be completely solved. The treatment rests on the principle of educated selfcontrol. The correct application of this principle is directed toward conscious control of the periph-

eral speech mechanism and the direct control of the emotional and nervous disturbance. The author lays no particular stress upon the important consideration that stammering represents many grades of intensity. His concept of the disorder is purely static.

Farrar, Clarence B. Neuroses among Returned Soldiers. [Boston Med. and Surg. Jour., Nov. 7 and 14, 1918.]

The following features are noted as the general characteristics of war neuroses. (1) The preponderance of exogenic factors as compared with the neuroses of peace. (2) The wide prevalence of neurotic reactions at least in mild or transitory form among soldiers at the front, though not necessarily incapacitating for duty. (3) The distinctive reactive war coloring. (4) The frequent incidence of phases of trench neurosis masking for a time, or modifying the course of the actual mental disease. (5) The not uncommon association of neurotic symptoms with minor physical disabilities, giving to the latter an apparently aggravated character. (6) The almost universal occurrence of stereotyped symtoms; the conditions and associations of warfare constituting a real neurosis school. (7) The attitude of hospitality on the part of the invalid toward his neurosis, or at least an air of resignation often suspiciously like satisfaction. (8) The stubbornness with which these neurotic habit reactions may persist as a result of the unique fixation motives underlying them.

Wolfsohn, J. M. Hysteria. [J. A. M. A., Dec. 21, 1918.]

The advantages afforded by the war in the study of hysteria are illustrated by this paper based on 573 cases treated in British and American hospitals by the author. In the former are included those hysterias largely due to "shell shock," and in the latter those found in ordinary civilian life. The paper is written with special reference to the treatment of these cases, of whom 550 or 95 per cent., were completely cured of their disabilities. The most important part of the treatment is the confidence of the physician in the correctness of his diagnosis and his ability to cure. No one can convince others who is not himself convinced. Wolfsohn divides the various methods of treatment into two classes: (1) The purely reëducative methods, such as breathing exercises, singing in the stammering cases, and the use of mechanical machines, massage, etc., in the paralyses. (2) Psychotherapy, consisting of psychanalysis. This is impracticable at present in the hysterias of warfare. It often accomplishes much in the psychoneuroses, but there are not enough psychoanalysists to deal with the cases in one large hospital for this form of disease. The method is too slow to be used in modern hospitals. "Early accessibility to the patient through a rapid cure is accomplished by any of the following methods, which include: (1) Hypnotism. This was used extensively, especially at the beginning

of the war, but its use has been discontinued by most physicians on account of the frequent relapses and otherwise indefinite results. However, hypnotism is very valuable in treating insomnia, and he has used it successfully in combating terrifying dreams and hysterical convulsions. (2) General anesthesia with ether, combined with strong suggestion in the excitement stage. This is still frequently used, but W. believes that on account of the discomfort to the patient simpler methods should be employed first. The method finds its most successful use in the intractable cases of hysterical deafness. (3) The continuous bath. This is reputed to have quite successful in the treatment of certain algias and motor disturbances of hysterical origin. (4) Suggestion. The best of all treatments in my hands has been strong suggestion, reinforced by some mechanical agent which will assist in relieving at least some of the disturbed functions. This is easily administered with the aid of faradism or galvanism, and the results are quick and complete." Suggestion followed by reëducation, making the patient believe he is curable, and discipline in the form of demanding military atmosphere and regular duties breaks down the unconscious resistance of the patient to the idea of recovery. Special treatments for the various hysterical disorders are described and form a large part of the article, each illustrated by actual clinical cases, and Wolfsohn concludes with a long list of general rules for the efficient, rapid and complete cure of hysterical symptoms, which are too fully given to be abstracted. Observing these rules, any physician, he holds, ought to be able to treat hysterical disorders successfully, but without such, failure stares him in the face. The article is illustrated.

Landau. The Principles of Psychical Isolation in the Treatment of Functional Nervous Disturbances. [Bull. de l'Acad. de Méd., 1917, LXXVII, p. 701.]

Landau describes a new mode of treatment which he has found of great value in most cases of functional nervous troubles in warfare; he has thus treated about fifty cases. The patient is brought into the presence of other patients who present symptoms similar to his, but of an organic nature. A detailed clinical examination is then made of his case in the midst of his fellow-patients. If, for example, his case is one of a functional causalgia, the physician briefly reviews the history of the case, its mode of production, and the distinctive signs of these conditions. In the case of a functional palsy of a nerve, the physician discusses openly before all the patients the electrical changes, and then makes an electrical examination of the functional case and also of an organic one. As a rule, after a few of these public demonstrations and lectures, and sometimes even from the first one, there is benefit to the patient. By means of this kind of procedure Landau claims that a state of "physical isolation" is set up: the functional patient is, as it were, brought face to face with himself. The exact mode of application of the treatment has to be varied to some extent according to the features of the partic-

ular case. Three illustrative cases are given. [Leonard J. Kidd (London, England).]

Hartung, M. U. German Experiences of War Neuroses. [Zeitschrift f. d. ges. Neur. v. Psych., vol. XL, Nos. 2–3, 1918.]

Of the innumerable papers published on war neuroses in Germany, this paper, according to the British Medical Journal, possesses the unusual merit of succinctness. In the course of a year he treated 780 cases at Thal, a military sanatorium for such cases. In 162 cases the patients suffered from hysterical paralysis, the lower limbs being twice as often affected as the upper. Atrophy of muscles and stiffness of joints were a common sequel in these cases to the misuse of splints and other appliances; in many instances considerable force was necessary to straighten deformed hands. About 98 per cent. of all the cases were cured by a combination of psychic and mechanical treatment. Tremor occurred in 28 per cent. of all cases, the parts most frequently affected being the head and upper limbs. Fine tremor was harder to cure than coarse, but a cure was ultimately effected in every case. Hysterical convulsions, which were observed in 8 per cent., were easily cured, either by suggestion combined with electricity, or simply by ignoring them. Disturbances of speech occurred in 5 per cent. of all cases and every one was cured. Hearing was affected only in 1 per cent., and in some cases the deafness had lasted for years. Recovery was effected in every case under a combination of suggestion and local treatment. The restoration of hearing was often instantaneous. Cardiac and respiratory neuroses were found only in 1.5 per cent., and the most common manifestations were tachycardia, dyspnea, and "heart cramp." The only patient in this category who failed to respond satisfactorily to treatment was also both deaf and imbecile. Neuroses of the digestive system comprised aërophagia, vomiting, "stomach cramp," eructations, and tympanites. They constituted 1.5 per cent. of the total, and all yielded satisfactorily to treatment with the exception of one patient, in whom vomiting proved intractable. The bladder neuroses, found in 1.5 per cent. of the total, consisted of incontinence in all but one case in which there was sphincter spasm; all were cured. Neurasthenia, in the strictest sense of the word, was present in 20 per cent. Hartung concludes that the principle of special hospitals for war neuroses has been fully justified, and insists that the atmosphere of military discipline in such institutions is of inestimable value in securing a high rate of recovery.

Nordman, Ch. Obstinate Forms of War Dyspepsia. [Paris médical, Nov. 30, 1918.]

Based upon an experience of some year and a half with dyspeptic patients in a military hospital Nordman states that whenever a patient fails to respond rapidly to rest, diet, and the remaining customary

measures, an organic irritative focus somewhere in the body must be sought. A pathogenic rôle of the neurosis which is usually superimposed on an organic lesion is not to be denied, but often an actual, detectable organic disease lurks behind the appearances of a gastroneurosis or common dyspepsia. Thus it may be seen that this author like most others gets caught up in the static vicious circle idea and does not work out a dynamic psychology. While most dyspeptics exaggerate their discomforts, true malingerers are rather rare; where deceit is resorted to, it usually consists in the regular ingestion of purgative salts to keep up a diarrheal disturbance. Again, many war dyspeptics are merely individuals suffering from colitis with dyspepsia and secondary vomiting. Some are merely unrecognized amebic cases, in which the dysentery has come on slowly. Examination of the stools may have been negative; but upon repeated study of fresh material after administration of small doses of sodium sulphate or of iodized enemas, ameba may eventually be detected. A considerable number of the dyspeptics are cases of tuberculosis. Such a patient loses weight, becomes anemic and suffers from slow digestion. Chemical and X-ray studies of the stomach may be negative, and the patient improves temporarily when placed at rest and on a diet. A few months later, pulmonary tuberculosis is manifest and often irremediable. Regular temperature estimations and the noting of abnormal pulse frequency and irregularity and of a low blood pressure have often led the writer to the diagnosis of incipient tuberculosis among men previously considered simple dyspeptics. Finally, in some atypical cases of gastric ulcer with the lesion in the mid-gastric region and the pain and vomiting closely following upon ingestion of food or occurring irregularly, persistent failure of rest and strict dieting to relieve the pain should suggest ulcer, in which event operative treatment is nearly always indicated.

Saliba, J. Antalgic Spinal Distortion. [Journal A. M. A., Feb. 22, 1919.]

Antalgic spinal distortion is a term used by John Saliba to denote an unnatural condition of the spinal column characterized by a misdirection of the normal attitude, a stooping with rounded shoulders and back, varying from slight curve to a decided deformity. The condition has received considerable attention by French writers, but the author has found no mention of it in the literature of this country, and in that of England he has found only one paper. Although the condition as an acquired one has been often observed in military life it is not unknown among civilians. Many surgeons have undoubtedly observed cases following operation or accident, especially in persons having a predisposition to hysterical or neurasthenic conditions. The main factor in its etiology is pain, which may be due to pathologic conditions or may be purely mental or functional. The change in position is adopted to re-

lieve the pain, and it may become so continuous and aggravated by stretching of the ligaments and small back muscles as to be a serious matter. Bruising from injury or rheumatism may cause it. The more or less permanent organic factor may be slight and the psychic element chiefly responsible. The distortion rises from the pain, not the pain from the distortion, as a rule. The organic element in it is a minor factor. In some cases it may be difficult to diagnose from spondylitis deformans, but careful observation will settle the diagnosis. In spondylitis the change of position does not affect the spinal curve, but in this trouble, the normal position can be restored with the patient lying on his back. Naturally with the difficulties of diagnosis and need of more thorough observation, all sorts of treatment may be adopted and the patient come to believe his condition incurable. Psychotherapy should take the place of the various and elaborate methods of treatment, and remove his impression that he has a serious organic disorder. Saliba reports an illustrative case in which the persuasion and reëducation of the patient brought about cure within a week. The article is illustrated.

Hall, George W. Camptocormia (Bent Back). [Journal A. M. A., Feb. 22, 1919.]

The author reports a case of "bent back" of soldiers, the camptocormia of Souques, which seems to be a functional trouble following shock from shell explosion, etc. In all cases, so far reported, lumbar pain was an important symptom, causing many days in bed and followed by spinal distortion. The injury causing the disability may be distant from the spine. In the case reported, the patient suffered a bruise on the left arm, and a box, weighing 115 pounds, had fallen across his abdomen. There was no immediate serious disability, but twelve days later his body became flexed to the left when sitting, standing or walking. The condition was regarded as functional, and an operation for a varicocele was performed which seemed to mentally affect the patient, as he believed himself becoming impotent. The patient was advised to be placed in a neuropsychiatric hospital. Rosenoff-Saloff, who described sixteen cases, found all his patients neuropathic cases. Sicard and Souques found hyperalbuminosis as the only symptom of organic nervous trouble. The condition resembles no other known disease except spondylitis deformans. The treatment that aids the patient's belief in a serious trouble is too often applied by the practitioner. The patient should be told that he is a victim of a bad habit, and that his trouble is purely functional. Electricity can be used as a means of suggestion only. In neuropathic cases the prognosis is not so good, and such patients should be treated in a neuropsychiatric hospital and be under the strictest discipline. This seems to be the opinion of those who have had the most experience with such cases.

Guojarro. Emotional Blindness. [Med. Iberia, Jan. 1, 1919.]

This report is of a young woman apparently in good health, is suddenly overwhelmed by an emotional storm. Her brother had just previously committed suicide and she passed under the branch upon which he had been hanging. She developed a bilateral blindness and in the beginning a complete deafness, which latter was transient. After several months she recovered. The real dynamic reasons for her illness are not revealed. The author talks about suggestion as the curative agent.

A. Hofvendahl. Nasal Reflex Neuroses. [Hygeia, Mar. 30, 1918.]

Hofvendahl refers to the recently reëmphasized knowledge of the antagonistic action of drugs and gland extracts upon the sympathetic and the autonomic nervous system. Those that increase the tonus in the sympathetic system modify the blood picture in the direction of neutrophilic eosinophilia, and those of that increase the tonus in the cranial and sacral autonomic nerves modify the blood picture in the direction of mononuclear eosinophilia. These nerves always respond to atropine by paralysis and to pilocarpine by stimulation. The sympathetic system responds quickly to epinephrin and cholin, but is not influenced by the first-named drugs. Hormones from the endocrine glands and bacterial toxins produce probably the same contrary effects on the two systems. So in bronchial asthma the copious watery discharge which precedes it is probably due to overstimulation of the parasympathetic (autonomic) system, which term the author prefers for these cranial and sacral autonomic nerves, and the swelling of the inside of the nose represents an irritation of the vasodilators of this system. Atropine produces a transient improvement, showing that this system is temporarily paralyzed by this drug.

Tuberculous toxins in three out of eleven cases of nasal asthma evidently caused the irritation of the parasympathetic system and eosinophilia. Such a nasal neurosis may be a first very early symptom of tuberculosis. In 500 tuberculous persons 10 per cent. revealed vasomotor disturbances of the nose in the first and second stages of the disease. A nasal neurosis therefore calls for a thorough somatic investigation. There is in persons so afflicted an unstable sympathetic parasympathetic balance, which may be easily disturbed by emotional stress, bacterial toxins, mechanical pressure, odors, pollen dust, etc. The endocrine system in such persons is also liable to disturbance especially during transitional periods, the imbalance existing chiefly between the genital and thyroid glands. Correction of anomalies, even the slightest, in the nose of persons with such an exaggerated reflex irritability of the nasal mucosa is important. Hofvendahl cites several instances which confirm this. Several cases of removal of polyps showed progressive decline of attacks of asthma. In one case nasal asthma appeared under a course of digitalis treatment and subsided under atropine, the digitalis

apparently producing a toxic effect. The onset of the menses, in one patient of 27 years, greatly exaggerated a bronchial asthma and other hyperthyroid symptoms. There was profuse sweating with the asthma. The asthma disappeared without return after resection of a nasal spine and crest which were much enlarged. [J.]

Pighini, G. Traumatic Emotional Trophic Disorders. [Policlinico, Feb. 10, 1918.]

The author contends in this extensive article that the trophic disturbances of various sorts which occur after minor war injuries are psychic reactions expressive of unwillingness [unconscious?] on the part of the soldier to return to the front. The man's thoughts and efforts are focused upon the wound and it is perpetuated in itself or its results. Even when the wound is healed the pulse is unstable, hypotension and tachycardia are frequent, also dermographism, intensification of the muscle response to mechanical stimulus, and trophic manifestations, such as edema of the hand after a slight wound of one finger, patches of leukoderma, or symptoms suggestive of excessive or deficient thyroid functioning. It is worthy of remark that these trophic disorders are never met with among the prisoners of war in the Italian camps, who know that they do not have to return to service. The reflex dystrophy becomes installed when the nervous system is below par. There is in these cases an intense reaction to atropine, with almost absence of reaction to pilocarpin, epinephrin or ingestion of glucose. He believes that the thyroid secretion regulates the functioning and the tonification of both the sympathetic and autonomic divisions of the vegetative nervous system. The formation of thyroid colloid is stimulated by the vagus ramifying in the throat and the vagus system in turn is stimulated and tonified by the thyroid secretion. The sympathetic is particularly responsive to thyroid treatment. If there is a tendency to autonomous miopragia and abnormal functioning on the part of this system, then thyroid treatment slows the heart impulse and the pulse, raises the blood pressure and the oculocardiac reflex tends to become normal. Thyroid treatment was very beneficial in one case of myxedematous changes in the leg. There were trophic changes in skin, muscle and bone, with these traumatic psychoneuroses and marked increase in the coagulation time of the blood. Deficit of lime in the blood or pathologic parathyroids be believes may be revealed by further research. [J.]

Hurst, A. F. Observations on the Etiology and Treatment of War Neurosis. [Brit. Med. Jour., Sept. 29, 1918.]

An exhaustive and interesting summary at the Charcot-Janet level. The author first discusses exhaustion resulting in neurasthenia and soldier's heart. Since the battle of the Marne and up to the date of

the paper in question there had been in Hurst's experience very little nervous exhaustion from sheer overstrain except in the campaigns of Gallipoli and Mesopotamia. Acute and chronic infections were rare in France but there were many mild toxemias from trench fever, influenza, which were easily avoided by timely rest. The most serious causes are mental strain, severe pain, and acute infections, because of their direct action upon the nervous system, and indirectly by their action upon the suprarenal glands, the liver, and probably the thyroid. Continued muscular exertion, great fear and anger, or any great emotion, may lead to chromatolysis of the brain cells. Symptoms are the usual ones of civil life. Those described under the name of "soldier's heart" are prominent. Generally the blood pressure is low. Treatment should at first consist in complete mental and physical rest in bed until the patient no longer feels tired (generally from one to three weeks, although badly complicated cases may require as many months). A dose of bromide gr. 5 may be administered two or three times daily. Opium and alcohol must never be used. Insomnia should be carefully prevented by some such treatment as sodium diethyl-barbiturate (medinal) combined with acetyl salicylic acid (aspirin) gr. 15, which the author has found best. 10 to 15 grains of the sodium salt should be given the first night, and reduced by 1 gr. every other night until only the aspirin is used. This may then also be reduced. In extreme cases suggestion under hypnosis is helpful.

He then takes up emotions resulting in stupor and amnesia, psychasthenia, hysteria, hyperadrenalism and hyperthyroidism, and exaggerated defensive reflexes. Generally such collapses result from cumulative tension of fear and horror rather than from single incidents. Even when a single event is the cause, it is difficult to discover, because at first the patient often refuses to talk of it, and later it is often obliterated from memory.

Stupor and Amnesia.—Onset may be gradual, shown in sluggishness and silence, and after special horrors may lead to mental confusion so great that the patient becomes wholly oblivious and wanders sometimes for miles. (Such effects are often produced by shell shock, exhaustion, and epileptic attack.) The processes of nature become involuntary. Stupor may last from a few minutes to a week, and may pass away suddenly, or, as is more usual, by slow degrees.

Psychasthenia.—Nightmare, day-dreams, and, less frequently, obsessions and phobias are the usual forms of this affliction. Tics are rare. *Treatment* should in most cases be like that for neurasthenia, except that hypnotic suggestion and "therapeutic conversations" must play a more important part, and are often the only means of preventing dreams and inducing sleep. Especial care should be exercised to gain the patient's confidence. Tics are most difficult to treat and hypnotic suggestion seems of little avail. Reëducation is the only resort. Regular exercises of the affected muscles and voluntary inhibition for definite periods

several times a day give good results. Eructation and aërophagy may be cured by clenching a stick between the teeth whenever the yearning is felt.

Hysterical Symptoms.—These are generally caused by the auto-suggestion of the physical results of extreme fear, especially that in which the knees give way, the breath is held, and speech is impossible. Hysterical paraplegia or mutism results. Usually a period elapses between the causal incident and the onset, and therefore cases are more frequent in clearing stations and base hospitals than in the trenches. Abnormal suggestibility following a prolonged dazed condition tends to make a patient exaggerate and perpetuate any physical weakness or defect: thus immobility often suggests paralysis, and silence caused by weakness often suggests mutism. Hence hysterical phenomena often result in war cases from causes that in ordinary life do not give rise to them; as, for instance, operations for appendicitis, and cases of muscular rheumatism. *Treatment.*—Since this affection, under whatever form it may appear, is due to suggestion, its best cure is suggestion or persuasion. Although many cases recover spontaneously, some, which cannot at first be distinguished from the others, persist indefinitely unless vigorous treatment is applied. This should be instituted *at once.* Although speedy improvement often follows treatment, complete recovery may be very slow. Patient reëducation for several weeks is often necessary, especially when the gait or speech is affected. Physicians should be on their guard against organic causes and malingering. Too great sympathy and luxury in comfortable hospitals often invites the feigning of such symptoms; therefore the patient should be given to understand that there is nothing unusual about his case, and that speedy recovery is expected. Encouragement from men in the same ward who are already improved is a form of suggestion of immense importance. Suggestion, then, in whatever form, is the best and surest treatment. Electricity and massage should be used sparingly, or when applied, they should be vigorous enough to produce immediate effects. Five minutes is often enough to cure a paraplegic man, if he is first aided in making movements, and then is told that he is strong enough to make them himself. In cases where recovery is delayed by clonic spasms, anesthesia followed immediately by passive, then active movements of the patient's limbs, has given quick and lasting results. In mute or aphonic cases, first suggest the certainty of recovery, and then apply, if it is thought best, an intralaryngeal electrode, previously connected with a faradic battery. The powerful suggestion caused by the pain and muscle contraction will generally produce the desired results. If electricity has already failed, ether should be given so rapidly as to cause great excitement. If the patient does not then talk spontaneously an electrode may be used, and the patient made to talk continuously until the anesthesia has passed. Similar treatment may cure stammering if applied at once, but generally reëducation is needed with lessons in

breathing and talking every day. Hysterical fits may be diagnosed from epilepsy, if one is induced by the physician by hypnotic suggestion. The author has found it effective to tell the patient before, during, and after the fit so induced, that it will be the last one that the patient will have. Cases of absolute and genuine hysterical deafness have been cured by pretending to operate on the patient. Enough ether has been given in such cases to make the patient excited, then two small cuts have been made behind the ear, and a hammer banged on a sheet of iron. In one case the patient jumped from the operating table in great joy althongh he had been deaf for nine months, and had been unable to hear the loudest noises even in sleep. By similar suggestion, blindness has been cured.

Hyperadrenalism and Hyperthyroidism.—Such cases result from a failure to expend the tremendous energy which the emotions of anger and fear, especially fear, supply to the muscles through a sympathetic nervous energy which causes abnormal secretions from the suprarenal and thyroid glands. When properly expended, this energy permits comparatively weak bodies to accomplish tremendous feats. They become entirely useless, however, if the emotions are not accompanied by the activity to which they instinctively give rise—that is, anger to fighting, and fear to flight. The author goes on to say: "Thus the ceaseless fear felt by the constitutionally timid when exposed to the horrors of war results in constant over-secretion of the suprarenal and thyroid glands, the physiological results of which are not followed by the muscular activity or flight for which they are the preparation. The unexpected energy may be so extreme that the soldier is incapacitated by it. On reaching the safety of a base hospital the hyperactivity of the suprarenal and thyroid glands and the signs and symptoms to which they give rise often disappear. But they may be perpetuated by war dreams and in severe cases the mind is absorbed by day as well as by night by pictures of the horrors which the individual has witnessed; every sound reminds him of shells and every movement suggests the approach of danger. The activity of the suprarenal and thyroid glands is maintained, and the patient presents a picture suggestive of Graves's disease." Rapid pulse, enlargement of the heart, and high blood pressure, are attending phenomena.

A pilomotor reflex can be produced sometimes by touching the skin so lightly that under any other conditions no effect would be produced. Goose skin appears and the hair sometimes stands on end. This phenomenon is followed by a vaso-dilator reflex, a blush with white borders. "Circulatory symptoms may be so marked that the case is often diagnosed as 'disordered action of the heart,' Excessive sweating often occurs, sometimes in paroxysms. . . . The hands and occasionally the eyelids are tremulous, and the patient is highly nervous and excitable. The eyes are often slightly prominent, and von Graefe's sign may be obtained." *Treatment.* The patient should be isolated from other

patients by screens, and he should see only persons likely to allay his irritability. He never should be even remotely reminded of the experiences he has passed through. Opium in this as in no other war neurosis may be used to allay mental and nervous activity. Suggestion is helpful when nightmares or special anxiety are involved. Belladonna tends to reduce the secretions. X-ray applications have been sometimes successful in affecting the thyroid gland, but they are likely to be otherwise injurious.

Exaggerated Defensive Reflexes.—The "flinch reflex" and the "jump reflex" which arise from the instinctive actions of defense and flight, have sometimes been diagnosed as hyperacusis. Hyperacusis sometimes occurs with hearing about sixteen times above normal accuity. 100 grains of bromide a day produced no effect on either affliction. Hypnotic suggestions may remove the actual dreams of terror, and yet the reflexes continue unabated. *Treatment.* Complete rest, no visitors, no change of nurses. Confinement to bed and isolation are highly desirable. Hypnotic treatment for nightmares and day dreams. Although bromides have little effect, medinal and aspirin produce sleep. Hyperacusis calls for wool plugs and thick pads over the ears, especially when there is much noise or thunder.

III. *Shell Shock.*—"The term 'shell shock' should be reserved for the condition which follows exposure to the forces generated by the explosion of powerful shells in the absence of any visible injury to the head or spine. In all cases there is an organic basis, which consists of the more or less evanescent changes in the central nervous system resulting from the concussion caused by aerial compression, to which is often added concussion of the head or spine caused by the sandbags or a falling parapet, or by the patient being blown into the air and falling heavily on his head or back. On this organic basis hysterical and psychasthenic symptoms are often superposed."

Post-mortem examination in men who have been blown into the air and have died without regaining consciousness and without apparent injury, discloses punctate hemorrhages in the white matter of the brain, and, in the nerve cells, chromatolysis with eccentric nuclei. Carbon monoxide poisoning from the gas produced by the explosion, gives rise to identical effects, and may be responsible for at least some of the cases, especially when the victims have been confined after explosion in recesses from which the gas did not quickly escape. Although at the base hospitals the cerebrospinal fluid has generally been found normal, French doctors have found by lumbar puncture that, immediately after the explosion, this fluid is under increased pressure, and that it contains albumin, blood, and slight excess of lymphocytes. Within forty-eight hours these symptoms disappear. It is then clear that organic changes occur in the nerves, but they are slight and quickly disappear.

Cases due entirely to the concussion of the brain and spinal cord. Shell shock symptoms are identical to those of concussion in civil life.

Unconsciousness, stertorous breathing, and, in serious cases, death without recovery of consciousness, are characteristic. Stupor with loss of memory for certain periods occurs in some cases. Nightmare is frequent and headache constant. If there is a raised pressure temporary relief may sometimes result from lumbar puncture. Excitability and irritability often continue long after recovery. Seminal emissions in one case attended the frequent dreams of horror, but were stopped by a single use of hypnotic suggestion.

Spinal concussion generally results from burial under earth or sandbags, or sometimes from a blow on the back. A projectile passing near the spine is sometimes the cause of concussion. Roselle and Oberthur have noted that within a few minutes of the injury tendon reflexes were exaggerated and cutaneous reflexes were absent, except for the plantar reflex which was extensor. There was hypotonus of all muscles. In most cases complete recovery with the disappearance of all abnormal signs occurs, but in some cases slight spasticity with exaggerated jerks and occasionally extensor reflexes persists, due to permanent lesion of the spinal cord. Usually there is rigidity and pain upon bending. At first there is often difficulty in the retention of feces and urine, but later excessive retention. These difficulties soon pass.

Cases with hysterical symptoms grafted on to organic basis of cerebral or spinal concussion. Organic paraplegia which is the result of actual spinal injuries, and which would naturally disappear as soon as those injuries have been repaired, is perpetuated in the form of hysterical paraplegia. Suggestion and persuasion may effect immediate cure. When the cure of spinal defects is only partial, spasticity and inaccuracy of movement must to some extent persist. As soon as the initial stupor has passed away an attempt should be made to induce the patient to walk. It is difficult to judge whether or not symptoms are of organic origin. Some of the most marked of these, such as extensor plantar reflex, altered knee jerks, and ankle clonus have proved to be hysterical and therefore quickly amenable to persuasion and reëducation. Auto-suggestion is apparently the cause of a good many affections which seem to be the result of lesions of the central nervous system. Men often become blind, deaf, dumb, or hemiplegic, when there is no apparent injury of the nerves. The author explains these divers effects by a theory of hysteria. Since in such cases at first all the faculties are inhibited, the patient upon regaining consciousness notices some one defect, but fails to notice others. By auto-suggestion, therefore, one defect, like blindness, may be perpetuated, while the others disappear automatically without having been noticed by the patient at all. It is, therefore, hysterical in nature. However, impressions during the moment between the explosion and loss of consciousness, or those made at the moment of recovery from unconsciousness, may in a few cases explain such phenomena. Rest is all important *from the start.* Sufficient rest at first often obviates the chronic aches of head and back that follow

concussion of the brain or spine, which the most costly treatment administered later fails to cure. Care should be exercised, however, that prolonged rest does not result in hysterical astasia-abasia or paraplegia. Except in severe cases of stupor, the patient should be made to go to the lavatory and to bathe from the first day. When there is no longer pain in the head and back, exercise should be taken, but massage often aggravates the pain and causes introspection.

2. PSYCHOSES.

Bourdillon. Mongolian Idiocy and Quadrupedal Gait. [Revue Médicale de la Suisse Romande, Oct. 20, 1918.]

This is a comparatively rare form of idiocy of which 69 personal cases in 13 years were seen by Comby. Two recent cases with new form of behavior—the well marked quadrupedal gait, also the suppleness of the joints, the acrobatic poses and a tendency to monkey-like mimicry and the familiar behavior as of some domestic animal. The child was affectionate, docile, harmless and fond of being petted, showing, as it did, an enjoyment of life and having complete animal development. There was no element suggesting a throwback to a Simian ancestor.

Hinrichsen, O. The War Psychoses of the Belligerent Nations. [Basel, Ernst Finckh, 1917, p. 48.]

The writer attempts here to outline some of the psychological factors at work to produce and maintain the war, but without applying to the situation either censure or approval. He is merely considering the exhibitions of a national psychology in which a collective affect dominates toward a certain attitude and toward a belligerent outbreak. Individuals who had not believed such a war possible were at last so stirred by the continued efforts of the governing classes and their utterances that whole nations finally went mad and developed contagious war psychosis. The collective mind is swayed by extreme factors which are less effective in the individual acting alone. Individuals sink themselves into the mass and are moved by fear, as, for example, of spies and espionage, by considerations of glory, love of country, etc.

Each nation manifests typical hysterical reactions in large form and in these reactions is a typical suggestibility in accord with the underlying feeling tone. England's mass psychology has been marked by economic instincts and ideas and influenced by dogmas which are interpreted in the light of these instincts and ideas of the Englishman's own. To the French the "revanche" idea has been charged with such an affective tone that the collective national mind has been for years kept ablaze and dominated by this idea. In Italy the "Irredentia" idea stood in the same way for national pride and the need for expansion. Germany was dominated against the will also of her individual citizens, by an unconscious current in her collective mind which was being driven

toward hostility to those in her way and away from the peace for which her individual citizens thought they were striving. It is the same sort of psychosis of enthusiasm which in a greater or less degree leads every one, whenever he yields to it, into some degree of mental aberration. The trend of the national psychosis is manifest in the head-lines of the daily papers, the cartoons and jokes and stimulation toward it is exercised chiefly upon the people who remain at home.

The author believes that the "morbus demokraticus" of which Grodich wrote in 1848 has a yet more disastrous influence than this psychosis of "war," for it leads to national disintegration and an impotent individualism and finally a "psychosis of revolution."

Redlich, E. The Etiology of Epilepsy with Special Attention to the Question of a "War Epilepsy." [Wien. med. Wchnschr., 1918, Nos. 17–19.]

The writer believes that after a doubtful attack of apparent epilepsy certain other signs should be tested for, which might aid in determining the diagnosis. These are the presence of lymphocytosis in the blood, the history of an old cerebrospinal meningitis, signs of a mild hydrocephalus, positive blood or fluid Wassermann, history of familial epilepsy, alcoholism or migraine. These are of special importance in determining cases of pseudo- or true epilepsy among soldiers. Redlich does not believe he has found any true cases of epilepsy due to army experience among the cases which have come under his care, aside from a condition arising from gross traumata in the service. Those attacks of true epilepsy which appeared could all be proved to be of constitutional and pre-war origin. One patient who had considered his condition due to exposure to sunstroke and great heat was treated in an electric hot-air bath, but without any such result following such exposure.

Espejo, L. D. Mutism. [Revista de Psyquiatria, Lima, July, 1918.]

In this newly founded review of psychiatry published in Spanish, Moreyra and Paz-Soldan contribute a history of hypochondriasis as seen in the eighteenth century. Espejo takes up the subject of deaf-mutism in three children of a syphilitic and alcoholic father and epileptic mother. They spoke normally until a skin eruption developed on the head. This took place at about 18 months of age. The children then grew deaf and forgot all they had learned. Another girl of 4 after an attack of malaria became, deaf, dumb and blind for a few days. Then vision returned, then hearing, and speech. Stammering, defective enunciation and tics persist.

Valdizan describes a case of infantilism on an endocrinous basis and Delgado an excellent and comprehending article on psychoanalysis far above the level of similar reviews observed in supposedly more progressive countries than Peru.

Menninger, K. Influenza Psychoses. [Journal A. M A., Jan. 25, 1919.]

Menninger after quoting Sir William Osler's remark that almost every form of nervous disease may follow influenza, and noticing the paucity of the literature on this subject, describes the diagnostic methods used in the Boston Psychopathic Hospital, and gives their statistics. The importance of the subject is obvious. The examinations seem to be thorough, and a preliminary diagnosis is made by vote of the entire staff, which may be changed by or after the tenth day. For statistical purposes the cases are divided into four groups: delirium; dementia præcox; other psychoses, and unclassified. Many of the cases of the last group and also of the preceding one may be properly classed after sufficient time has elapsed. The frequency of dementia præcox is remarked. The incidence of the different types is discussed at some length. Giving the results of analysis of eighty cases of mental disease associated with influenza, the author sums up his paper, substantially, as follows: They cover a large variety of types but for convenience are readily classified in four groups, of which the greatest numerically, is dementia præcox. That age may be a factor in determining the form of psychosis is suggested by the analysis, and the duration of the influenza does not affect the occurrence of the psychosis, or its form. In most instances, an interval occurs between the termination of the influenza and the first manifestations of mental trouble, the averages varying from two to eight days. "The symptomatology is as complex as the nosology. Delusions and hallucinations are the most common symptoms, and depression is relatively infrequent, contrary to the case in mentally normal subjects. The states of delirium encountered are best classified as of three forms, on a temporal basis: prefebrile delirium (prodromes), (cum-) febrile delirium, and postfebrile delirium (collapse delirium, exhaution delirium, confusion, etc.). This accounts for all cases and avoids ambiguity. Neurologic signs were few; ophthalmoscopic examinations negative, save for one instance of bilateral neuritis, and spinal fluid examination negative save for one instance of modified colloidal gold reaction. An organic basis for some instances of the picture denoted dementia præcox is supported by the preeminent frequency of its occurrence in this series (31 per cent.), the age factor above mentioned, the frequency of schizophrenic symptoms in otherwise typical cases of delirium, and the occurrence of several (six or more) cases in which a diagnosis could not be made between delirium and dementia præcox, despite the presence of all diagnostic acids." The psychiatric prognosis may be generally expressed, as deduced from the findings of this series, as delirium (with recovery), death or dementia præcox. This excludes cases of previous psychotic basis, such as alcohol or nervous syphilis.

Notkin, S. Influenzal Psychoses. [Correspbl. f. Sch. Aerzte, Dec. 14, 1918.]

Two case histories are given in which a quiescent or latent schizophrenia became manifest following an attack of influenza. In two other cases acute maniacal excitement developed. Several other psychoses developing during influenza had been seen but he is convinced that there was always some more or less latent predisposition.

Sanz, E. F. Postinfluenzal Psychoses. [Rev. d. Med. y Cir. Prat., Jan. 7, 1919.]

These case histories were of women between 22 and 34, inclined to nervousness or hyperemotionalism. The influenza was mild in two, lasting three days only. In one there was acute depression with suicidal tendency and refusal to eat. This patient had not recovered from excessive hemorrhages at a childbirth three months before. The case histories demonstrate the importance of underlying factors in such cases.

Weber, F. Influenzal Psychoses. [Deut. med. Woch., Dec. 26, 1918.]

Several case histories are here given of acute psychoses arising during defervescence or even during convalescence from influenza. They were delirious states with motor agitation, hallucinations, etc. The development was completed within from four to ten days and the prognosis was good.

Jelliffe, S. E. Nervous and Mental Disturbances of Influenza. [N. Y. Med. Jl., Nov. 2, 9, 1918.]

This is a complete though condensed résumé of the many neurological and psychic disturbances due to the microörganisms causing influenza. Jelliffe calls attention to the antiquity of the illness, gives citations from the earliest literature and comments on the enormous literature of the subject. He gives his experiences with the neurological complications including disturbances of all of the cranial nerves, isolated or in combination, calling particular attention to the types of ocular palsies, optic neuritis, and facial palsies, and specially raises the question of localization. He notes that different observers have spoken of "this epidemic as being noted for the large number of mental cases"; "this epidemic has been noted for the large number of pneumonia cases"; "this epidemic runs to intestinal types," etc., etc. Thus, in the epidemic of 1781, it is recorded that there were great numbers of very severe head symptoms, "cruel pains," and the term "cephalitis epidemica" was coined and used as a standard of classification by Sauvages, as has been referred to. Thus there are direct indications at least that a certain specificity of tissue type involvement may be the usual

thing. Complete analyses, which are rarely ever possible, may show this to be a faulty generalization, for there are by no means few instances when diffuse and severe neuritides are known to have occurred with severe pneumonic types. Thus a severe facial cervical zoster type accompanied a severe and fatal exudative edematous pneumonia in one of his patients. Since the general problem of the determination of localization of disease processes is still so obscure, the generalization is left for subsequent modification and criticism. When one patient with a mild influenza develops a zoster, another a mild optic neuritis, and still a third a tachycardia, diffuse perspiration, tremor, and other symptoms of a vagotonic exophthalmic goitre with other adenopathies, all three resulting from a similar toxic producing agent, it becomes an interesting problem of individual constitutional variation in organ susceptibility—a problem which has been but little touched upon but is of paramount importance, not only in the reactivity to the influenza toxin, but to other types of infectious disease, syphilis for instance. Among others, Potzl, Bartels, Paltauf, and Adler in his Inferiority of Organs and Their Psychical Compensation have touched upon this aspect of the problem.

Of the spinal complications neuralgias, neuritides, zosters, myelitides, polyneuritis, pseudotabes, are recorded. Brain involvements such as meningitis, purulent and serous, and the subject of *lethargic encephalitis* is particularly discussed. Jelliffe had seen cases in 1890 and later, of which of late some special mention has been made, in which it has not been certain whether one has to do with botulism (see English reports), poliomyelitis, or an unknown infectious disorder involving the structures of the midbrain. The French first called it lethargic encephalitis and attention has been already directed to it here, when speaking of paralysis of the oculomotor nerves. The type of disorder referred to has been present in Austria, England, Italy, and France and has been given several names. It is characterized by acute onset with chilliness, headache, and fever; nausea and vomiting are occasionally present. Then a series of symptoms develops in which great lethargy and cranial nerve palsies occur. The lethargy, at times spoken of as narcolepsy, is very profound. It may come on slowly with heavy eyelids—complicated by organic ptoses in the eyelids—and an irresistible torpor. The patient may be aroused, wake up, answer in responsive or irresponsive monosyllables and sink again into deep unconsciousness. The patient may not be waked up sufficiently to be fed, urination and defecation taking place in this deep stuporous state. Occasionally this is broken by nightmares or at times a muttering delirium. Death may ensue, the patient developing Cheyne-Stokes respiration and going out. In the patients who recover, which is the rule, the lethargy slowly diminishes and the patient comes to himself gradually.

Speaking of mental involvements Jelliffe says there is probably no other acute infectious disease which gives rise to, or results in so many diversified types of mental disturbance, ranging from the simplest fatigue states of a transitory nature to some of the severest defect mental conditions which may wipe away at a blow the entire mental life. Fortunately the tendency is towards the mildest and milder involvements, but the gamut of possibilities is indeed kaleidoscopic. This great diversity in syndromy is worthy of the closest scrutiny, for it affords a very important research background bearing upon the complex dynamic interdependence of the health of the bodily organs and interference with the energy receptors, transformers and effectors. There is a special affinity for the grip toxins, whatever they may be chemically, for nervous structures. The special nervous structures which apparently handle the poisons with the greatest difficulty seem to be the sympathetic division of the vegetative neurons. As is well known functional balance of the metabolism is chiefly if not exclusively maintained by the vegetative nervous system. The functional metabolism of nervous structures themselves is likewise affected and fatigue is a preliminary warning in consciousness of threatened faulty adjustment. The fatigue threshold is dangerously near consciousness because of the most universal of all affective goals, indolence. Indolence is ever ready to camouflage its real desires and by means of a conversion mechanism fatigue states arise from the conflict with indolence, which varies with every individual. Hence in those, and perhaps they are the majority, a slightly added weight by means at times of a minimal amount of metabolic imbalance from intoxication which throws up the danger semaphore (instinctive sense of wellbeing) the sense of fatigue is doubled or redoubled. Flight now is the psychological alternative as a protection mechanism. The robust and healthy stand up and fight and the victory is won. This robustness applies to mental rather than to physical robustness. Many of the muscularly most robust of mankind are worshippers at the shrine of Narcissus. They are strong for self aggrandizement. Hence they are mentally not healthy, for mental health means the direction of one's aims towards socially valuable rather than individual goals.

Those less healthy minded then unconsciously run away and the flight into a protective psychoneurosis or to a psychosis ensues. A classified bibliography completes the article in the author's reprint.

Dunlap, Chas. B. Suggestions for a Study of the Pathological Anatomy of Dementia Præcox. [State Hospital Quarterly, New York, Nov., 1918.]

Dunlap published some suggestions for the use of hospitals for mental disease in studying their dementia præcox cases at autopsy. Some of these suggestions of general interest are: That the patient be not over thirty-five in order that changes due to advancing age may not

complicate the histological picture. That the cases be unquestionably præcox and not "grouped as" or "allied to" præcox, thus avoiding results of dubious value. Dunlap also suggests the use of control material, that is, the study of cases of about the same age, where there is no suspicion of dementia præcox. He also offers some fundamental suggestions regarding the mode of study, illustrated by cuts.

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Original Articles

A CONTRIBUTION TO THE STUDY OF THE PATHOLOGY OF HUMAN AND EXPERIMENTAL POLIOMYELITIS, BASED ON CASES OCCURRING DURING THE EPIDEMIC OF 1916 IN NEW YORK CITY[1]

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(*Continued from Vol. 48, page 235*)

MONKEY NO. 1081

Cerebellum

Pia Mater.—There is moderate hyperemia and edema of all the pia mater covering the cerebellum. There is evidence of slight hemorrhage and in some places of slight cellular infiltration, though this is nowhere marked.

Cerebral Substance.—The blood vessels in the substance of the cerebellum are dilated. The white matter appears normal. Some of the Purkinje cells show moderate acute cloudy swelling.

Cerebral Hemispheres

Pia Mater.—As in the cases described before, there is marked edema and hyperemia of the pial membrane. There seems to be practically no hemorrhage and there is no cellular or fibrinous exudation.

[1] Owing to technical and other conditions this continuation was overlooked and is now presented. [Mg. Ed.]

Pallium.—The blood vessels show moderate congestion but no evidence of cellular accumulations in the Virchow-Robin spaces. Throughout the cortex there seems to be a slight proliferation of the neuroglia cells. There is no evident infiltration with lymphocytic elements and no hemorrhage or edema. The cortical cells for the most part appear normal.

MONKEY NO. 1085

Spinal Cord

Pia Mater.—The pia mater in this section appears normal. There is no congestion, edema, cellular or fibrinous exudate.

Anterior Horn.—Throughout the entire gray matter the blood vessels are congested. Some of them show a moderate increase in cells in the Virchow-Robin spaces but this is nowhere marked. No hemorrhages are observed and there is little edema. Throughout the entire anterior horn there is a slight diffuse cellular infiltration.

Ganglionic Cells.—None of the motor cells seem to have disappeared. Some of them appear nearly normal but most of them show moderate acute cloudy swelling. There is no neuronophagy and no evidence of neurogliar proliferation.

Posterior Horn.—Except for a general vascular congestion, the posterior horns appear normal.

White Matter.—The white matter is normal.

Cerebellum

Pia Mater.—There is a marked congestion of the blood vessels and a widespread edema which nearly everywhere separates the layers of the pia. Other inflammatory signs are absent.

Cerebellar Substance.—The cerebellar substance appears normal.

Cerebral Hemispheres.

Pia Mater.—The pia has the same appearance as that over the cerebellum.

Pallium.—Except for a congestion of the blood vessels, there are no pathological changes present.

PATHOLOGICAL FINDINGS IN CATS DYING OF A FELINE EPIDEMIC DURING THE TIME OF THE 1916 POLIOMYELITIS EPIDEMIC IN NEW YORK

CAT NO. 1049

Spinal Cord

Pia Mater.—The pia appears absolutely normal, as do likewise the blood vessels of the cord substance. There is no invasion of lymphocytes or other abnormal elements into the pial spaces, into the Virchow-Robin spaces, or into the gray or white matter of the cord itself. However, a striking and uniform picture is seen in this cord. The motor cells of the anterior horn have undergone

severe acute degenerative changes. These cells show acute cloudy swelling to a very pronounced degree. Apparently the process has been quite as acute as it is severe, for one sees some of the swollen

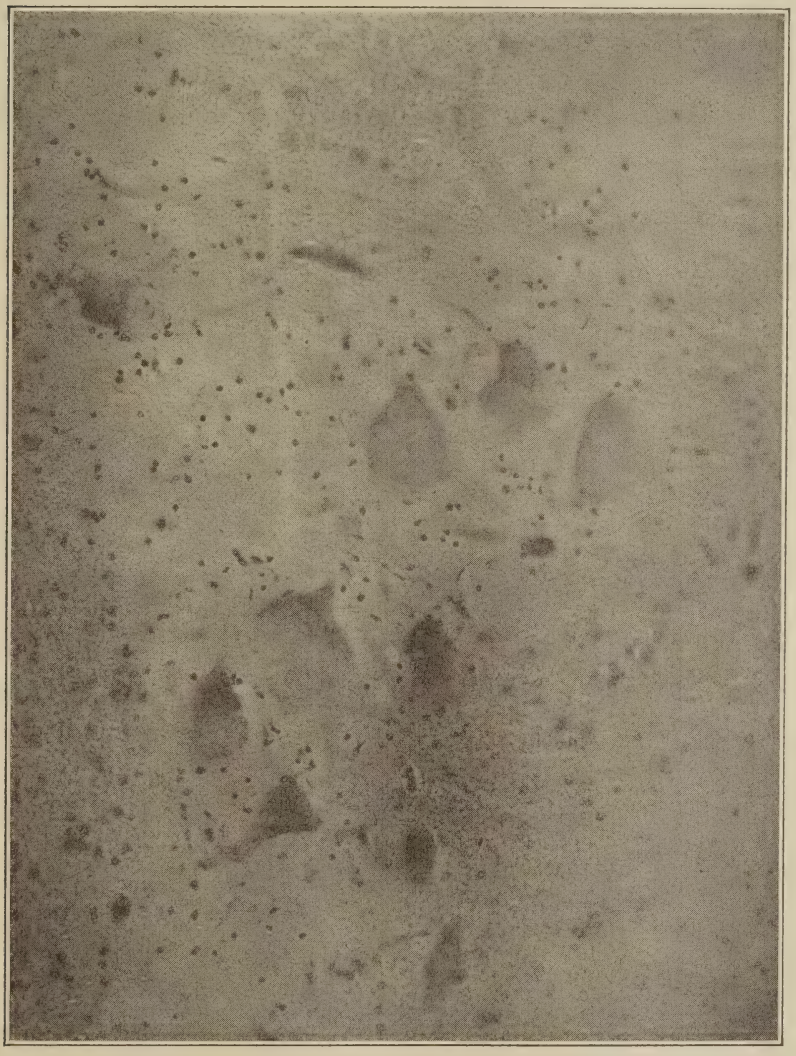

FIG. 23. Section of anterior horn of cat 1049, × 400, showing severe acute cloudy swelling without mesodermogenic tissue changes.

cells darkly and diffusely stained with the cytoplasm very finely granular and the nucleus appearing normal and centrally placed. Others are considerably broken up without nuclei and without cell

Monkey 1001	Blood Vessels	Perivasc. Infiltration	Diffuse Infiltration	Hemorrhage	Edema	Neuronal Cloudy Swelling	Neuronal Disintegration	Neuronal Disappearance	Cavitation	Neuronophagy	Types of Neuronophagocytes	Prolif. of Neuroglia
CORD: Pia	Congested	None	None	Moderate	Marked							
Anterior horn	Moderate congestion	Slight	None	None	Marked	.....	Marked	Nearly complete	None	None	.....	Marked
Posterior horn	Moderate congestion	None	None	None	Moderate	Moderate	None	None	None	None	.....	Moderate
Dorsal root ganglia												
White matter												
BRAIN STEM												
CEREBELLAR PIA												
CEREBELLUM												
CEREBRAL PIA	Congested	None	Slight	Moderate	Marked							
PALLIUM	Congested	Slight	None	None	None	None	None	None	None	None	.....	None

Monkey 1045	Blood Vessels	Perivasc. Infiltration	Diffuse Infiltration	Hemorrhage	Edema	Neuronal Cloudy Swelling	Neuronal Disintegration	Neuronal Disappearance	Cavitation	Neuronophagy	Types of Neuronophagocytes	Prolif. of Neuroglia
CORD: Pia	Congested	None	Moderate	None	Moderate							
Anterior horn	Congested	Moderate	Very slight	None	Slight	Present	Present	Present	Absent	Slight	Leucocytes, polyblasts	Slight
Posterior horn	Normal	None	None	None	None	Slight	Absent	Absent	Absent	None	.....	None
Dorsal root ganglia												
White matter	Normal	None	None	None	None							
BRAIN STEM												
CEREBELLAR PIA	Normal	None	None	None	Slight							
CEREBELLUM	Slight congestion	None	None	None	None	None	None	None	None	None	.....	None
CEREBRAL PIA												
PALLIUM												

Cat 1049	Blood Vessels	Perivasc. Infiltration	Diffuse Infiltration	Hemorrhage	Edema	Neuronal Cloudy Swelling	Neuronal Disintegration	Neuronal Disappearance	Cavitation	Neuronophagy	Types of Neuronophagocytes	Prolif. of Neuroglia
CORD: Pia	Normal	None	None	None	None							
Anterior horn	Congested	None	None	None	None	Marked	Marked	Slight	None	None	.....	None
Posterior horn	Congested	None	None	None	None	None	None	None	None	None	.....	None
White matter	Normal	None	None	None	None							
Dorsal root ganglia												
BRAIN STEM												
CEREBELLAR PIA												
CEREBELLUM												
CEREBRAL PIA												
PALLIUM												

Monkey 1054	Blood Vessels	Perivasc. Infiltration	Diffuse Infiltration	Hemorrhage	Edema	Neuronal Cloudy Swelling	Neuronal Disintegration	Neuronal Disappearance	Cavitation	Neuronophagy	Types of Neuronophagocytes	Prolif. of Neuroglia
CORD: Pia	Congested	Slight	Slight	Slight	Moderate							
Anterior horn	Congested	Slight	Slight	Slight	Moderate	Advanced	Moderate	Present	None	Marked	Leucocytes, polyblasts	Moderate
Posterior horn	Congested	Slight	None	None	None	Moderate	None	None	None	Slight	Leucocytes, polyblasts	None
White matter	Normal	None	None	None	None							
Dorsal root ganglia												
BRAIN STEM	Congested	Moderate	Moderate	None	None	Moderate	Moderate	Present	None	Marked	Leucocytes, polyblasts, glia cells	Moderate
CEREBELLAR PIA	Congested	None	Moderate	Moderate	Marked							
CEREBELLUM	Congested	None	None	None	None	None	None	None	None	Absent	.....	None
CEREBRAL PIA	Congested	None	Moderate	Marked	Marked							
PALLIUM	Congested	None	None	None	Marked	.....	None	None	None	Absent	.....	None

Monkey 1055	Blood Vessels	Perivasc. Infiltration	Diffuse Infiltration	Hemorrhage	Edema	Neuronal Cloudy Swelling	Neuronal Disintegration	Neuronal Disappearance	Cavitation	Neuronophagy	Types of Neuronophagocytes	Prolif. of Neuroglia
CORD: Pia	Congested	None	Slight	Slight	Moderate							
Anterior horn	Congested	Marked	Marked	Marked	Moderate	.....	Marked	Marked	Present	None	.....	Moderate
Posterior horn	Congested	Moderate	None	Slight	Slight	Moderate	None	None	None	None	.....	None
Dorsal root ganglia												
White matter	Congested	Slight	None	None	None							
BRAIN STEM												
CEREBELLAR PIA	Congested	None	Slight	Moderate	Moderate							
CEREBELLUM	Normal	None	None	None	None	None	None	None	None	None	.....	None
CEREBRAL PIA	Congested	None	None	None	None							
PALLIUM	Congested	Slight	None	None	None	None	None	None	None	None	.....	None

Monkey 1074	Blood Vessels	Perivasc. Infiltration	Diffuse Infiltration	Hemorrhage	Edema	Neuronal Cloudy Swelling	Neuronal Disintegration	Neuronal Disappearance	Cavitation	Neuronophagy	Types of Neuronophagocytes	Prolif. of Neuroglia
CORD: Pia	Congested	None	None	None	Slight							
Anterior horn	Congested	Slight	None	Slight	Moderate	Moderate	None	None	None	Absent	.....	None
Posterior horn	Slight congestion	.....	.....	.....	.....	.....	None	None	None	Absent	.....	None
White matter	Normal	None	None	None	None							
Dorsal root ganglia												
BRAIN STEM	Congested	Slight	None	None	None	None	None	None	None	Absent	.....	None
CEREBELLAR PIA	Congested	None	Moderate	Slight	Moderate							
CEREBELLUM	Congested	None	None	None	None	None	None	None	None	Absent	.....	None
CEREBRAL PIA	Congested	None	None	Slight	Moderate							
PALLIUM	Congested	Slight	None	None	None	None	None	None	None	Absent	.....	None

Monkey 1081	Blood Vessels	Perivasc. Infiltration	Diffuse Infiltration	Hemorrhage	Edema	Neuronal Cloudy Swelling	Neuronal Disintegration	Neuronal Disappearance	Cavitation	Neuronophagy	Type of Neuronophagocytes	Prolif. of Neuroglia
CORD: Pia												
Anterior horn												
Posterior horn												
White matter												
Dorsal root ganglia												
BRAIN STEM												
CEREBELLAR PIA	Congested	None	Slight	Moderate	Moderate							
CEREBELLUM	Congested	None	None	None	None	Slight	None	None	None	None	.....	None
CEREBRAL PIA	Congested	None	None	None	Marked							
PALLIUM	Congested	None	None	None	None	None	None	None	None	None	.....	Slight

Monkey 1085	Blood Vessels	Perivasc. Infiltration	Diffuse Infiltration	Hemorrhage	Edema	Neuronal Cloudy Swelling	Neuronal Disintegration	Neuronal Disappearance	Cavitation	Neuronophagy	Types of Neuronophagocytes	Prolif. of Neuroglia
CORD: Pia	None	None	None	None	None							
Anterior horn	Congested	Moderate	Slight	None	Slight	Moderate	None	None	None	None	.....	None
Posterior horn	Congestion	None	None	None	None	None	None	None	None	None	.....	None
White matter	Normal	None	None	None	None							
Dorsal root ganglia												
BRAIN STEM												
CEREBELLAR PIA	Congestion	None	None	None	Marked							
CEREBELLUM	Normal	None	None	None	None	None	None	None	None	None	.....	None
CEREBRAL PIA	Congested	None	None	None	Marked							
PALLIUM	Congested	None	None	None	None	None	None	None	None	None	.....	None

membrane over a considerable extent. Others again are much swollen and rounded with intact cell membrane with no nucleus, the whole cytoplasm staining pale, not infrequently with a large rounded central area stained diffusely red with the polychromic basic anilin stains (cresyl echt violet). Other cells appear merely as large shadow forms with faint indistinct outlines of fainter almost invisible cell borders with no nucleus. The cells of the corona lateralis are somewhat better preserved but these are likewise swollen and neuronophagy has begun. The cells of the posterior horn are for the most part normal, showing at most a slight degree of acute cloudy swelling. The neuroglia cells are increased in number in the anterior and lateral horns. Most of them have small pycnotic nuclei and fairly large cell bodies which stain palely. While these are more numerous in the anterior than in the lateral horns, they do not appear to play so important a part in the cell degeneration in the former area, for here the process of neuronophagy is much more the exception than the rule. In this case, as in most of the others of the cat series, we have observed that the infection, whatever its nature, appears to have, in cats, a decided predilection for the efferent neurone cells of the spinal cord, and especially the motor cells of the anterior horn. As a result of the pathological process, these efferent cells undergo rapid and complete degeneration. Coincident with this there is a hyperplasia of neuroglia elements which in the case of the lateral horn cells plays a phagocytic part in the cell degeneration, while the true motor cells go on to complete degeneration, for the most part quite independently of neurogliar action.

Whether this animal suffered from an actual poliomyelitis infection or whether its disease was of some other nature, the pathological findings are both interesting and suggestive. In the first place, they reveal the possibility of a definite predilection of a virus for the anterior horn cells and further emphasize the contention already made by other observers that in animal epidemics resembling human poliomyelitis the pathological changes may be entirely confined to the parenchymatous or ectodermogenic elements of the central nervous system. During the epidemic of 1916 there were a number of cats brought in from the street suffering from some disease which produced paralysis and death and which, upon histological examination, showed degenerative changes confined exclusively to the anterior horn cells. Of these animals, seventeen were investigated and the pathological changes were identical in them all. In addition, five cats were inoculated intracerebrally with virus obtained from different individual cats found to be affected by the feline epidemic above described. All of these experiment animals showed changes similar in all respects to those dying from infection by the original street strain of the virus.

Discussion

As a result of the observations made in this study, it is possible to recognize three pathological types of acute anterior poliomyelitis. First, those cases in which the alterations are limited to infiltration of the pia and blood vessels. This may be called the *mesodermogenic tissue type.* Second, cases in which the main feature is degeneration of the motor cells in the anterior horn accompanied by a proliferation of neuroglia. This is the *ectodermogenic tissue type.* Third, the *mixed type,* in which both mesodermogenic and ectodermogenic tissue changes are pronounced.

While this conception of the pathology of this disease offers nothing distinctly new in the way of neuropathological classification, it does place the interpretation of the alterations of anterior poliomyelitis on a broad biological basis. In this respect, it is entirely in accord with the views already expressed by Alzheimer (1) in his work on the pathological changes in paresis and cerebrospinal syphilis. The principles of classification recommended by Alzheimer, in which he recognizes the changes in the ectodermal tissues and those in the mesodermal tissues, are of fundamental importance in the study of all organic diseases affecting the nervous system.

In considering the pathological changes observed in the ectodermogenic elements, it is to be noted that no uniform process of degeneration may be recognized in all cases. In the main, although the cellular changes are different, the more usual observation is that each individual case presents but one type of pathological alteration. The pathological changes in acute anterior poliomyelitis in so far as they affect the cellular elements of the central nervous system are, therefore, polymorphous in character. This fact is emphasized by the following summary of the different types of cellular changes observed in the sixteen cases studied in this series. In some instances, cloudy swelling of the ganglionic cells without neuronophagy was observed. In other cases, acute chromatolysis without neuronophagy was the characteristic feature of the pathological alteration. In a few instances, the anterior horn cells showed single and multiple vacuolization without neuronophagy or chromatolysis. Acute cloudy swelling with moderate neuronophagy but without chromatolysis was also observed, and likewise, acute chromatolysis with moderate neuronophagy. In some cases, there was an intense and predominant neuronophagy with the disappearance of the cells. In one instance, fatty pigmentary degeneration was noted, and in this particular case there was no neuronophagy or chromatolysis. A

number of cases showed cellular dissolution causing complete disappearance of the anterior horn cells in the absence of any neuronophagy. These pathological processes, so diverse in their general characters, can scarcely be considered as phases in a single, degenerative process. It is for this reason that the ganglionic cellular changes are to be considered as polymorphous. The meaning of this polymorphous reaction of the ganglionic cells is not clear, although its occurrence seems to be suggestive of certain possibilities. It may be that a difference in the degree of intensity of the infecting virus is sufficient to explain the several appearances in the degenerated cells. Yet why is it that in one instance these anterior horn cells show single or multiple vacuolization, while in another they have the distinct appearance of chromatolysis or neuronophagy? Mere differences in the intensity of the virus is scarcely sufficient to explain these differing reactions. It may be that the explanation is to be sought in the inherent tendencies of the ganglionic cells themselves to the infecting virus.

The changes observed in the mesodermogenic tissue elements represent, in all probability, a more diffuse and general reaction on the part of the organism to the infection. This idea is borne out by the fact that such reactions are not confined to the nervous system, but are manifest in other tissues of the body. Furthermore, these mesodermogenic changes are not so radically different from the changes observed in any general infection, so that they seem to partake of the nature of a more or less diffuse reaction on the part of the organism against the infection. Taking into account the fact that these changes occur in the lymphoid tissues throughout the body, and also lead to small accumulations of lymphoid cells in the liver and spleen, it would seem fair to presume that the mesodermogenic tissue reaction is in reality a general and widespread response to the infecting organism. In the main, therefore, there is nothing in the mesodermogenic tissue changes which is specifically characteristic of acute anterior poliomyelitis.

The theory that the changes in the ganglionic cells are secondary to alterations in the blood vessels does not seem to be well founded in the light of this investigation. That the degeneration of the anterior horn cells is dependent upon vascular alterations leading up to the formation of a thrombus in the branches of the anterior spinal artery is an interpretation which has been abandoned. That the chromatolytic and other changes observed in the motor cells of the anterior horn is the direct result of an ischemia produced by pres-

sure resulting from the distention of perivascular lymph spaces may perhaps be considered a more reasonable explanation than that based upon the occurrence of thrombus. On the other hand, there are many cases in which the perivascular lymph spaces are little, if at all, affected in this respect and yet the cellular changes in the anterior horn cells are so pronounced as to leave no doubt as to the pathological process in them. The fact that the neurone may become compressed by a general engorgement due to the distention of vessels, the proliferation of connective tissue elements and the presence of invading cells in the anterior horn of the spinal cord or in the nuclei of the brain stem, has been offered as an explanation of the secondary involvement in the motor element. Here again, however, it may be shown in many cases that no such diffuse invasion of the mesodermogenic elements is present, and yet marked changes are observed in the anterior horn cells. There is still another fact which may be urged against the conception that the parenchymatous or ganglionic changes are secondary to vascular changes, namely, that in areas in which there is a dense infiltration by connective tissue elements, one frequently observes perfectly normal anterior horn cells. In general, therefore, it seems unlikely that the primary changes of the disease are in the connective tissue elements, and that from these latter the parenchymatous or ganglionic changes result as a secondary pathological process.

That there is a special susceptibility of the motor cells in the spinal cord and in the brain stem to the virus of poliomyelitis seems to be well established. It is a remarkable fact that so few cells of the central nervous system, other than those mentioned, respond in any marked degree to the influence of this infection. In this light it seems fair to conclude that there is a specificity in the action of the poliomyelitis virus and that it has a selected affinity for a certain group or type of cells in the neuraxis. An especial interest attaches to the fact that these cells are almost exclusively of the motor type. If there were any doubt that a virus might be possessed of such specificity in its selective action, this would be set aside by the observations made from a histological examination of the spinal cords of cats dying as the result of a feline epidemic which occurred coincidently with the poliomyelitis epidemic of 1916. The pathological changes in these animals showed a degenerative process limited exclusively to the anterior horn cells, a condition which was observed not only in the animals brought in from the street but reproduced experimentally in animals injected intracerebrally with a street strain of the virus.

The reason for this special susceptibility on the part of the motor cells in the neuraxis to the virus of poliomyelitis is not understood, yet such evident specificity in the reaction suggests a number of possibilities which may be offered in explanation of the condition and should be the subject of future investigation. Very little is known of the mode of conveyance of the virus from its point of entry to the central nervous tissue. It may gain entrance to the spinal cord or brain by way of the blood stream, in which event it might be expected that the infection would be widespread and also intense. From our knowledge of clinical conditions, however, the hematogenous mode of conveyance seems unlikely and this view has few supporters. On the other hand, it is much more likely that conveyance is made by means of the lymphatics; here one or two routes are possible. The virus may travel by means of the perivascular lymph spaces and in this way reach the nervous system, in which event its distribution would nearly coincide with that of the blood vascular system in the spinal cord and brain. The second possibility is presented by the perineural and endoneural lymph spaces by means of which the virus may be transmitted directly along the nerve sheaths or in the endoneural spaces to the gray matter from which the motor fibers arise. This offers a reasonable explanation of the possible conveyance of the organism from its point of entry. It is especially easy to understand in connection with such nerves as are situated about the nasal and pharyngeal cavities. The virus entering by way of the nose might, according to this view, travel through the endoneural or perineural lymph spaces of the olfactory nerve, or coming from the mouth and pharynx, might make its way to the central nervous system in the endoneural lymph spaces of the fifth nerve, of the vagus and of the glossopharyngus nerves. If, on the other hand, the portal of entry be through the intestinal canal or the stomach, a much more circuitous route for the conveyance of the virus would be followed; it must either travel over the extensive and complex connections of the sympathetic system or follow the long course of the vagus nerve. This mode of conveyance seems sufficiently indirect to call its possibility into question. Furthermore, in those instances where the endoneural and perineural mode of conveyance is simplest, namely, in connection with the olfactory nerve and the nerves in relation with the mouth and pharynx, it is notable that the great majority of the cases show no involvement of the areas in the central nervous system which would be in direct connection with the

nerves supplying these parts. By far the great majority of cases are limited to the spinal cord. At best, therefore, this explanation of the conveyance of the virus through the endoneural and perineural lymph spaces leaves much to be desired.

It is possible that the specificity of the virus reaction depends upon the cellular chemistry of the motor cells. The chemistry of these motor cells may be, and probably is, different in certain fundamental respects from the chemistry of all other cells in the central nervous system. From this standpoint, it is not difficult to understand how such cells might be more susceptible to certain types of infection, and, in particular, to the virus of poliomyelitis.

The majority of the cases of human poliomyelitis show a simultaneous involvement of the mesodermogenic and ectodermogenic elements. Whatever may be the effects of the changes in the vascular and connective tissue elements, it seems certain that the greatest impairment of function results from the disorders arising in the ganglionic cells. As has been shown from the series of cases studied in this investigation, the relation between the reaction of the mesodermogenic and ectodermogenic elements varies considerably from case to case. In certain instances, marked mesodermogenic alterations may exist without pronounced changes in the ganglionic cells. Under such conditions, the pathological process of necessity would be transitory and a restitution of function would result from the recession of the pathological changes. Indeed, no other interpretation offers so convincing an explanation of the abortive cases or those in which the initial paralysis is extensive, but rapidly improves. On the other hand, the more severe, permanent paralysis should be regarded as indicative of profound alterations in the ectodermogenic elements.

Summary and Conclusions

I. The tissue changes in acute anterior poliomyelitis are of three distinct types—those which predominantly affect the ectodermogenic elements, those which predominantly affect the mesodermagenic elements, and those which affect both these elements about equally.

II. The ectodermogenic type of tissue change in the central nervous system of man is polymorphous; that is to say, the cellular constituents derived from the ectoderm show no one form of degenerative process. The reaction in the ganglionic cells and neuroglia makes it possible to recognize no less than eight different forms in the degenerative process consequent to the poliomyelitis infection.

III. The degenerative changes in the ectodermogenic elements are so diverse as to make it impossible to conceive of them as phases in a single disintegrative process.

IV. The mesodermogenic type of tissue reaction presents the more general reaction of the organism to the infection and manifests itself by uniform changes affecting not only the central nervous system but also the lymphoid tissues throughout the body.

V. Changes in the elements derived from the ectoderm, neuroglia and ganglionic cells are, in the main, not secondary to or dependent upon the changes in the mesodermogenic tissues, but represent a specificity on the part of the ectodermogenic elements in their reaction to the virus.

VI. The susceptibility of the motor cells in general and the anterior horn cells, or their homologues in the brain stem, in particular, furnishes further evidence of the specificity of the poliomyelitis virus.

VII. The possibility of such definite specificity in a given virus is demonstrated by the exclusively ectodermogenic reaction observed in the pathological changes resulting from the feline epidemic which was coincident with the poliomyelitis epidemic of 1916.

VIII. While it is possible to conceive of certain conditions which might underlie a selective reaction of such a specificity, the determination of these conditions still remains to be disclosed by future work in this field.

IX. In human poliomyelitis, the pathological reaction to the virus is a mixed one, in which both mesodermogenic and ectodermogenic changes occus. It is undaubtedly true that the most severe impairment of function results from the changes in the elements of ectodermal origin, while it seems probable that the more transitory or even abortive disturbances of normal function are the result of changes almost, if not wholly, limited to mesodermogenic tissues.

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A CASE OF TUMOR OF THE CORPUS CALLOSUM AND FRONTAL LOBES[1]

By Dr. C. C. Beling and Dr. H. S. Martland

R. S., Male, white, 54 years of age. Born in United States.

Family History.—Is of no importance. The father died at 65 years of age from a carbuncle on his neck. Mother is alive at 83 years of age.

Personal History.—At 17 years of age he suffered from mild symptoms of lead poisoning. He was always healthy and robust. He is said to have had syphilis at about 24 years of age, for which he was treated without any return of the symptoms. At 30 years of age he suffered for a few days from vertigo. During this time, although fully conscious, he could not walk in a straight line, but had to circle around to reach an objective point in front of him. On January 23, 1914, on his return from Texas, where he had been employed, he complained of a tired feeling, of burning sensations in his feet and of his eyes being hypersensitive to light. His eyesight failed him and he changed glasses frequently. He complained of a feeling of heavy pressure on the front and top of his head and often put his hands upon it. For many years he had experienced difficulty, if interrupted, in taking up the thread of a conversation. During the last few months of his life this difficulty was extremely pronounced. In April, 1916, it was noticed that he was very forgetful and failed to do what was requested of him. On May 19, 1916, while at work he had a sudden convulsive attack, which began with twitching of the right arm, hand and leg. The face was not involved. The eyes were deviated towards the right. Consciousness was not lost. His speech was affected to the extent that he could not talk and answered questions by shaking his head. He could not show his tongue on request. About three hours later he got up and ate a hearty supper, "shovelling his food continuously into his mouth," like an automaton. This act grew worse steadily. His attention had to be often called to it. On May 24, 1916, he had recovered sufficiently to resume his work. A week or two later it was markedly noticeable that he was talking and acting in a silly manner. He scraped his plate for a long time after he had finished

[1] Read before the New York Neurological Society, February, 1917.

eating. When asked to stop he said, "I just can't help it." All through June he grew rapidly worse. He made all kinds of jokes, mostly of a silly character. He rubbed his hands vigorously and said, "Don't you see the white spots, they itch." He took a comb and measured distances with it. One morning he had a cold bath and stayed in the tub for two hours playing in the water. It was noticed that he did not rise as early in the morning as was his habit, that he spent a longer time at his meals, that he ate his food peculiarly, mixing the usual order of eating, indiscriminately, and that he was dilatory and not prompt in his actions. On arising in the morning as well as at other times, he made circles on the wall with

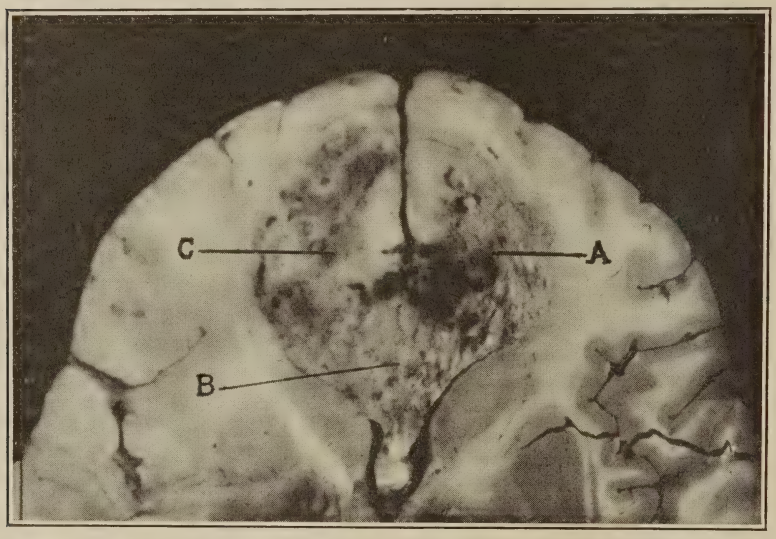

FIG. 1. Transverse section of brain showing location of tumor. *A*, tumor mass in right frontal lobe; *B*, tumor invading genu and body of corpus callosum; *C*, tumor in left frontal lobe.

the fingers of his right hand. In dressing he often turned around from right to left as if he was looking for something. He frequently stood in front of a mirror and combed his hair and mustache for a long time. He went about with a yard stick measuring distances. He opened an umbrella, hung it on a gas fixture and said there were eggs in it. He did all manner of foolish things until he was stopped or his attention was otherwise directed. He often stood up for a long time and did not seem to be able to sit down. At times he asked to be pushed down. Early in June, 1916, he wrote on a piece of paper, "My mother is in my debit for twelve

dollars and ten cents for malleable iron." For some time previous to the convulsive attack (May 19, 1916) it was noticed that he could not control his emunctories. Later he urinated and defecated involuntarily. He gradually grew more and more somnolent. After a full night's rest he would sleep several hours during the day. He was a great reader and had a retentive memory. In June, 1916, it was observed that he held his newspaper in his hands and apparently did not concentrate his mind on what he was reading. He changed gradually from an active and energetic state into one of general indifference. He had to be urged to dress or to go from one place to another. He was satisfied to remain where he was. At times he seemed to be worried and at others he constantly joked

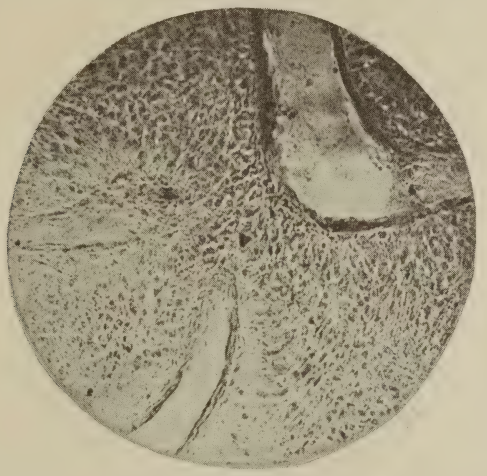

FIG. 2. Glioblastoma (low power). Note distended vessels and general radiating arrangement of neuroglia tumor cells.

in a silly manner. On one occasion he put on two vests and was putting on two coats, when his attention was drawn to it, but he did not correct his mistake. He frequently did the opposite of what he was told to do. He promised to do differently, but repeatedly performed the opposite action. When asked to hang his coat over the chair, he put it over the banister. He did this repeatedly after correction. He often failed to finish a sentence and shook his head affirmatively that he knew what he wanted to say but could not utter it. After removing his clothes, soiled by involuntary excretion, to take a cleansing bath, instead of leaving them as requested for laundering, he put them in the bath tub. On another occasion he was lying in bed and said to his sister, "Do you see

those two hunters and the dogs?" pointing to the wall. On July 2, 1916, the day before his death, he suffered from a persistent spasm of his jaws which were tightly set, both hands were in constant motion as if he was rolling something up. He often bit the glass or the spoon when he was fed. During the last few days of his illness he stood in one position. If asked to move he answered, "Yes," but did not stir. If started, he would move on. He often said, "I can't move my leg, push it." A few days before his death he rubbed cold cream on his hands and then put the tube in his mouth and began to chew it up and would have swallowed it if it was not taken away from him.

Examination: Physical.—The sense of smell could not be tested on account of his mental state. The sister stated that in June, 1916,

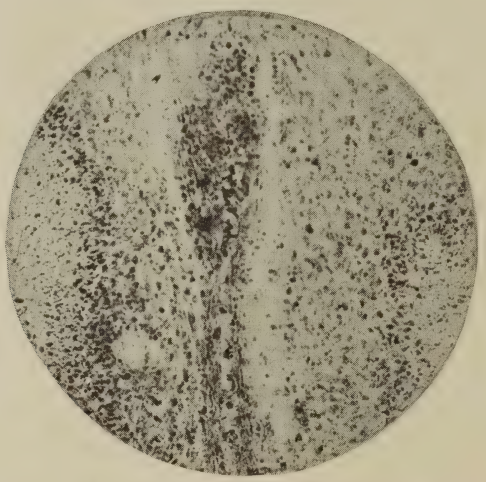

FIG. 3. Glioblastoma (low power). Area showing extensive hemorrhage and necrosis.

a few days after the convulsion, he remarked about some roses, but said they had no fragrance. Optic neuritis was more marked in the right eye than in the left. The fields of vision could not be obtained. Sight was approximately reduced to 20/70. The other cranial nerves were apparently normal. The pupils were equal, regular, and reacted normally. On request the tongue was at times protruded clumsily without tremor or deviation, while at others the teeth were shown or no action followed. When asked to close his eyelids, he wrinkled his forehead or made grimaces, looked silly or did something different. The right epigastric reflex was somewhat diminished and easily exhaustible. The knee and plantar reflexes

were fairly active. No Oppenheim, no Babinski, no clonus, no Gordon. The gait was unsteady and somewhat ataxic. There was an occasional tendency to fall forwards. His handwriting was affected as shown in the specimen. It showed markedly the condition of "clonic perseveration" (Liepmann). When asked what he was writing in the specimen submitted, he said, "Why this is an essay on smoking." The spinal motor and sensory functions were normal. Involuntary urination and defecation was due to cerebral involvement. Blood and urine normal. Blood Wassermann negative. Spinal Wassermann was unobtainable. He gripped well with both hands. When objects were placed in his right hand they were

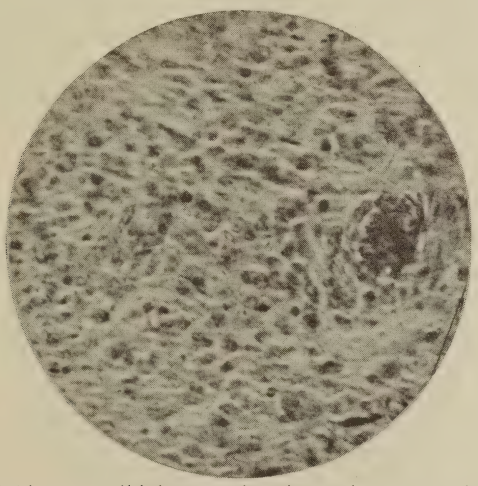

FIG. 4. Glioblastoma (high power). Area shows morphology of tumor cells, most of them being of the small oval and spindle type. An occasional mitotic figure is seen.

grasped tightly and not released until upon repeated request and then they often enough had to be forced out. (Diminution of spontaneity of movement, will-lessness, Liepman's tonic perseveration.)

Mental.—There was a peculiar incoördination of his mental faculties. At times he seemed to grasp what was told him and to answer correctly, but at others he failed to answer at all, apparently from lack of attention. He was able to name objects correctly and to feel them in his hands with his eyes shut and to interpret them correctly. His memory for synergistic movements necessary for the performance of effective and purposeful actions was disordered. When asked to protrude his tongue he put his finger in his mouth, to wrinkle his brow he opened his mouth. His appearance was vacant, clowny and silly. He was generally indifferent, did not talk

spontaneously and fumbled around. He did many silly things and walked around aimlessly. His mental condition was characterized by irritability, inattention, impairment of volition, automatism, inability to concentrate, loss of memory for recent events and partially for remote events, incoherence and irrelevance in conversation and irresponsibility of speech and actions, exhibition of clownism, silly jesting and making of witticisms (Witzelsucht) with loss of ethical sense, alteration in character, temperament and tastes and a steadily progressive dementia which terminated with increasing stupor, coma and death (which occurred on July 3, 1916).

A clinical diagnosis of tumor of the corpus callosum and frontal lobes was made on the grounds that the disturbances of association resulting in apraxia, chiefly of an agnostic ideo-motor, aphasic and

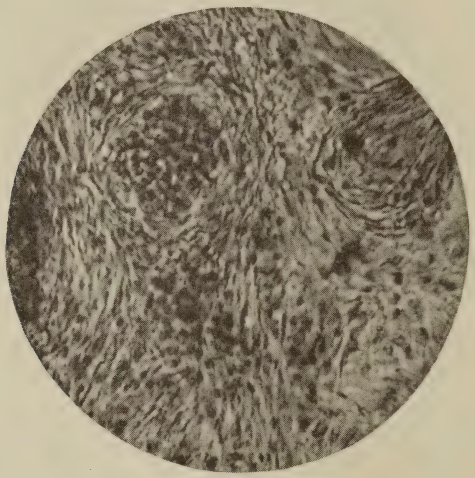

Fig. 5. Glioblastoma (high power). Area showing pronounced formation of neuroglia fibrils.

agraphic character, were referable to a lesion of the corpus callosum; the automatisms to a right prefrontal and the defects of volition (lack of initiation of movement ideas) to a left prefrontal.

Pathological Report.—On July 3d a post-mortem examination of his head was made about eight hours after death, the body having been previously embalmed.

The following conditions were observed. Head was well formed, symmetrical and bald on top and sides. The hair was moderately abundant, light brown in color and turning gray.

On reflecting the scalp which was well hardened by the embalming fluid, the tissues were dry and of normal thickness and appear-

ance. The top of the skull was well formed and symmetrical. The temporal muscles and the pericranium were free and clear. On removing the calvarium together with a wedge-shaped portion of brain (autopsy technique of Wadsworth), the brain was seen to tightly fit the cranial cavity. The convolutions were distinctly flattened out from increased intracranial pressure.

Cross-section through the anterior portion of the brain revealed a large, apparently round tumor occupying the inner halves of both frontal lobes, the genu and the anterior one third of the body of the corpus callosum. The tumor was found to be separated in its anterior one half by the longitudinal fissure forming a somewhat horseshoe-shaped mass. (See Fig. 1.)

The gray matter of the mesial surfaces of the frontal lobes was involved only to a very slight extent in the tumor mass, which was almost entirely subcortical.

The tumor mass in the right frontal lobe had a vertical diameter of 7 cm. and in the left lobe of 4 cm., showing that the tumor was distinctly larger on the right side although this was not so apparent in horizontal sections.

Anteriorly and superiorly the tumor extended to within 1 cm. of the cerebral cortex; laterally it occupied the inner halves of the frontal lobes, the outer halves presenting a normal appearance; inferiorly it pushed down the roofs of the anterior horns of the lateral ventricles, causing the partial obliteration of these points; posteriorly it infiltrated the greater part of the genu of the corpus callosum and a portion of the anterior part of the septum pellucidum. There was also a moderate tumor-infiltration gradually merging into normal tissue in the anterior one third of the body of the corpus callosum.

The tumor was infiltrative in character, fairly well circumscribed but not encapsulated. Its borders were irregular and consisted of degenerating, softened brain and tumor tissue. It was slightly firmer in consistency than that of the surrounding brain substance. The larger part of the tumor was of a translucent, grayish color, interspersed with numerous yellow (necrotic) and yellowish red (necrotic and hemorrhagic) mottled areas. In the right frontal lobe there was a large area containing numerous round red spots (newly formed vessels).

The other parts of the brain showed only the effects of a continuous and slowly progressive intra-cranial pressure. The lateral ventricles were reduced in size anteriorly. The third ventricle was free and clear. The tumor did not show from the inferior surface

of the brain. The olfactory and optic nerves including the chiasm were free and clear. A normal sized sella contained a normal pituitary gland. The cerebellum was normal in appearance. The brain stem fitted rather tightly into the foramen magnum. The pons on section showed a considerable number of recent scattered punctate and streaky hemorrhages. The ependyma of the floor of the fourth ventricle showed patchy hemorrhagic blotches.

The fossæ of the skull were normal in appearance. The mastoids, middle ears, ethmoidal and sphenoidal cells were free and clear.

The tumor presented the gross characteristics of a telangiectatic, infiltrative, noncircumscribed glioblastoma, which had invaded and destroyed the white matter of the anterior half of both superior frontal gyri more extensively on the right than on the left, the anterior one fifth of the cingulate gyri, and the association fibers in the genu and anterior one third of the body of the corpus callosum. It also encroached upon and destroyed for a small extent the inner portions of the fiber tracts of the midfrontal gyri, involving the right much more than the left. Microscopic sections of the tumor showed that it belonged to a class of tumors of epiblastic origin in which the type cell is a neuroglia cell, namely, a glioblastoma.

It was composed of proliferating neuroglia cells, presenting a whorl-like, radiating and wavy arrangement. The tumor cells varied considerably in size and shape, although the greater part of the tumor showed cells of a small oval and spindle type. In places there was pronounced formation of neuroglia fibrils. The stroma consisted of numerous newly formed blood vessels so massed in places as to resemble areas of hemangioma. The mitotic figures throughout the tumor were very scant in number, but quite regular in type, showing that histologically the tumor was a distinctly benign growth as regards metastases. The greater part of the tumor presented extensive retrograde changes, especially necrosis and hemorrhage. (See Figs. 2, 3, 4 and 5.)

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TETANY IN THE EUNUCHOID: REPORT OF A CASE[1]

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While the degree of dysfunction of the thyroid gland can now be established with mathematical precision by determining the rate of metabolism, disorders of the parathyroids usually progress unrecognized until in the adult, at least, the symptoms of tetany suddenly become manifest. That these are dependent on a hypofunction of the parathyroid glands seems now firmly established. A condition of hyperparathyroidism, analogous to that of hyperthyroidism, has never been demonstrated anatomically; that it may exist, clinically, in the guise of certain peculiar nervous diseases of obscure or wholly unknown etiology, as for example, myasthenia gravis or periodic family paralysis, has been a matter of supposition, although proofs that will satisfy scientific criteria are still lacking.

There remains no longer any doubt that tetany, spasmophilia, carpopedal spasm, arthrogryposis, and so on, are but different designations of the same disease, which is dependent on a substratum of parathyroid deficiency regardless of the immediate exciting factor. While it is likely that Hippocrates already knew of the disease, it appears to have first been recognized in children in modern times by Clark, who, in 1815, described a condition of laryngospasm associated with cramps in the hands. In 1817 Johnson proposed the term carpo-pedal spasm. In the adult, it was first described by Steinheim, in 1830 and independently by Dance in 1831, in a scholarly work, under the title "Le Tetanos Intermittente." To Dance is usually ascribed the credit of priority. Then followed a long list of French works, and in 1852 the disease received the name of "Tetanie" by Corvesart.

The next significant advance in our knowledge of this malady was made by Sandstrom, a Swedish anatomist, who in 1880 discovered the glandulæ parathyroideæ, although others, particularly Virchow, in 1864, had often noted "accessory thyroids" of pea-size,

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located behind the body of the thyroid. Following this in 1881, Nathan Weiss made the observation that tetany often followed total thyroidectomy. These two findings, however, were not correlated until about 1895, when it was shown that the parathyroids were developmentally and anatomically entirely independent from the thyroid. On the physiologic side, their independence was demonstrated by Vassale and Generale, Biedl, Pineles, and others, the first two writers pointing out for the first time the causal relation between clinical tetany and the parathyroid bodies.

Because of certain unusual features and its relation to endocrine disorders of another source the following case seems worthy of a detailed report.

Case A228896. E. H., aged 36, a barber by occupation, presented himself at the Mayo Clinic for examination April 19, 1918, complaining of convulsions.

Family History.—His father had died at the age of seventy of carcinoma of the rectum; his mother was living and in good health, save for some cardiac trouble at the age of sixty-nine. In her younger days, she frequently had attacks of very severe supraorbital headaches suggesting migraine. Two brothers are living, one, forty years of age had had attacks of localized edema for two years, which appeared at times on the legs, the trunk, the scalp, and the face. Swelling of the eyelids sufficient temporarily to shut off vision frequently resulted. While this usually followed a localized and continued pressure, it sometimes appeared suddenly without known cause and vanished as suddenly. There was no itching. We had no opportunity of observing this brother; however, the description certainly suggests an angioneurotic disturbance, possibly a Quincke's edema. He also suffered considerably from periodic headaches. Another brother, aged 26, had croup as a baby and is now afflicted with some stomach disorder associated with vomiting. A third brother died in infancy of spasms lasting three to four days. Four sisters are living, one has rheumatism; two died at the age of one year, the one of measles associated with convulsions, the other from an unknown cause.

Personal History.—The patient had had general convulsions which began at the age of one year, and disappeared spontaneously at the age of two years. From the fourteeth to the sixteenth year he had inflammation of the bowels associated with vomiting. The vomiting spells continued until he was 21 when a herniotomy and an appendectomy were performed; after this he was perfectly well for a period of eight years. He then married. His wife is well but she has never been pregnant. The patient's appetite is variable and his bowels are constipated. He sleeps fairly well; uses tobacco and coffee in moderation, and alcohol semi-occasionally and in very small amounts. Save for an occasional

attack of tonsillitis and la grippe, he has enjoyed fairly good health until the onset of the present trouble. About seven years before, while working in the barber shop, he noticed that his legs became very easily tired; this was particularly marked on Saturday nights, following a long day's work, and it became progressively worse. Three years previously he noted that his abdomen became distended at intervals of about a week, the distension being so marked as to render breathing uncomfortable; this lasted about three quarters of an hour, and was accompanied by eructations of gas. There appeared to be no relationship to meals and there was no intestinal upset save some constipation. This condition persisted until the occurrence of convulsions, similar in nature but less severe than those described subsequently. After three or four attacks of this character, while on his way home from work one Saturday night he lost control of his legs; they began to jerk up "like a horse with the spring-halt." He summoned help, and with assistance walked about ten feet further when his legs stiffened out and he was compelled to stagger along on his tip toes, which he accomplished only with the greatest effort. Ultimately he fell and was carried home and put to bed. His general condition improved sufficiently to enable him to be up off and on but he could not work.

In the fall of 1915, the spasms appeared with increasing intensity and frequently, five to six times a day. During this time he had attacks that caused his jaw to cramp, as though yawning, the mouth remaining widely open for from thirty to forty minutes at a time. On other occasions a trismus appeared which was so marked that a diagnosis of tetanus was entertained and anti-tetanic serum administered. He seemingly improved somewhat but had to remain in bed almost constantly for eight and a half months, on account of spasms in his arms and legs. The convulsions diminished in frequency, appearing about once a week, and in January, 1916, the patient was able to get about with the aid of crutches. Convalescence was protracted and incomplete; his legs began swelling and by August of 1916 they had become two or three times their normal size; he had, also, edema of the abdominal wall, the back, and probably some ascites. His face was not swollen. In September he developed prickling and numbness of the hands and a burning pain in the legs which rapidly became excruciating and he felt as though his legs were being "roasted over a fire." The slightest noise disturbed him greatly and he became very irritable. One afternoon he suddenly cried out, rolled over on his left side, lost consciousness, and turned a livid color (laryngospasm?), saliva running from his mouth. There was no general convulsion. He remained unconscious for three days, at the end of which time he became greatly agitated, was noisy, scolded every one in sight, and accused them of turning fire on his legs. One day, he decided to go to his sister's place for dinner, where he thought they were celebrating a wedding anniversary. After just having

finished a meal, he wanted to eat again, saying he had had nothing since the previous day. He recognized people, and seemed to be oriented as to place. He complained bitterly of the burning, prickling and numbness of the fingers. His legs had been straight before he lost consciousness, but were now flexed at the knees at an angle of about 45 degrees, which position they maintained in spite of efforts made to correct the deformity. The tendons, particularly those of the hamstring muscles, seemed to have become shortened. The patient was so reduced in flesh that one's fingers could easily be placed around his thighs, although the latter did not seem disproportionately atrophied. His face had a puffed-out appearance and he was almost completely bald. The skin was dry and scaly "like a fish." The abdomen was covered with brown pigmented spots from an eighth of an inch to one inch in diameter. In October, improvement began; the mental condition cleared up and the spasms diminished both in number and in intensity so that he had but five or six from then until the time of his examination. For fifteen months, however, he had been bed-fast, and every attempt to get him up was promptly followed by vomiting.

Physical Examination.—The patient was well-developed, somewhat emaciated, lying in bed with his thighs flexed on the abdomen and his legs flexed on his thighs at an angle of about 45 degrees. He appeared to be about six or seven years older than his actual age. His face had a puffy appearance, was much wrinkled, and of a pasty yellowish-gray color. The skin of the trunk was moist, somewhat boggy to the touch, and free from pigmentation. The panniculus adiposus was somewhat reduced in thickness and normal in distribution except for a well-developed mons veneris. The hair was of a light brown color, thin, and rather dry. Very few hairs were present in the axillæ and about thet genitalia. The latter presented the transverse distribution of the female type. There was practically no hair on the rest of the trunk or extremities. The right testicle is flabby and small (about the size of a navy bean), the left is absent; an orchidectomy had been performed for tumor.

Mentally, the patient was clear and alert, though his speech was very deliberate. The voice was somewhat cracked and higher in pitch than the average. Examination revealed a slight gingivitis; the teeth showed no transverse grooving or other trophic disturbances; the tonsils were somewhat enlarged and contained a few plugs; there was a pharyngitis marginalis on the left side; anterior deflection of the septum to the left and a high posterior deflection to the right; the membranæ tympani were slightly retraced; the superficial glands were normal to palpation; the palpation of the thyroid gland was uncertain; the heart and lungs were normal; there was a linear scar over the right inguinal region, the site of a former herniotomy; the liver, kidneys, spleen, pelvis, rectum, and spine were normal. The systolic blood pressure was 135

mm. and the diastolic 92 mm. The urine was examined on four different occasions, once following a convulsion. The amounts were normal, the specific gravity varied from 1012 to 1025, the reaction was acid, with a trace of albumin, and an occasional pus cell in three specimens, and once a few red cells; there was no sugar. March nineteenth the blood showed 76 per cent. hemoglobin, 5,100,000 red blood cells, 15,600 white blood cells, and April sixteenth it showed 75 per cent. hemoglobin, 4,400,000 red blood cells, and 9,200 white blood cells. A test meal given April fourth showed the gastric contents to be of a cream color, with advanced chymification; total acidity 40, free hydrochloric acid 20, no lactic acid, no blood. The x-ray examination of the stomach was negative. The Wassermann tests of the blood and of the spinal fluid were negative. X-rays of the sella and hands were negative. On two occasions examinations of the stool showed a few red blood cells; no evidence of parasites. Skin tests, made by Dr. Fricke Davis were found negative to proteose, oats, corn, cabbage, tomato, lact-albumin, walnut, egg-white, egg yolk, casein, strawberry, veal, horse serum, cat dander, horse dander, lamb, bran, Staphylococcus aureus, and ragweed. A combined phenolsulphonephthalein test showed an output of 40 per cent. in two hours.

Neurologic examination showed the cranial nerves to be negative save for a pallor of the nerve-heads suggesting a slight primary optic atrophy; the musculature presented a marked general atrophy, the small muscles of the hands and the calves were perhaps disproportionately affected. There was bilateral pes cavus. While the knees could be completely flexed, extension beyond an angle of 45 degrees was prevented by contractured hamstrings. Tonus was about normal throughout. Fibrillary twitchings were occasionally noted in the interossei of the hands. There was marked general weakness and almost complete loss of power in the thighs. The calves imparted a leathery sensation to palpation. There was no reaction of degeneration in any of the atrophied muscles. The biceps, triceps, supinator, and abdominal reflexes were normal. The left patellar reflex was normal, the right moderately increased. The left tendo-achillis was slightly more active than normal, the right greatly increased. Ankle clonus was present on the right side. The plantar response on the right side was extensor by the methods of Babinski, Chaddock, and Rossolimo, while that on the left was constantly flexor. Sensation for touch, pain, and temperature was normal throughout, save over the dorsum of the toes where tactile sensibility was possibly slightly reduced. Vibration and joint sensibility were normal. Tendon sensibility seemed to be almost absent in the legs. Coördination was very slightly impaired in the arms; that of the legs, making allowance for weakness was probably normal. The bladder and rectal control was good.

A Chvostek II was readily elicited. On compressing the left, upper

arm in testing for the Trousseau phenomenon, the fingers grew pale and cold, and within approximately half a minute passed into a tonic spasm in marked abduction and extension. The spasm extended rapidly up the arm and almost simultaneously appeared in the right arm, in the muscles at the floor of the mouth, in the tongue, in the lips, and to some extent in the legs. The fingers were maintained in almost constant tetanic extension and were widely abducted, the wrist and elbow being flexed. Off and on, there appeared clonic convulsive movements of the brachial adductors and internal rotators. The position of the fingers shifted slowly from time to time with occasional slight flexion of the distal phalanges, particularly those on the ulnar side. The lips were at times drawn tensely over the teeth, and at times assumed a sucking position; the lateral angles were approximated into the "fish mouth." The patient stated that this drawing of the lips over the teeth was occasionally so intense that bleeding resulted. The mandibular muscles also partook in the attack, the jaw being fixed by a tonic spasm, sometimes closed, sometimes opened, and interrupted occasionally by clonic lateral movements, which were very painful. Consciousness remained clear throughout and the patient was able to speak whenever the muscles of articulation were not too actively involved in the spasm. The duration of the attack was about sixty-five minutes and was terminated by the administration of one-half grain of morphine; the spasm gradually disappeared, leaving the fingers last. The spasm was at times obviously very painful, and left the patient greatly exhausted but unable to sleep. At no time did he exhibit any emotional outbreaks. Elevation of the arm above the head did not bring on the characteristic hand attitude, Alexander's test, nor did a pedal spasm appear when the extended leg was flexed on the abdomen, Schlesinger's phenomenon. Erb's test, utilizing the external peroneal nerve, gave the following electrical values:

K.C.C.[2]	A.C.C.	A.O.C.	K.C.T.
0.6	1.8	1.2	3. MA.

[2] It may be stated that in infants, with the exclusion of certain organic conditions as hydrocephalus, spastic paraplegia, cerebral sclerosis, the presence of a K.O.C. of less than five milliamperes indicates tetany, Thiersch's phenomenon. This arbitrary rule does not apply to adults in whom normally the electrical values are relatively much lower. This change takes place after the second or third year and is already established at 12–13, as Holmes has shown. The normal values at these ages are as follows:

	C. C. C.	A C. C.	A. O. C.	C. O. C.	Chvostek Present in
2–3 years	2.5	4.2	4.3	> 5.0	5 per cent.
12–13 years	1.7	3.6	2.3	5.0	20 per cent.

K.O.C. is equivalent to K.C.Te. as the former cannot always be obtained.

When the dorsum of the tongue was lightly tapped, a small welt appeared which gradually subsided, Schlutze's phenomenon. Tapping the N. peroneus externus was followed by dorsal flexion and abduction of the foot, phenomenon of Lust.

Hoffmann's test, which makes use of the hyperexcitability of the sensory components of peripheral nerves, gave the following formula where s = sensation, o = local, ↙ = radiating, p = persistent, k = cathodal, and c = closure.

	O. K. C. S.[3]	K. C. P. S.	A. C. S.	A. C. P. S.	K. C.↙
Cutaneous branch, peroneal...	0.1	0.2	0.12	0.3	1.4
Cutaneous branch, post-radial.	0.2	0.8	0.14	1.0	3.0
Supra orbital.....	0.08	0.2	0.18	0.5	0.6

The temperature remained normal throughout, save when it rose twice to 99 degrees. This elevation was not preceded or accompanied by convulsions. The pulse rate averaged about 70, and varied only slightly during the attacks. May eighth the attack appeared first in the muscles of the throat and continued for forty minutes. In the course of this seizure the m. flexor pollicis brevis of the left hand stood out as a prominent narrow band, while the neighboring muscles were comparatively relaxed. Two or three times the respiratory muscles were involved in a spasm of half a minute duration. The eyeballs were turned upward until the cornea could hardly be seen, and could not be rotated downward until the spasm had subsided. This attack was preceded from four to five hours by a burning sensation in the pit of the stomach.

May twelfth. This spasm resembled the others; it began in the eyelids, and was of 1:05 duration.

May fifteenth, in this attack, which was of one hour and fifteen minutes' duration, the right leg showed both tonic and clonic spasms. They were, however, transient. The face and eyeballs were involved also.

Medication did not produce the desired results, which is quite in keeping with the general experience in this type of tetany. Thyroid did not seem to alter the course of the disease one way or the other; any change, in fact, seemed for the worse. Calcium lactate was administered during a greater part of the time while the patient was under observation. The striking results so often seen in the tetany of infants were not noted; absolutely no change in the course of the disease could be observed. The intravenous administration was not tried. A communication from the wife states that the patient vomited considerably,

[3] These findings, while of interest from an academic standpoint require too great a reliance on the statements of the patient and his intelligent coöperation to gain great prominence as a diagnostic procedure.

had numerous convulsions, and ultimately died on March third, greatly emaciated.

While tetany is decidedly rare in this country, as Crozier Griffith has pointed out, isolated cases are probably more common than is ordinarily supposed. The diagnosis, when the patient is seen during an attack, can be made with tolerable certainty at a glance. The physician, however, usually does not witness the attack itself, and it is only by bearing in mind the existence of such a disease that serious blunders can be averted. The story of tingling and stiffness in the fingers which the patient relates to the physician is usually hearkened to with customary tolerance, attributed to the fantasy of the individual, and dismissed as "nervousness."

Clinically, the most outstanding feature of tetany is the well-known tonic spasm of the hands and arms resulting in the characteristic "writing position," or the "main d'accoucheur" as Trousseau so ably described it. While this is typical, all other positions of the fingers may be taken. At times, clonic movements are associated with the tonic, as in our case. Rather characteristic is the onset and association of the spasm with parasthesias, especially formication in the hands and feet, burning, a sense of mummification or drawing. The cramps themselves may or may not be painful. Next in frequency to the extremities is involvement of the facial muscles.

Ocular spasms were noted in seven of one hundred and twenty-two cases by v. Frankel-Hochwart. The eyes may suddenly become set or may move independently. Occasionally, there is a spasm of the pupillary and ciliary muscles. Spasms of the tongue noted in our case are decidedly rare. Laryngospasm, so common in infants, is rare in adults, but may occasionally prove fatal. Muscles of the trunk may participate. The bladder is said never to be involved and the gastro-intestinal tract probably not, as the work of Wilson, Stearns and Janney goes to show. At times the respiratory muscles, both of the chest and diaphragm are involved and rarely is there cardiac stillstand. Spasm of the bronchioles has been described by Lederer and may simulate pneumonia.

Retention of consciousness is a characteristic feature, although general convulsions with loss of consciousness may occur. The duration of the attacks varies from several seconds to several days, and they may be bilateral or unilateral. Involvement of the legs alone is certainly rare and has never been observed by v. Frankel-Hochwart.

Vasomotor disturbances are not uncommonly seen. Thus in 10 per cent. of cases, one sees the rather characteristic swollen "tetany face" which may persist long after the active tetany has subsided. Redness or pallor of the extremities may be noted. Chloasma, pemphigus, herpes, urticaria, dermatitis exfoliativa, localized edema resembling a Quincke's edema, marked dermographia, sweating, polyuria, and transient glycosuria occur. There are often trophic disturbances of widely varying types, among them falling of the hair, brittleness of the nails, transverse grooving of the teeth—a valuable sign of early tetany—cataract formation, especially in tetany of maternity, and even necrosis of the fingers as in Raynaud's disease. Occasionally, there is optic atrophy.

While the mentality is usually clear, one may see psychic disturbances, usually of the type of intoxication deliria (Kraepelin) with confusion and hallucinations. There may be fears, increased excitability, insomnia, lack of attention, memory defects, and impaired intellectual accomplishments, but seldom a marked grade of dementia. At times, psychic disturbances suggesting a psychic equivalent may replace or accompany the attacks.

The association of epilepsy with tetany is of great interest. In infancy, as is well known, tetany frequently expresses itself in general epileptiform convulsions. In adults this is rare unless associated with other expressions of the disease. Here the epilepsy may accompany a typical attack of tetany, the patient retaining the characteristic tetany attitude of the arms and legs; it may immediately precede it, follow it, alternate with it, or it may exist as an entirely independent affection. This type of epilepsy does not respond to bromide treatment and pursues its course pari passu with that of the tetany itself. The fact that typical epileptiform seizures have been produced in parathyroidectomized rats, cats and apes is significant; as in the human, they are especially prone to occur in the young. As demonstrated by Ibrahim, Falta and Kahn, hyperexcitability to mechanical and particularly chemical stimulation, for example, adrenalin and pilocarpin, obtains also in the vegetative nervous system, indicating the deep-seated physiologic action of the parathyroid glands.

Characteristic as the clinical features of tetany are, just so indefinite are the pathologic changes noted in the parathyroids or elsewhere at necropsy. Constant findings are as well as missing. Per contra, pathologic changes, particularly tumors, have been found in the parathyroids in cases which showed no evidence of tetany (De Santi, Benjamins, MacCallum, Ascanazy, Weichsel-

baum, and others). This, however, may be explained by the vicarious functionating of the remaining parathyroids, it having been demonstrated that two of the four glands ordinarily suffice to prevent the occurrence of tetany. Findings elsewhere in the body are usually irrelevant or entirely missing.

The intimate anatomic relationship of the parathyroid glands to the thyroid seemed for a long time, per se, to stand in the way of arriving at the underlying cause of tetany. Even after it was established that both ontogenetically and morphologically the parathyroids were independent structures, these organs could not be dissociated in the minds of investigators, a fact which accounted for the first theory of parathyroid function, namely, that of Vassale and Generale, who looked on the parathyroids as furnishing a secretion, the purpose of which was to neutralize a toxin secreted by the thyroid gland. In the light of subsequent developments, however, this assumption had to be abandoned.

The occurrence of tetany among certain classes of workers, especially shoemakers, tailors, etc., that is, the idiopathic variety, in whom the epidemic-endemic character and seasonal variation is particularly prominent, implies certain conditions which current theories fall short in explaining. Oppenheim's suggestion that some toxin may be present in the working material of these people commands serious thought, as it could also explain the endemic character, the presence of several cases in the same family, the frequent rise in temperature, and the association with an hallucinatory confusion as the common type of psychosis in this disease. Wermel's experience in Moscow in 1901, where he observed among twenty-six rubber washers working in a small quarter of a factory seven cases of tetany within a very short time, while of 700 workers in other parts of the factory not one single instance of tetany occurred, may be considered as evidence in favor of Oppenheim's theory.

The endeavor to identify more definitely the chemical nature of the substance at work has met with more or less success. Fuchs considered tetany a mitigated form of chronic ergotism. The most active principal of ergot, according to Biedl, B-imidazolylæthylamin, an aminobase, and an endproduct of protein metabolism, is looked on by some to be the chemical substance, however, experimental poisoning with this material does not produce the full picture of tetany. According to Eppinger, an injection of 5 gm. histidin chlorhydrate in persons with intestinal disorders will bring about a Chvostek phenomenon, a positive Trousseau, and increased galvanic excitability.

The association of tetany and rickets in infants, artificially fed, had long been noted. Thus attention was directed toward the metabolism of calcium, and the work of MacCallum and Voegtlin gave the problem a new direction. These authors found a marked deficiency of calcium in the blood of tetany individuals as well as a marked increase in the excretion of calcium in the urine, a condition which might be termed "calcium diabetes," analogous to the excretion of dextrose following extirpation of the pancreas. The marked beneficial effect of feeding calcium in spasmophilia supports this view. The inactivation of circulating calcium by intravenous injections of trisodic citrate was followed by convulsions similar to those occurring in tetany, which were relieved by the administration of calcium. Quest also showed diminished calcium content in the brains of three spasmophilic infants, although these findings have been challenged by other investigators. The parathyroids are accordingly considered the regulating mechanism of calcium metabolism. Certain objections to this theory have been raised. It was pointed out that bleeding followed by replacement of the fluid lost, by saline, relieved the convulsions, instead of increasing them, by reason of having further reduced the calcium content by one-third; that the bones surely contain enough calcium to delay, at least, the onset of tetany following parathyroidectomy, which is not the case; and that animals ultimately die within the same period of time regardless of whether calcium has been administered or not. Strontium and magnesium also control the attacks, as does calcium.

Certain other factors which have a definite bearing on the disease remain to be explained. It has long been noted that feeding meat hastens the onset and increases the intensity of the convulsions. A large increase of the ammonia content in the blood, or an alkalosis, preceding the onset of the convulsions, and a definite acidosis following, has been noted. The problem was further investigated by Wilson, Stearns, Janney and others, and its bearing on protein metabolism studied. It was demonstrated that the injection of ammonia into healthy animals in the same amounts noted in tetany animals, was in itself sufficient to produce convulsions, although these were of a different character.

The more recent findings which give promise of leading finally to the solution of the chemical aspects of the problem are centered around the guanidin bases. It remains necessary to correlate these with such definite factors as calcium metabolism, magnesium and phosphorus excretion, age, etc. This Koch has attempted to do and his theory may be briefly summarized:

Guanidin and its alkalated compounds, as methyl and dimethylguanidin, are known to be very toxic substances, capable of producing exactly the symptoms seen in tetany. This base has been shown by Burns and Sharpe to be present in the urine of normal dogs to the extent of 1 mg. per 1,000 c.c., and after parathyroidectomy, 8.7 mg. per 1,000 c.c.; the blood contains normally .25 mg. and following parathyroidectomy 1.1 mg. It is known that meat diet increases the severity of the tetany, and that a high protein diet produces large quantities of ammonium which generally unites with carbon dioxid to form the innocuous substance urea, or with other acids to form salts. Here, however, the ammonium which is increased to the point of tetany, unites with the cyanimids, forming the alkali guanidins until the threshold dose of guanidin intoxication is reached, when tetany results. The attendant lactic acid formation permits ammonium to join the acid radicals, prevents the formation of poisonous guanidins, and by hydration converts the poisonous cyanimids into nonpoisonous urea. Thus the tetany serves as a detoxication mechanism. The mother substance of guanidin is supposed to be methylcyanimid, which Koch isolated from the urine of parathyroidectomized dogs in small quantities as the picrolonate and as the picrolonate of its polymer trimethylmelamine, both of which, by adding ammonium are readily converted into the guanidins. The apparent beneficial effect of the calcium is produced by interfering with the normal balance of monovalent and bivalent cations, which control the colloidal relation of water and lipoids, an excess of the former producing lipoid in a water phase, which increases the permeability of the cell, thus enhancing intracellular activity and quickening the cellular metabolism by facilitating waste product removal; by adding the bivalent calcium, it changes the protoplasmic colloidal relation from lipoid in a water phase to the dispersion of water medium in a lipoid phase. This depresses cellular metabolism, prevents the entrance of the toxic guanidin bases into the cell body and thus delays the appearance of the toxic symptoms. When the guanidin concentration arises too high, however, intoxication results unless so much calcium is administered that cellular exchanges are practically prohibited and death results.

As a theory of interest, we may mention Kling's views who regards tetany in the light of an anaphylaxis. In our case there was no such sensitization. The theory has many shortcomings. It has also been considered a deficiency disease, dependent on vitamine disturbance.

Whatever the chemical mechanism may be there remains to explain, if possible, the origin of the parathyroid insufficiency itself in our particular case, in which there was a definite endocrine syndrome present. The relation of the parathyroids to the other members of the hormone system was everywhere apparent. The history of convulsions and laryngospasm in various members of the family during childhood at once commands attention. The family history of migraine and the development in a brother of a condition which strongly suggests an angioneurotic, or Quincke's edema assumes new significance. The abnormal dryness and scaling of the skin, suggesting thyroidal features, and the striking pigmentation noted during one of the exacerbations, possibly of adrenal origin, are striking indeed. We have, finally, the direct evidence of disturbance of the gonads in the development of a testicular tumor, with the clinical picture designated variously as pseudohermaphroditism, eunuchoidism, "infantilisme reversif ou tardif" of Gandy, etc., pointing to disturbance of the secretory activity of the cells of Leydig.

Of these designations, Falta prefers the term eunuchoidism, since infantilism would imply an arrested sexual life, absence or only partial development of secondary sexual characteristics, faulty involution of the lymphatic apparatus, delayed growth and ossification, child-like dementions—depending on closure of the epiphyses and childish mentality, which are not present in these cases.

It was largely through the work of Claude and Gougerot that the intimate hormonal relation of these organs was shown, the sum total of the disorder produced being termed by them "insuffisance pluri-glandulaire endocrinienne." While this term has been criticized as abandoning more or less the effort to determine what particular glands are most extensively or solely involved, it serves to impress on one the intimate correlation, not hormonal antagonism, of the entire endocrine system, injury of one member being reflected by a perverted action of all the other ductless glands due to a shifting of the chemical coördination.

This observation is supported on the anatomo-pathologic side by the demonstration in a number of these cases of a multiple endocrine sclerosis (Falta) underlying which we have, as shown by Wiesel, Falta, and others, a connective tissue diathesis, the expression of a primary constitutional defect. On the basis of this we note a peculiar locus of lessened resistance exposing these organs to attack by noxious substances which would ordinarily not result in any such serious consequences. It is quite possible indeed that

such diseases as chronic lenticular degeneration, which have an associated hepatic cirrhosis belong in this category, as organs showing insufficiency have a marked tendency to sclerosis.

I wish not to be misunderstood as implying that all of these cases exhibiting multiple glandular involvement are associated with this sclerotic process, for this is obviously incorrect; I do believe, however, that it is very important to distinguish the type of case in which tetany merely appears secondarily as a result of this shifting of chemical coördination due to a primary involvement of one of the other members of the endocrine system, and the other type in which all of the glands of internal secretion are primarily involved with or without sclerosis on the basis of a constitutional hypoplasia. This distinction can probably be made in a large percentage of cases. The prognostic significance is apparent. In the first instance, return to normal of the primarily involved gland will be accompanied by a restitution of the remaining organs; in the second case the outlook must necessarily be much more unfavorable.

The outcome in other cases of tetany likewise differs materially with the type. Thus, in the idiopathic or artisan's variety, death is almost unheard of, however, in this type, as well as in tetany of maternity, only one fifth of all patients may be said to recover completely. Four fifths are more or less permanently invalided and a large percentage die of tuberculosis. Of subsequent complaints which these patients have, may be mentioned cramps, tremors, sensation of drawing in the limbs, general fatigability with weakness, paresthesias, headache, vertigo, sleeplessness, fears, and increased lability of affect. The chronicity of the disease may be illustrated by one of v. Frankl-Hochwart's patients, who showed repeated exacerbations for sixty-six years.

In gastric tetany, the mortality rate varies from 50 to 75.5 per cent. In the tetany of infancy the mortality, according to Potpeschnigg is over 23 per cent. According to Guleke the prognosis of postoperative tetany is not good, 25 per cent. of the patients dying, and 17 per cent. developing a chronic or markedly recurrent tetany. The mortality in pregnant women, according to Seitz, amounts to 7 per cent.

Tetany associated with eunuchoidism appears to be decidedly uncommon, as a survey of the literature reveals. Phelps reported a case of tetany occurring in combination with psychic developmental deficiency, infantilism, early optic atrophy, cataract, and trophic disturbances of the teeth. A case described by Falta in a seventeen-year-old male, showed tetany, epileptiform seizures, pal-

lor, dry skin, myxedema, and infantilism. It is quite impossible to arrive at an idea as to the ultimate outcome of the few cases referred to, as they are examined and no note is subsequently made.

In concluding it must be emphasized that tetany is by no means to be regarded as an illness of little significance. It would seem justifiable to assume that where there appears marked evidence of polyglandular participation in which the disorder is not initiated by a disturbance of the thyroid gland, the prognosis is rendered much more grave, for, after all is said and done, the therapeutic results from gland administration other than thyroid leaves much to be desired. A distinct heredo-familial tendency to glandular disturbance would render the prognosis even less favorable, judging from somewhat analogous situations recognized in dealing, for example, with the psychoses or certain neurasthenic states. Further evidence bearing on this question is needed and would be of considerable value in aiding the solution of a problem having such fundamental bearings.

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Society Proceedings

NEW YORK ACADEMY OF MEDICINE, SECTION IN NEUROLOGY AND PSYCHIATRY

Regular Meeting Held March 11, 1919

The Chairman, Dr. Joseph Byrne, Presided

INFLUENZAL FACIAL NEURITIS

Dr. Simon Rothenberg (by invitation) presented this case of post-influenzal involvement of the nervous system. The points of interest were a high lymphocyte count of 290 cells, persistent miosis, and pain in the back of the head and neck, all pointing to a meningeal irritation beside the encephalitic involvement. The patient, a man thirty-six years of age, was admitted to the hospital on January 8, 1919, complaining of frontal and occipital headache and pain over the mastoid region. He was drowsy and responded very slowly to questions, dozing off frequently while talking. He vomited a great deal at this time, had photophobia and was unable to open his mouth widely. The previous history, beyond the attack of influenza, was negative except that he had been suffering intermittently with migraines for two years which were often relieved by spontaneous vomiting. There was tenderness over the mastoid region and all reflexes were exaggerated except the abdominal. There was partial ptosis of both eyelids, sluggish pupillary reaction, the lower facial nerve was affected, giving a flat and drooping expression, the tongue came out straight but with difficulty and mouth opened partially but symmetrically. The speech was indistinct and slurring. There was an intention tremor in the left arm. There was no Kernig or rigidity of the neck, no involvement of mentality. There was bilateral miosis. Wassermann examination of the blood and cerebrospinal fluid was negative. Influenza bacilli and micro-catarrhalis were present in the sputum. The blood contained a very high lymphocyte count. Diagnosis was made of nuclear involvement of both facials due to lethargic encephalitis of influenzal origin.

INTRATHORACIC GOITER

Dr. Joshua H. Leiner (by invitation) presented this case, one of true intrathoracic goiter or struma profunda lying entirely within the thorax. There was no visible sign whatever showing the condition of

the gland. The patient was a married woman, thirty-four years of age, a Russian Jewess. She had no difficulties in labor at the birth of her three children and had had no miscarriages. Her menstruation, however, had always been irregular. She first came under observation in the early part of 1916 at which time she showed a marked exophthalmia, von Graefe's sign, pulse 96, and an enlarged thyroid. A soft systolic murmur was heard at the apex. The only subjective disturbance complained of was nervousness. About one year later she was taken suddenly very ill. She was confined to her bed with the entire chest wall heaving and pulsating together with pulsations of both carotids. At this time she showed objectively a marked hypertrophied thyroid, marked exophthalmia, a pulse of 140 a minute, tremor, and other evidences comprising a clinical picture of a Basedow goiter heart. Her complaint was a marked asthenia, dyspnea and cardiac palpitation. Examination showed a heavily built young woman with abundant hair, moist palms, impalpable glands, no pigmentation, normal teeth, some exophthalmia, a double von Graefe, fine tremor of fingers, pulse 108 a minute, blood pressure 138 systolic, eighty diastolic. The thyroid gland was not palpable in the neck but at its side there was a baggy mass of loose distended fatty tissue. There were systolic murmurs of the heart at the apex and at the base. Percussion over the sternum revealed a small area of dulness.

The diagnosis of intrathoracic goiter was confirmed by fluoroscopic examination. There was no displacement of the trachea or the esophagus. The patient was given Forchheimer's treatment of quinine hydrobromate and ergotin and was given ovarian and thymus extract. She improved subjectively and objectively, the thymus treatment being particularly effective. Prognosis in this case included two considerations. Regarding her Basedow, the thyrotoxin was burning itself out and in the future she would probably reach a state of hypothyroidism. Regarding the intrathoracic symptoms, as the struma was of small dimensions the pressure symptoms were negative and surgical interference was therefore not indicated. In view of the fact that the thyrotoxic symptoms were showing improvement the patient would probably get along very well under careful observation.

LETHARGIC ENCEPHALITIS; FORME FRUSTE

Dr. Hyman Climenko reported the case of a young girl, thirteen and a half years of age, who came for treatment on November 22, 1918, complaining of excessive drowsiness. She had previously had an attack of uncomplicated influenza which confined her to bed for three weeks. One week after she was out of bed and apparently well, she began to suffer from somnolence, falling asleep on every occasion, while eating at the table and even while walking on the street. It was always easy

at these times to arouse her and, although she was fully conscious of the approaching drowsiness, she could not overcome it. In the beginning of this lethargic condition these attacks occurred every five minutes so that they seriously interfered with her daily routine, but they gradually became more and more rare. At the time of the patient's first visit, Doctor Climenko did not know as much about the condition of lethargic encephalitis as he did later when the condition became more generally known, and he gave the patient hormotone and a week afterward she felt better. Then small doses of thyroid were given and she continued to improve. On discontinuing the organotherapy the symptoms grew worse but at no time returned to the original state. After she had had no attack for two weeks a preparation of glycerophosphates was given but the symptoms immediately returned, and opotherapy was again resorted to and the patient was relieved of all symptoms of lethargy and had been so for two weeks. In this case the cell count was negative, every laboratory test indeed being absolutely negative. There were no organic neurological symptoms. It was presented as an atypical example of lethargic encephalitis following influenza.

TRAUMATIC MYELITIS

Dr. William Cohen presented this case, as well as the röntgenograms showing the fragments of bullet still in the vertebra. The patient, a young man, thirty-two years of age, was accidently shot while walking on the street in April, 1917. He fell backward to the ground, his hands first striking the pavement. Though fully conscious he could not rise, as he was unable to move his legs. He was taken to the hospital and here he began to experience excruciating pain in the soles of his feet, though his feet and legs from the soles to the thighs felt numb. He was operated upon and the bullet removed. About four weeks later sensation returned to his legs and in six weeks he could lift both feet from the bed. In four months he could walk. He had to be catheterized for seven weeks, but from that time on he has had incontinence of urine. There was rectal incontinence for six weeks, but at this time he was constipated. Sexual impotence had existed for one year and a half. At the present time the station and gait were negative: no decensus and the gross motor power was intact in both extremities. Tonus was normal except for slight hypotonia of the left knee joint. The plantar reflexes were normal. There were muscular twitchings of the left thigh. Knee jerks were present on both sides but the Achilles jerks were not obtainable. Sergent's white line was present below the lesion beginning at the level of the twelfth dorsal in the region of the lesion and a marked dermographia was present above the lesion.

MULTIPLE SARCOMATA (?) OF THE SPINE CURED BY COLEY'S FLUID

Dr. I. Abrahamson reported the case of a woman sixty-three years of age, who was admitted to Mount Sinai Hospital, July 20, 1918, complaining of pain in the lower back and weakness of legs, which had existed for six weeks, confining her to bed; and she was constipated for the first time in her life. There had been loss of urinary control on the first day of the illness; no incontinence since but partial retention. She had slight dyspnea on exertion. Examination was made and the reflexes were found to be abnormal; the triceps and wrist jerks were not elicited, the knee jerks were present, but there was no plantar response; Achilles were not elicited. There was slight Kernig; wasting of the left thigh and both legs, especially the left, and decided weakness of both legs, ankles and feet; pain at the base of the chest posteriorly, marked tenderness of spine of tenth dorsal vertebra and a large, bulging, firm mass at the sacrococcygeal region but no redness, heat or fluctuation; and saddle anesthesia, perineal and down thighs bilaterally. Röntgenogram of the last dorsal and first lumbar vertebra showed an irregular outline; fusion of the dorsal part of the dorsal vertebræ; and disappearance of intervertebral space. The articulating surface of the other lumbar vertebræ was slightly "lipping," probably the seat of a spondylitic condition. There was a high lymphocyte count. Wassermann of blood and spinal fluid, and complement fixation test for tuberculosis, were negative. Diagnosis was made of neoplasms of the spine involving the lower cord above the conus and involving parts of the cauda equina, and it was decided to treat the patient with Coley's fluid. The first injection was made August 2, 1918, and as the needle penetrated the lower spinal mass it felt firm and cartilaginous. The patient had a marked reaction and for one or two days thereafter the mass seemed to increase in size and firmness. On the 7th it was noticed, however, that the mass had decreased to almost one third its former size and there was marked softening. On the 10th the mass felt soft to the penetrating needle. On the 14th the fluid was injected in the upper mass and again on the 19th. The lymphocyte cell count on the 27th had decreased to 12,000. The injections were continued until August 31st and on September 4th the patient was discharged much improved. The only evidence of the tumors was a small fibrous knot about one half centimeter in diameter at the level of the twelfth dorsal at the end of the spinous process, and a diffuse bulging, soft but not tender, in the sacrococcygeal region. The injections had been kept up at home with further improvement. The tumor masses had practically disappeared; she had regained her former state of good health, could walk about freely and attend to her household duties.

INTERMEDIARY STAGES IN SEXUAL DEVELOPMENT

Dr. C. P. Oberndorf traced the transition of heterosexuality from the sexual impulse in its earliest manifestations of autoerotism in children. The earliest pleasurable impulses that develop in the child are those derived solely from bodily movements, such as suckling, swaying, etc., and are autoerotic. Autoerotic impulses are those arising spontaneously from within and finding satisfaction in the individual's own person. From this state the normal individual gradually progresses to object love, that is, the love of another person. The intermediate stage between these two is called narcism, which comprises a great subdivision of autoerotic activities and is characterized by the fact that in the transition of the patient from the most primary autoerotic impulses which he collects in earliest infancy to the heterosexual object love, he directs his impulses toward his own person in his actual or fancied state. In this transition stage each person is apt to pass through a period where his love is directed toward an actual object or fancied object of some one like himself; *i.e.*, a homosexual image, before passing to heterosexual actualities. It is evident that in this period of autoerotism, homoerotic as well as autoerotic impulses may be given unrestricted, fanciful outlet.

The most frequent unmistakable autoerotic sexual manifestation in the child is masturbation. In fact, it may safely be regarded as a normal phase of sexual development, and it is only when prolonged to an age beyond the normal, arbitrarily twenty years, or accompanied by excessive narcissistic fancies, that it is to be considered pathological. Seventy per cent. of the students at a certain university recorded that they began masturbation between the thirteenth and seventeenth years, and sixty-three per cent. of these made a transition to intercourse between seventeen and twenty-one.

The primitive forms of masturbation, however, do not as a rule continue long in their simpler mold, especially in neurotic individuals, but become associated with elaborate fancies. This "fancy" activity is particularly pernicious as it removes the individual further and further away from realities, and the fancies acquire a hold on the life of the individual which it is difficult to alter, and they fix a standard of comparison for all subsequent erotism. He is apt to have recourse to it as a solace in times of stress and this tends to increasingly unfit him for sex actualities and leads to all sorts of conflicts. These in turn form the basis of neuroses. Persons lingering in autoerotism frequently suffer from a sense of guilt and dishonesty and a fear that retribution in some form must overtake them for their practices. Where the sense of shame of guilt has become excessively emphasized, through parental warning or religious or even broad social censure, each repetition of the act may be accompanied by remorse and attempts at repression which result in the establishment of neurotic compromises or uncon-

scious manifestations. While early autoerotic impulses are normal and physical masturbation is without great subsequent effect upon physical sexual functions, the continuance of narcissistic fancies into adult life may be productive of most unfortunate consequences. Merely to label a condition as masturbation in no way indicated the psychic difficulties with which the person so afflicted was contending. In homosexuality there were two forms in the male, with homologous counterparts in the female. Subjective homoeroticism in the male, *i.e.,* where the male assumed the passive rôle exclusively, was probably a biological anomaly and such individuals were apt to show secondary sex signs. Active homosexuality, where the individual was abnormal only with regard to his love object, was a compulsion neurosis. Such individuals had precocious heterosexual experiences in childhood, but were severely reprimanded for them, and unconsciously felt impelled to seek the same sex because the opposite sex had become psychologically forbidden for them. Objective homoerotics showed all the mechanisms of a compulsion neurosis. Subjective homoerotics showed very few of these conflicts, were fairly content with their condition, and rarely sought medical aid.

Since most individuals preferred to conform rather than deviate from the norm, it was evident that homosexuality must be considered as a disease (one type a compulsion neurosis, and the other a biological anomaly) rather than a crime. Developmentally speaking, the homosexual was somewhat more advanced and less seriously affected than the profound autoerotic. From the study of intermediary phases of sex development the conclusion was reached that: First, autoerotism was not to be alleviated by rigid repression but was best handled by educating the individual to a psychic tolerance of heterosexuality; second, that attempts to force either the confirmed active homoerotic or autoerotic into heterosexuality before he was adequately psychically adapted to it was most likely to result unfavorably, and that active homoeroticism in the male and its homologous condition in the female were best regarded as compulsion neuroses and, as such, offered a really hopeful field for therapy.

Dr. A. A. Brill considered both masturbation and homoerotism nothing but intermediary stages, and as far as masturbation was concerned, did no harm at all. The only harm associated with it resulted from conflicts that the individual had and these could be removed. On the other hand, there were a number of masturbators that continued the practice and they were usually of the dementia præcox type. The best way to obviate these abnormal deviations was through early education. Though masturbation did no harm in a physical or mental sense, psychologically it did harm, for it made the person autoerotic. The average normal individual gave it up and turned to normal object love, and the other kind adhered to it for the rest of his existence. Masturbation in

women had nothing directly to do with marital frigidity; frigidity was a characteristic of cultured women, the average woman being taught to ignore and suppress sex, and it was a well known fact that most newly married women were frigid. Women of the lower classes, such as the peasants in European countries, were not usually so. As far as homosexuality was concerned, it was well to remember that everyone was more or less homosexual, which enabled them to live in friendly relations with their fellow beings of the same sex, but on the other hand there was a pathological homosexuality in which the individual felt a sexual pleasure in persons of the same sex. Homosexuality could thus be divided into two groups. In the second group the defect could not be cured even if these people ever came for treatment, which they did not except when in some legal trouble. The ones who sought treatment were those who always struggled against it and many were of the compulsion neurotic type; they could usually be cured after a prolonged treatment. The problem could only be handled properly by starting in childhood and educating people in the various phases of psychosexual development.

Doctor Leiner said he cured a case of masturbation in a boy five years of age by putting him on an alkaline diet, assuming that there was irritability in the bladder. He also believed that many cases of homosexuality had their origin in a disturbances of the endocrine system and he thought that if such physiological data were taken into consideration in the study of many of these cases a solution of the problem might very often be achieved.

Dr. Leonard Blumgart said that the State Charities Aid Association had 1,500 children under their care, and masturbation presented itself prominently in the history of almost all these children. Doctor Brill's statement that education was a great factor in the cure of this practice had been borne out by experience with these children.

NEW YORK ACADEMY OF MEDICINE, SECTION IN NEUROLOGY AND PSYCHIATRY

Meeting Held April 8, 1919

The Secretary, Dr. Hyman Climenko, in the Chair

DYSTONIA MUSCULORUM DEFORMANS

Dr. S. Philip Goodhart presented a case, as being typical of this rare condition, for confirmatory opinion. It was the first of its kind in his private practice although he had seen a few cases at the Montefiore Hospital. The patient was a girl twenty-four years of age whose family and personal history showed no taint. The onset of the present

condition was atypically sudden and its progress rapid. The young woman had none of the stigmata of neuroses and she was not emotional. Under unusual emotional stimulus, as for example the present demonstration, the spasmodic hyperextension of the muscles became more pronounced and beyond her control. The will had but little influence in the control of the movements which did not persist when the patient lay quietly recumbent.

Doctor Goodhart said that such cases had heretofore been regarded as functional, but it was now quite a general opinion that they belonged to a definite group whose pathology might reasonably be placed in the corpus striatum. This important ganglion, deeply seated within the hemisphere, was the center of tone and its component structures, with their connections with red nucleus and cerebellum, represented the extra pyramidal influence of the several phases of muscle tone. The case presented was distinctly a disorder of that function peculiar to physiological muscle activity comprehended by the term *tone*. Dystonia musculorum deformans, a condition originally described as such by Oppenheim, was essentially one in which part of the musculature was in a state of hypertonicity, another in a state of hypotonicity, and another in a normal state of tone. This variation of tone became manifest only upon movement. The same set of muscles might be involved, at one time hypertonic and again hypotonic. The hypertonicity of the leg muscles and those of the trunk and pelvis was characteristic, so that in walking the trunk appeared to revolve about the pelvis.

Dr. William M. Leszynsky considered that the only objection to the diagnosis would lie in the suddenness of onset of the condition. Dystonia musculorum deformans was a gradually progressive disease.

SURGERY OF CRANIOCEREBRAL WAR WOUNDS

Dr. Harold Neuhof read a paper on this subject in which he related facts drawn from his experience during the spring and summer of 1917 when he had the opportunity of treating patients with head wounds at U. S. Army Base Hospital No. 2 (New York Presbyterian Hospital Unit) attached to the British forces. These patients, the majority of whom had been operated upon in the front area, fell into two classes, one in which there had been primary closure, and the other in which there had been drainage. The great majority of the patients in the first class did well, but sometimes secondary operations were necessary. When the dura had been lacerated by the missile or bone fragments a hernia cerebri was apt to develop, and such hernias often meant early acute brain infection with later development of brain abscess. Once a hernia cerebri appeared hope for the ultimate outcome was not good. Concerning the second class of patients with wounds drained or incompletely closed, the results were on the whole unsatis-

factory. The best ultimate outlook in serious head wounds existed after complete operations performed at hospitals in the advanced zone; operations short of complete were followed frequently by serious and often by fatal complications, and delayed primary operative procedures performed at the base generally had disastrous sequelæ.

Accordingly when Doctor Neuhof was sent with a neurological team to British Casualty Clearing Station No. 17 in Flanders in the fall of 1917, he concluded that complete operations should be done, whenever feasible, upon all head wounds. He realized that efforts at complete operation might result in an even higher immediate mortality than the generally accepted fifty per cent. for wounds penetrating the dura, but in the patients who recovered there would be a greater likelihood of freedom from subsequent complications. Careful follow up records were kept and as they covered a period of more than a year they showed figures which might be termed end results. There was not a single report of late hernia cerebri, meningitis or brain abscess. This was the most striking feature of the records of this series of head wounds. Up to the present there had been two reports that suggested the existence of *petit mal,* but none of convulsive seizures. Turning to the symptoms that continued after the patients arrived in England or the various colonies, headache and dizziness were the most frequent complaints, either or both of these symptoms being reported in the first months after operation, and had persisted in twenty per cent. of the patients. There was, however, a general trend toward improvement. Other subjective symptoms, such as insomnia, hypersusceptibility to sounds, inability to concentrate, and so on, were not infrequently mentioned but these had no proportionate relation to the gravity of the wound. The reports in but one case suggested the possibility that insanity might have developed. Gross paralysis occurring after wounds damaging the brain in the parietal and parietofrontal regions was comparatively infrequent, and the majority of paralyses showed improvement before the patients left the casualty clearing station. Subsequently the course of the paralyses or pareses ranged from progressive improvement to complete disappearance. The development of spasticity was reported in but one case, and there was not a single instance of persistent aphasia. The conclusion to be drawn from the follow up of this series was that the ultimate prognosis for patients with craniocerebral wounds after complete early operations was far more favorable and cheering than was generally thought to be the case. The total mortality in the head wounds operated upon, including deaths from other causes and deaths after leaving the hospital, was forty-two per cent., in dural penetrations in the first series of cases, and was reduced to twenty-nine per cent. in the second series of head wounds with dural penetration. In the latter group of cases the patients were treated at Mobile Hospital No. 2, American Expeditionary Forces.

Doctor Neuhof described the type of material that came under his care, the physical signs and neurological manifestations, and gave in some detail the operative technic that was employed.

Dr. Foster Kennedy said that Doctor Neuhof had covered such a wide field that it was difficult to decide which parts of his paper to discuss. At the beginning of the war the neurologists and the surgeons acting with them seemed to be very much in favor of very wide exploration in almost all cases of cranial injury. As the war went on that policy was more and more modified and it would seem the modification was associated with good results. At the hospital to which he was first attached he said that he saw more cases of brain abscess within three weeks than he had ever seen before. The policy which had been inaugurated there was that a man coming in with a cranial injury was subjected to a revision of the wound. In the course of that revision, if a crack of the cranium was found a trephining operation was automatically done. The result of that policy was the production of innumerable cases of brain abscess. It was very difficult to get surgeons to realize that though they were dealing with a fracture it might be a fracture in good position. They had to acknowledge that if they were dealing with an infected fracture of the femur without displacement they would not cut down upon it and plate it. But this procedure with the skull was followed because it always had been done, as it was believed to be necessary. But it was not necessary. When those same men got in the habit of looking at these wounds, not for cranial injury but to see whether there was cerebral injury, the mortality was very markedly reduced. A rule was followed afterward that men coming in with head injuries were examined neurologically. If they had cerebral symptoms they were then subjected to cranial exploration. But whether they had a fracture or not, if they had no symptoms referable to compression they were left alone. As Doctor Neuhof had said, the whole problem was sepsis. All these wounds were terrifically septic. The capacity of the scalp to become gangrenous and to have a widespread subcutaneous cellulitis of a fulminating type was a serious consideration. It was through such a surface that one had to operate. When a gratuitous opening was made in the skull an avenue for infection of the meninges was laid open which usually had gave consequences and led rapidly to death. It was found that the dura had an ability to wall itself off and the gross manipulations of the surgeons tended to break down those young adhesions. So they became very cautious and this caution was followed by success.

Doctor Kennedy was glad to hear Doctor Neuhof speak against the policy of digital manipulation of the brain. Sometimes such manipulation failed to remove a bullet from below the surface of the brain and yet the patient subsequently recovered. The capacity of the brain to encyst foreign bodies was remarkable and even large pieces of metal seemed to be borne without much discomfort.

Doctor Neuhof had said that he thought cerebral hernia was associated with a septic process. The speaker agreed with him up to a certain point but he was not as pessimistic regarding the certainty of brain abscess following. The septic process was often quite superficial. Large hernias had disappeared under dressing every two or three hours; it was an edematous process which disappeared in four, five, six or seven weeks. Those patients, if transferred to England, would have died, for there had been a high mortality among patients taken back home; but when a patient could be kept in France he very often recovered. Those cases were most often the result of a purely local sepsis overcome in the ordinary way by dressing very frequently.

There were some valuable lessons to be learned from the subsequent history in these cases. There never had been a time when so many men were so seriously hurt in the head as in the last few years. There had been ample opportunity to observe the results of very serious brain injuries in the mass. For instance, men returned to the firing line after they had been trephined a year or so before did not do well. They had all lost their nerve. They did not suffer locally from their injury but they were not able to stand the strain, to adapt themselves again to their environment. But on the whole, very little afterresults, as far as ordinary peace time conditions were concerned, had developed. It was amazing that there were not more cases of epilepsy and more cases of mental breakdown as a result of head injuries. Emotional instability varied inversely with the seriousness of the wound; the more seriously the man was wounded the more calm his mind and emotional sphere.

Doctor Neuhof had not said anything about filling in the open wound by the surgeon after the removal of missiles or operation for the relief of pressure—trying to do an Albee operation on the head by implantation of bone graft. In this operation there was always uncertainty whether or not the area would become septic again and it was not advisable. The same operator would make an artificial skull by imposing a piece of metal in place of the bone defect. That seemed to be very bad plastic surgery. It seemed neurologically wrong. If there was a well healed area with the individual not suffering from it one ought not to interfere any more with it, and a metal cap could be given to be placed on the outside of the head—a solution unlikely to open avenues for bacteria.

In some of the worst cases seen by Doctor Kennedy the patients did remarkably well. He was amazed to discover the resistance of the brain to very severe injury. One man had had a very large glancing wound of the left frontal lobe with crushing depression fracture sustained forty-eight hours before. The wound smelled gassy. Fourteen pieces of bone were removed and some of the lining of the helmet, all from brain tissue. The wound was left open but all of the destroyed tissues of the scalp were cleaned away. The patient had a series of

convulsions after the operation, became completely aphasic, recovered, and was sent to England, where he had a plastic operation done, and when last heard of he was doing perfectly well and working as a laborer.

Another man had a small cranial crack but was without symptoms other than headache and some vomiting. The wound was in the region of the left temporal lobe and he had been operated upon but nothing was found. After operation he became motor aphasic. The wound was reopened and a subpial hemorrhage was found. The wound was widened and the hemorrhage left undisturbed. He subsequently made a complete recovery. There was a series of cases of men who were struck on the helmet, sustaining a very small wound, the whole force of the blow having been taken by the helmet. These men came down with concussion of the brain, with pulse below 40 and remaining between 40 and 50 for three days, during which time they would vomit. There was no sign of local brain pressure but the spinal fluid came out under extreme tension. The symptoms would last three to five days, the men would be quite well for three to five days, and then they would have a relapse and that situation might be maintained for eight weeks. Many such cases were seen. The men all had the appearance of profound episodic compression of the medulla; by prolonged rest, without operation, they all recovered.

Doctor Goodhart considered very interesting the fact that Doctor Neuhof placed great reliance on the location of the injury through the neurological reflexes, and thought that was very important. He had a case under observation in which deep seated neoplasm had been suspected, the only sign being absence of abdominal reflexes on the right side, and ten days later there was evidence of pyramidal tract derangement.

Doctor Neuhof thought the cases to which Doctor Kennedy referred were different from those seen in his own experience, that is, wounds in a state of infection. The treatment for them was different and consisted in not doing anything unless there were definite indications from a neurological examination. At the base hospital he saw six cases of hernia cerebri treated by persistent efforts at sterilization which receded. In four patients subsequent complications developed and they died from five to nine months after the recession of the hernia cerebri. This Doctor Neuhof believed to be ample reason for pessimism.

CLINICAL FEATURES ACCOMPANYING CHANGES IN THE SELLA TURCICA

Dr. Walter Timme considered that it was difficult in these cases to announce which came first, the sella changes or the actual metabolic and blood disturbances. He did not wish to be understood as saying the clinical manifestations were produced by these changes in the sella

turcica. Thirdly, he was not talking particularly of the pituitary gland but of the changes in the sella turcica itself and those two things were not synonymous.

The normal sella turcica in an adult was variable in size, the limits being fairly large, the average anteroposterior measurement being ten to twelve mm. and in depth eight mm. The sella turcica, as well as the pituitary body, was larger proportionately in woman than in man. The anterior lobe of the pituitary body was more liberally supplied with blood vessels than was the posterior or the socalled middle lobe. If through some emotional or other disturbance the abdominal arterial supply was diminished as to capacity, due to excess amounts of adrenalin or other sympathetic stimulant, such condition would be followed by an increased amount of blood in the pituitary body and would have its effect on the pituitary.

The manifestations produced by enlargement or disturbance of the anterior or posterior lobes occasioned a different symptomatology. Hyperplasia or stimulation of the anterior lobe produced genital enlargement and general bodily growth; and disturbance of the posterior lobe was followed by metabolic changes such as increased or decreased sugar tolerance, blood pressure changes, and changes in tonicity of the smooth muscle fiber.

Granting most of these things, what happened to the sella turcica, the pituitary body in which was more or less affected by these conditions? With a sella turcica so small that the pituitary body fitted snugly in the cavity, there was no allowance for much expansion and any increase in size for any length of time was accompanied by certain pressure changes; so that headache in the region of a line drawn between the two temples was produced by a pituitary body enlarged beyond the point where the sella turcica would allow it to enlarge. If such a process continued for any length of time, certain changes took place in the sella.

The small sella turcica was not necessarily synonymous with a low activity of the gland. One might find associated with a small sella turcica a marked increase in growth. In some patients also there were marked symptoms of hyperpituitarism, prognathous jaw, spaced teeth and symptoms of acromegaly, and in addition to disturbance of sugar metabolism, excessive growth of adipose tissue and similar conditions. Up to a certain point these conditions were progressive. If, however, there was too long continued increase in size or pressure of the pituitary body against its bony capsule, then things began to happen to the sella turcica. In the first place, the body capsule began to enlarge, the pressure itself producing an enlargement in all diameters of the sella turcica; or the anterior or posterior wall or base became eroded and absorbed. For a long time it was believed that the change produced in such a capsule as the sella turcica would be indicative of the portion

of the gland which was enlarged; if the anterior clinoids were eroded then it was concluded that the anterior lobe was the cause and sexual or growth changes were looked for; and if the posterior, changes in metabolism were expected. That was not always true; the clinical picture might be different and the reason was that if there was an adenoma, or a foreign body, or hyperplasia of the gland, it did not necessarily transmit its pressure on the portion immediately surrounding it but might exert it on a portion quite distant which became eroded. Another possibility was this: Realizing that the pituitary body compensated for certain activities of other glands, it was clear that the pituitary body itself must enlarge in the performance of this compensation. There was such a thing as a small sella turcica and a closing in of the sella turcica. None entirely closed in had been seen at autopsy, but there were röntgenograms in which the anterior and posterior clinoid processes seemed to be united. A large sella turcica, large as compared to the gland it contained, might be associated with manifestations of pituitary disturbance without a feature of disturbance appearing in the X-ray picture.

Dr. Leon T. Le Wald thought that Doctor Timme had given a most careful and conservative paper on the interpretation of the relationship between the pituitary manifestations and variations in the sella turcica. Inasmuch as he had mentioned the heart, in regard to the compensation of the heart it might be apropos to refer to studies recently made in the army of the hearts of aviators under conditions of low pressure and low oxygen supply to determine if the heart dilated. Even in such a large organ, measuring twelve or thirteen centimeters in diameter, it was difficult to differentiate a few millimeters in size as the aviator ascended 20,000 feet. Manifestly then still greater difficulty must be encountered in attempting to differentiate the slight changes in size of the pituitary fossa. In the aviator, account was taken of his size, weight, and height. In the study of the sella turcica this was impracticable, for after considering a large number of healthy individuals one would be struck with the extreme variations to be found in the pituitary fossa. Doctor Timme appreciated that fact and had stated definitely that under certain circumstances it was difficult to make the clinical manifestations agree with no apparent change in the size of the sella turcica, and yet changes might be going on in the gland which did not cause any change in the bony formation. It was impossible to measure accurately the lateral diameter of the sella turcica, so the anteroposterior diameter and the vertical were the only two out of three dimensions usually considered. By stereoscopic radiographic examination a more accurate conception of the size of the fossa might be gained and this should be made a part of the X-ray examination. There were two things that were striking in Paget's disease: The conformation of the skull, which was almost the opposite of the conformation in cases of

acromegaly, and the difference in the size of the frontal sinuses which were greatly enlarged in acromegaly but in Paget's disease were very shallow. There was a prominence of the frontal bone which made one think there were large sinuses, but as a matter of fact they were exceedingly shallow. The syphilitic theory of bony changes in Paget's disease had been entirely exploded, though it was repeatedly diagnosed as syphilitic disease of the skull. When a clinical history did not agree with the laboratory findings, or X-ray findings, it was well to trace the case up and identify the individual with the report of the special examinations.

Critical Digest and Review

WAR NEUROSES AND PSYCHONEUROSES

By Drs. Charles R. Payne and Smith Ely Jelliffe

(*Continued from Volume 50, page 368*)

Contracture upon flexion of the leg is more frequent than that during extension. This follows upon wounds of the thigh or leg and there may be lesion of the sciatic complicating it. In standing or walking the heel is lifted and the foot rests only upon the anterior portion. When the patient lies on his back the leg is flexed a little with the flexion and abduction of the thigh. Active movements are possible but limited. This is true of passive movements although they are more extensive. In the ventral recumbent position only slight oscillations are possible. The angle of flexion in these cases is not modified from one examination to the other, even over a fairly long period. The contracture is accompanied by amyotrophy. It does not yield except under very deep narcosis, but the effort to reduce it under ordinary anesthesia provokes a spasmodic movement which exaggerates the vicious attitude.

Motor disturbances limited to the foot and the toe result usually from wounds to the leg or the foot. They appear as paresis of the extensors with the foot in varus equinus—the toes seized by contracture of the flexors or as a more rare type in which there is a contracture of the small toes at the same time with a flaccid paralysis of the great toe. These disturbances may be associated with the disturbances of the lower limb already described. The vasomotor disturbances with hyperexcitability of the muscles, weakness of muscular response, anticipated faradic tetanus and loss of cutaneous reflex are very marked.

In the upper extremities following wounds of the arm and forearm there is contracture of the forearm on flexion and pronation with paresis of the extensors of the hand and contracture of the flexors. The combination of contracture and paresis with hypotonia make for a relaxation of the ligaments whereby the palm of the hand can sometimes be laid against the surface of the forearm.

Here again the extremities are more affected than the forearm. Motor troubles associated with amyotrophy and vasomotor disturbances are often connected with the various forms of contracture of the hand, especially with the so-called "obstetrician's hand."

This is a very common form of contracture and appears in an exaggerated form. The fingers overlap in such a way as to form the three sides of an equilateral triangle, the base of which is represented by metacarpophalangeal articulations. The aspect of the whole hand is that of the priest dipping the holy water, or like that of a book being closed. The affected muscles are probably the abductor of the thumb and the interosseous muscles, especially the palmars, which are abductors. While some of these phenomena can be voluntarily produced, others, the authors state, must be due to a physical or physiopathic disturbance. The muscular disturbances already described are present with fibrous retractions and global atrophy of the fingers. The hand responds easily to passive correction of attitude and maintains this for some moments when it gradually returns to the deformity, revealing a hypertony of the muscles more common thus to the upper than the lower extremity.

There may be other forms of contracture of the hand and also paralyses and pareses of the hand and fingers. These are seldom if ever complete. There is here perhaps, it is suggested, a hysteroreflex. What strikes one most is the extreme flaccidity of the hand, which hangs and swings, during walking, like an inert body. The hypotony is very pronounced, the hypothermis very characteristic and the muscular hyperexcitability together with the weakness of response very clear. The paroxysmal character of this affection shows an analogy to tetanus.

There are other cases where the motor disturbances are very discreet and appear of little importance. They deserve serious attention, however, as they may impede function for a long period of time.

The vasomotor and thermic disturbances are very clear in the majority of cases. They can be best observed in the cold season. These cases are of a unilateral and acquired vasomotor disturbance as against a constitutional one which manifests itself bilaterally. Here again the disturbance may involve the whole limb, but is usually found at the extremity. There are changes in the color of the skin, there is a light infiltration, which on the back of the hand appears "succulent." There may be even edema, especially of the lower limb, on the foot or extending to the region of the knee.

There is a hypothermia which is well marked, which also extends

far beyond the site of the wound. This is modified temporarily by external temperature, immersion in water, exercise and electricity. There is enfeeblement of the arterial pulsations, but there is no arterial lesion. Neither systolic nor diastolic pressure shows any distinct modification.

The mechanical hyperexcitability of the muscles is especially marked in the paralytic and paretic forms and sometimes in the hypertonic forms. It can be observed most clearly and most commonly in the small muscles of the extremities, sometimes in the muscles of the leg, of the forearm and of the quadriceps. This cannot be called a muscular reflex. It manifests itself by a sort of vermicular contraction without displacement of the corresponding segment. It is also closely associated with the hypothermia, becoming exaggerated, for example, when the affected member is plunged into cold water. By detailed graphic methods the authors confirm their clinical observations that the slowness of the muscular reaction provoked by percussion is very marked and they believe that the muscular hyperexcitability and this slowness of reaction are of equal intensity with vasomotor and thermic disturbances, and that when the hypothermia is excessive these muscular indications will also be marked. And there does seem to be a connection between these and vasomotor disturbances although there are other motor disturbances of a reflex order which are not accompanied by vasomotor and hypothermic disturbances.

There are also associated with the mechanical hyperexcitability a hyperexcitability to faradic and voltaic stimulus or on the other hand a slight hypoexcitability. There is never any reaction of degeneration. There is sometimes anticipated fusion of the reactions. This is particularly apparent in the muscles of the feet and the hands and it is due to the slowness of response on the affected side. There is also mechanical hyperexcitability of the nerve trunks and this too appears bound with the vasomotor and hypothermic disturbances. It too grows less or disappears temporarily under the influence of heat.

Muscular hypotony is sometimes very pronounced, but its area is usually much limited. Certain groups of muscles will show it while others of the same limb do not. It can be shown by passive movements or in the severe cases in active movements, as in sudden lifting of the arm, the hand will hang and swing like an inanimate object, seeming to obey laws of physics only. If associated with contracture of antagonistic muscular measses, there will be true subluxation.

Amyotrophy is practically constant. It may appear without pronounced paretic disturbances or be secondary to these. It is usually generally spread over the affected limb.

Tendinous hyporeflectivity is an important sign when it is clearly recognizable, which is not always, since the reflexes in the sound limb may be not very marked. In the lower limb the reflexes are more often exaggerated in contracture than in the hypertonic forms seen in the upper limb. Sometimes, even in contractures of the lower limb, the reflex is diminished or lost. Sometimes it is latent and discoverable under anesthesia. There is, however, more or less weakening of the Achilles reflex with slowness of movement and in these cases cyanosis and hypothermia with other physiopathic disturbances will be very marked. Heating of the limb restores the reflex to normal.

The abolition of the plantar cutaneous reflex is very frequent and is associated with marked hyperthermia. It returns to normal temporarily when the foot is dipped in warm water. It would seem that this reflex disturbance is dependent upon interference with the circulation.

The affected limb frequently manifests a trembling especially when the limb is warm and when the patient makes an effort.

Sensory disturbances are manifest in painful sensations sometimes induced by pressure along the nerve trunks. Sometimes even the effort to move the limb produces acute pain. This has been proved even under anesthesia when sensation in the other parts of the body has been dulled, which the authors believe to be a proof of the sincerity of these painful reactions. One is tempted to ask here whether this is not simply a clearer indication of an unconscious psychic influence controlling these disturbances, acting below the threshold of the anesthesia.

In many cases of reflex pareses of the lower limb there is a hypoesthesia more or less segmentary. It is especially clear at the sole of the foot, but less so in the dorsal part or on the leg. Sensory disturbances are those of touch, pricking and heat. Postural sense also shows disturbance. Sensory disturbances are diminished by immersion in warm water.

Secretory disturbances manifest themselves by a moisture of the skin especially at the extremities and sometimes the skin is even slightly macerated. Hyperactivity of the sweat glands has been observed even in the sound member some time after the injury was received.

(*To be continued*)

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

de Besche, A. Constitutional Susceptibility and Respiratory Activity. [Norsk Mag. f. Laeg., Ap., 1918.]

The author here takes up the study of constitutional hypersusceptibility and respiratory response in asthma. The patient, a physician, who since childhood had horse asthma, developed severe respiratory asthmatic signs after an injection of diphtheria antitoxin. This idiosyncrasy to horses is here discussed and the author reports the details of eleven cases, one of which was reactive to cats. In eighteen other cases of asthma, no connection with animals could be learned. This kind of constitutional reaction can be evidenced by touching a horse with the finger and then touching the patient's conjunctiva. Pronounced redness, lacrimation and edema follow, and sometimes sneezing. It might be advisable to apply such eyeball and scarification tests before injecting antitoxin in persons subject to asthma or hay-fever. In his twelve cases of horse asthma, in some the reaction was to horses only; in others to cows, goats and dogs. Two had also hay-fever, and a tendency to hay-fever or asthma was common in other members of the family. In some of the horse-asthma patients there were also abdominal pain and vomiting or diarrhea. No appreciation of the possible psychogenic autonomic factors appears in this article.

Spolverini, L. M. Asthma in Children. [Pediatria, Oct., 1918.]

The author here adopts the now well recognized vegetative nervous origin of certain types of asthma. In other words, a predominance in the autonomic over the sympathetic stimuli causes a local vagotonia in the bronchi and the asthmatic attack. This assumption is rendered more reasonable by the favorable action of adrenalin in asthma, as this stimulates the sympathetic. In his experience with nineteen cases of recurring asthma in children, from 6 months to 10 years old, he found a high percentage of lymphatic status. The relationships of this status lymphaticus to faulty thyroid and parathyroid activity, causing for the former a diminished iodine function and for the latter a faulty calcium content, he met by calcium and iodine therapy with excellent results.

Chalier, R. Mitral Disease and Raynaud's Syndrome. [Presse Mèd., Sept. 12, 1918.]

The author calls attention to the mechanical factors, and the constitutional inferiority of blood vessel development as one of the important situations bearing upon the complex etiology of Raynaud's disease. A few cases are on record of association of the peripheral lesion with mitral stenosis while in a much larger number some other lesion of the heart was in evidence. These comprise interventricular communication, aortic insufficiency, angina pectoris, pulmonary insufficiency, tricuspid insufficiency, cardiac hypertrophy, etc. To these totals may be added an entire large series of cases of arteriosclerosis, atheroma, and combinations of cardiac and vascular disease. In this communication he focusses attention on the mitral stenosis and cites six personal cases of the association with Raynaud's disease. All six presented the double affection in greater or less purity and in all the cardiac lesion evidently preceded the Raynaud's disease. The cardiac affection was a causal element or concomitant in the genesis of the gangrene. Much must depend on the nature and cause of the endocarditis which was responsible for the stenosis. The next causal factor to consider is tuberculosis, which may cause mitral stenosis in some indirect fashion, probably by action of the toxins on the endocardium. There is considerable resemblance also between certain tuberculides of the fingers and Raynaud's disease. The vasomotor system is probably involved in the mechanism in the latter as it is in the former.

Massaglia, A. On the Function of the So-Called Carotid Gland. [Frankfürter Zeitung f. Pathologie, Vol. 18, No. 2.]

The carotid gland consists of cells resembling the paraganglia. Certain distinctive differences, however, relate this gland to the sympathetic cells. Since the chromaffin tissue as well as the sympathetic tissue is developed from the same rudiments, the writer believes that the carotid gland should be considered a paraganglion. Cauterization of the carotid gland or its complete removal (removal of the last section of the *carotis communis* and of the beginning of the two branches, externa and interna, into which the vessel forks) produces glycosuria in animals. This usually lasts 2 to 4 days; the glucose content of the urine varies between 2 and 12 per mille, on the first day. Glycosuria also occurs with enervation of the gland. Cauterization or removal of the carotid gland rarely causes glycosuria in rabbits. The writer thinks that this phenomenon is explained by the fact that the carotid tissue in rabbits does not form a unit organ but is divided into groups of cells which are fairly widely distributed over the connective tissue. Hence the difficulty of destruction or complete enervation of the whole gland. The author's results may possibly act as a counterpart to those obtained by Scaffidi with guinea pigs. The latter had no apparent disturbances

to report on extirpation of the carotid. The occurrence of glycosuria in cats and dogs as a result of operative action may be comparable to Claude Bernard's glycosuria, the result of puncture of the floor of the IV ventricle. The writer's hypothesis is based on the anatomical conclusion that the gland contains many nerve elements, and upon the fact that as a result of the extirpation of its nerve, glycosuria appears. That, as a result of cauterization of the upper cervical ganglion of the sympathetic in the cat, glycosuria did not occur, does not damage the hypothesis in the writer's opinion, because the carotid gland in addition to medullated nerve fibers, also contains countless unmedullated fibers from the vagus nerve, the glossopharyngeus, and from the hypoglossus. [J.]

Charon et Halberstadt. Emotional Tachycardia. [Paris Mèd., Aug. 17, 1918.]

The fact that emotion can provoke an attack of marked if fugitive acceleration of the pulse rate is known to all. But it is only within recent years that the existence of a persistent post-emotional tachycardia has been insisted upon. First by Dejerine and Gauckler it was again rediscovered by Laignel-Levastine, then by Gallavardin. This last-named observer remarked with reason that between undeveloped Graves' disease and the tachycardiac neurosis the analogy is so great that "we must have the courage to admit that these two varieties of disease differ only in name." English physicians have for that matter seen tachycardia develop in the subjects of shell shock. The Neurological Society of Paris has also looked into this matter which has been the subject of numerous communications (Babonneix and Celos, Oppenheim, Dupré and Grimbert, etc.).

Charon and Halberstadt hold that it is impossible to distinguish between incipient exophthalmic goiter and tachycardia which, especially when accompanied by tremors, greatly resembles the former. These observers have collected a number of personal observations in which there were mental disturbances of post-shell-shock origin (mental confusion, puerilism, anxiety, impressionability, emotionality) in which persistent tachycardia accompanied by hyperreflectivity and, on two occasions, by heightened blood pressure were present. Thus the shock may leave not only mental sequelæ but also cardiac lesions whether these be due to stimulation of the sympathetic, as Gallavardin thinks, or to any other cause. What becomes of these subjects? This is an important question from a medico-military point of view, but one which is still far from being answered.

MacDowell, A. Obesity and Disordered Heart Action. [Brazil Med., Jan. 25, 1919.]

The relationship has long been known and the author here attempts an analysis of the mechanism. He puts both the obesity and the dis-

turbed heart action on an endocrine basis, but leaves it there without much real analysis. Especially is there no suggestion of the psychogenic obesities on an indolent basis with constitutional hypopituitary syndromes.

Hirschfelder, A. D. Does Atropine Alter the Effects of Digitalis Upon the Tonus of the Heart Muscle? [Proc. Am. Soc. Pharmacol., XI, 2.]

The effects of digitalis in diminishing the volume of the heart are much more pronounced in dilated hearts than in hearts of normal volume. A convenient method for obtaining any desired degree of dilatation of the ventricles is to procure an aortic stenosis by a ligature around the aorta which can be tightened by a specially devised screw clamp to which the ligature is attached. If a stenosis just sufficient to produce a well marked lasting dilatation is brought about, the administration of digitalis intravenously causes the heart to return to its normal volume. The injection of atropine does not cause the heart to dilate again. Atropine does not antagonize the effect of digitalis on the heart muscle in dilated hearts as is the effect on the vagus and on heart rate in auricular fibrillation, and accordingly, its use does not seem to be contraindicated in dilated hearts with regular rhythm.

Brooks, C., McPeck, C., and Seymour, R. J. Action of Epinephrin on Vasomotors and Heart Beat. [Proc. Am. Soc. Pharmacol., XI, 2.]

The method of study consisted in the use of a reservoir of defibrinated blood and salt solution which was kept at the desired temperature and pressure, which reservoir is connected by a T cannula with the carotid artery as described by Brooks and Heard. In addition a vasomotor balance was devised whereby the compensator bottle was placed on a balance and a writing lever recorded on the drum of all changes in general vasomotor tone. That is, when the vasomotors constrict the blood vessels, the blood passes from the animal out into the reservoir bottle. This shows on the balance and is recorded graphically on the drum; and when the vasomotors dilate the vessels the fluid from the reservoir passes down into the dog which likewise is traced on the drum. In this way the blood pressure and temperature of the normal animal are under artificial control. The tracings show all alterations in vasomotor tonus and also all changes in heart rate or force. As regards the action of epinephrin it is noted that when it was injected intravenously while the blood pressure was controlled artificially and kept at the same level so that no rise in general blood pressure followed the injection, then there was slowing and increase of amplitude of heart beat; but not nearly so marked as in the usual uncompensated animal experiment. Also the vasoconstrictor effect was very marked.

In short the vasoconstrictor effect is the main action of epinephrin. The rise in blood pressure then causes increased amplitude and decreased rate of heart beat as a secondary effect, although there is some slowing with some increase in the force of the heart beat as a direct effect on the heart mechanism apart from this vasomotor effect. Artificially raising the blood pressure causes a slowing of heart beat and increase in amplitude; while artificial lowering of blood pressure causes an increase in heart rate with decrease in amplitude. Also it was noted that, within limits, artificially forcing the pressure up to a high level tended to educate the dog's own pressure to the higher level; and artificially forcing the pressure to a lower level tended to educate the dog's own pressure toward the lower level. The method appears to have a wide application in the study of the physiology, pathology and pharmacology of the circulation.

Costellino, G. Raynaud's Disease and Temperature Changes. [Gazz. d. Osp., Feb. 23, 1919, J. A. M. A.]

In Castellino's 1895 compilation of 316 cases of Raynaud's disease, syphilis was incriminated as responsible for the affection in 22 cases; malaria in 19; alcoholism and arteriosclerosis in 16; diabetes in 23; tuberculosis in 14; pernicious anemia in 9; leukemia, nephritis and heart disease in from 8 to 12 each; typhoid, pneumonia and rheumatism in less than 5, and a neurosis in 171 cases. But in all of them the action of cold was the provocative factor. The cold need not be severe, even the change from a warm bed, getting up in a cool room, may be enough to bring on the disturbances. He reviews what has been written on the subject, and then describes a case that differs from all others in that the disturbances came on for the first time in August. The attacks of pain, numbness and cyanosis in feet and hands then returned regularly every morning and lasted from 8 till 10. The young man was of a frail constitution and had been sent to the hospital for disordered heart action but no organic defect could be found except that the spleen was enlarged. The attacks recurred every morning but subsided completely in November under vigorous quinin treatment. The blood was not examined for hematozoa but the response to quinin confirmed the assumption of a malarial origin, as the young soldier had been serving in a malarial region.

Rathery, R. Raynaud's Syndrome. [Progres Mèd., March 29, 1919.]

Three patients suffering from this syndrome are reported who also had chronic nephritis, tuberculosis, and diabetes. The nephritic patient presented marked phenomena. The entire history of the patient and even the family history showed predisposition to cardiovasculorenal disease for the mother had been a cardiorenal patient and patient had been attacked in youth with scarlatina and acute arthritis. With the

peripheral gangrene associated with the Raynaud syndrome were other areas of dry gangrene, as one in the region of one elbow which were doubtless due to arteritis of the same or an analogous type. A case of gangrene in the feet was seen in a diabetic. Tuberculosis was found at autopsy and syphilis was probable. The third patient suffered from chronic nephritis.

Christoffersen, N. R. Quincke's Circumscribed Edema. [Ugeskrift f. Laeger., Feb. 27, 1919.]

The author here specifically calls attention to various endocrine stigmata as being in some way related to the unstable vegetative control of the vascular mechanisms underlying this type of angioneurosis. In a girl who had been having hemorrhagic purpura, and high blood pressure transient edema developed in different regions and there was a marked tendency to retention of water and salt was evident without any cardiac or renal basis for explanation.

Parkinson, John. Left Scapular Pain and Tenderness in Heart Disease and Distress. [Lancet, April 5, 1919.]

This observer noticed that a considerable proportion of soldiers sent to the heart section complained of pain in the back along with pain below the left breast. He investigated this pain in the back in 100 consecutive men who came to him with the complaint of pain in the left chest. Of this series twenty-eight men also were found to have pain in the region of the angle of the left scapula. These, with twenty-two others collected later, comprise the material on which he bases his statements. The pain is typically localized by the patient to the area just below or internal to the lower angle of the left scapula, though this pain may be found to extend up along the vertebral border of the whole lower half of the scapula, or may be associated with complaint of pain in the posterior axillary line at the level of the lower scapular angle. The scapular pain did not seem to occur in the absence of submammary pain, which is located in one or more of the fourth, fifth or sixth interspaces. In front it may also extend up to the third or the second space. Eight of the men also complained of pain or paresthesia in the left arm, as well as in the back and left side of the chest. Usually the pain in the back is of the same type as the submammary pain and it may be sharp and stabbing or dull and aching. Exertion was found to be by far the commonest exciting cause of the pain, while in a few cases the pain was also aggravated by lying on the left side. Usually the scapular pain had gradually developed after the appearance of submammary pain and it had lasted for more than one year in all but eight of the men. The commonest associated symptom was shortness of breath dependent upon exertion, and this usually preceded the onset of the pain. More than a fourth of the patients also had definite hyper-

esthesia of the skin of the lower part of the back of the left chest, always including the angle of the scapula, but often extending far beyond it. Study of these cases led to the conclusion that whatever causes pain below the left breast is also capable of causing left scapular pain, and the latter is therefore seen in myocardial and valvular diseases of the heart, arteriosclerosis, chronic nephritis and functional heart disorders. In twenty of the fifty cases there was a definite history of acute rheumatic fever, ten of which had valvular disease. In about half of the cases no abnormal physical signs could be found. The pain and hyperalgesia about the angle of the scapula associated with submammary pain arises from the heart and belongs to Head's class of referred visceral pain.

2. ENDOCRINOPATHIES.

Bram, I. Nonsurgical Treatment of Exophthalmic Goiter. [N. Y. Med. Jl., Nov. 30, 1918.]

As hyperthyroidism shows markedly excitable nervous states, Bram first advises rest. Opposed to hospital treatment, the author emphasizes the necessity of strict discipline and considers the presence of a nurse essential in most cases. Regularity of sleep, rest, exercise, feeding, proper attention to bathing, the quality and quantity of foods and beverages, the kind of recreation to be indulged in, must all be given careful attention, and the doctor's orders carried out to the letter. Bram states that, except in cases where malignant changes are evident in the thyroid gland or where there are dangerous pressure symptoms, surgery is distinctly contraindicated. Hyperthyroidism is not a surgical entity, but is a disease which belongs strictly to the realm of the internist, for the following reasons: (1) Recent researches prove that Graves' disease is not a local condition, nor has it a local etiology; (2) though surgeons report very favorable surgical recoveries, clinical recoveries are rare, and in a vast majority of cases there is a postoperative return, occasionally with even greater vehemence of all the signs and symptoms of hyperthyroidism; (3) the patient who has been operated upon, and who does recover clinically, gets well because of a carefully outlined system of postoperative nonsurgical treatment, or because the case in question is one of those instances of spontaneous recovery and would have terminated favorably in spite of treatment; (4) internists who specialize in thyroid gland therapy cure more than 75 per cent. of their cases of hyperthyroidism by dietetic, hygienic, medicinal, and electrotherapeutic measures. The author adds that he has been able to cure nearly every case of hyperthyroidism that came under his care, and that this was accomplished by nonsurgical and remedial measures.

Loeb, L. Thyroid Transplantations. [Jl. Med. Research, Sept., 1918. J. A. M. A.]

Loeb says that in multiple transplantations of the thyroid the individuality differentials of the thyroids of different animals are preserved; they may find expression in a reaction of the host towards the transplant, which is similar in the case of lobes derived from the same animals and differs in the case of lobes derived from different animals. The lymphocytic reaction in the second transplant is not markedly accelerated or intensified over control transplants, even in cases in which the first transplantation had been multiple; this is especially noticeable in experiments in which the second transplant had remained in the host during a period of three or four days. In a considerable number of cases of multiple transplantation, the first transplants were found to a great extent, or completely, destroyed. It is at present uncertain to what extent this is due to unfavorable conditions of a more or less accidental character or to the production of immune substances. Loeb's results make it very probable that the lymphocytic reaction is, in part, at least, a response of the host to primary homoiotoxins (syngenesiotoxins) and that it is not entirely the result of the development of immune substances. It is probable that the cell constituent which, directly or indirectly, gives rise to the original formation of homoiotoxins (syngenesiotoxins), may also act as antigen and call forth the production of immune substances which, after combination with the antigen, act on the host cells in a way similar to the primary homoiotoxins (syngenesiotoxins).

Gordon, A. Hypothyroidism in Children. [Arch. of Pediatrics, Oct., 1918. Med. Jl. Australia.]

The last few years has shown that the delinquent and mentally defective child is the frequent end-result of a disturbed metabolism, produced by a polyglandular endocrinopathy. There is an intimate correlationship between the different hormones, so that, generally, no one endocrine substance is at fault alone, but all are involved to a greater or less degree in any disease which threatens the integrity of one. In the majority of cases hypothyrodism is the predominating factor. The present paper reports a series of 55 cases of hypothyroidism, 34 being mild in type, 21 being definitely cretinous. The age varied from one to twelve years; the sex incidence was not definitely marked. The nationalities showed a predominating foreign element. Birth trauma was not a causal factor, nor was syphilis, and many of the children were breast fed. The manifestations of thyroid dyscrasia appear in two groups: (*a*) physical, (*b*) mental defects. (*a*) The physical defects observed were backwardness in the development of the power of holding up the head, of sitting, of standing, of walking and of talking, and in the process of teething. To this certain changes in the bony system, skin and

appendages, and deviations from the average due to disturbed metabolism. (*b*) The mental defects ranged from a slight dulness to the more marked aberration seen in the cretin. In the author's series the most frequent delinquency was observed in the speech function. About 60 per cent. did not talk and late talking was the rule. The next most frequent defect was noted in the power of voluntary muscular coördination. Delay in sitting up and late walking was very common. Teething was late, often beginning after the tenth month, and if early dentition occurred, caries was evident and extensive. The proportion of decayed and mal-occluded teeth was very large. There was usually marked deficiency in height and weight, and constipation was the rule. Vision and hearing were usually not impaired. Enuresis was present in twelve cases. Anterior fontanelle closure was delayed in all the cases. High, arched palate was common. Treatment was usually followed by marked improvement in the physical defects, whereas the mental condition did not improve so rapidly or to the same extent. Calomel was first given, 0.006 grm. for ten doses, followed by a saline. Then thyroid extract, 0.006 grm. thrice daily, was given for ten days, then glycerophosphates of lime and soda for one week, then thyroid extract, 0.0075 grm. thrice daily. The alternation was adhered to, and the dose of thyroid increased until 0.18 grm. daily was given as a maximum. The thyroid extract was immediately suspended on the appearance of nervous, gastric or cardiac symptoms of overdose, to be resumed later in smaller dose. The prognosis depends on the age at which treatment is instituted and on the regularity and length of treatment. The secret of success is early and long-continued treatment.

Goetsch, E. Differentiation of Early Tuberculosis from Hyperthyroidism by Epinephrin Test. [Abst. J. A. M. A., 1919.]

For three years Goetsch has been practicing the subcutaneous injections of 7.5 minims of a 1:1,000 solution of epinephrin chlorid in patients who present marked symptoms of hyperthyroidism, but in whom no positive diagnosis can be made by ordinary methods of examination. If the patient, following the epinephrin injection, reacts with manifest symptoms of hyperthyroidism, Goetsch believes that a positive diagnosis of the condition is justified. At the Trudeau Sanatorium, Nicholson and Goetsch tested forty patients by this method. Of eighteen patients whose diagnosis was "clinical tuberculosis, questionable," ten reacted positively and eight negatively; of sixteen with a diagnosis of "clinical tuberculosis, inactive," nine reacted positively and seven negatively; and of six with active clinical tuberculosis, none reacted positively. The authors conclude that the test is a valuable aid in determining whether the disease from which patients are suffering is purely a tuberculosis complicated by hyperthyroidism, or a pure hyperthyroidism. Hyperthyroidism, whether or not associated with tuberculosis, will give

a positive reaction to epinephrin. Tuberculosis, uncomplicated by hyperthyroidism, does not react positively to epinephrin. They feel that in a considerable number of border-line cases presenting symptoms more or less characteristic of both conditions, they can now pick out those suffering with hyperthyroidism.

Johnson, W. Hyperthyroidism and Exhaustion in Soldiers. [Brit. Med. Jl., Mch. 22, 1919.]

The author adds his weight of observation to this question and is of the opinion that many cases of irritable heart, D. A. H., and many fatigue-neurasthenic states, are of hyperthyroid origin. The most marked and constant of these symptoms include exophthalmos, subdued mental excitement, prominence of the eyes, lagophthalmos, constant fine muscular tremor, rapid pulse, sweating, and various subjective symptoms such as throbbing headache, nervousness, disturbed sleep, fatigue, and some digestive disturbances. Actual definite enlargement of the thyroid gland was uncommon. All of these symptoms diminished greatly, or totally disappeared, after several weeks of rest in bed, full diet, tonics, and the occasional use of a sedative. Among the more characteristic physical signs, aside from those referable to the eye, were variable but generally rapid pulse, elevated blood pressure, while the adrenalin test and deep pressure on the eyeball did not yield concordant results. The mechanism of the condition is suggested as being due to the accumulation in the body of toxic substances due to the prolonged hyperactivity of the thyroid, which in turn results from prolonged strain of life in the trenches. The various emotional responses associated with fear and rage are there continually provoked, while the opportunity of giving vent to the feelings is infrequent. This leads to continued hyperactivity of the several organs of internal secretion and the victim is deprived of the normal method of reaction so that the effects become perverted.

Masson, G. Treatment of Exophthalmic Goiter. [These de Geneve, 1918.]

The author maintains that the disturbance of the thyroid secretion (dysthyroidia) is the chief cause of the production of the symptoms. This dysthyroid hypothesis is supported by the clinical data, as well as by the experimental, pathological, and therapeutic facts. The treatment with sera obtained from thyroidectomized animals is that which gives the best results, and this treatment is at the same time logical, but it must be continued for a long period of time. It gives rapid results, but if interrupted the symptoms quickly return. It does not, however, appear to bring about a complete and permanent cure, although so long as it is continued, it assures a functional cure which is often perfect. The lacteal treatment by milk from a thyroidectomized goat gives far better

results than any other form of antithyroid treatment. The subjective state of the patient is particularly favorably influenced. The dose of the milk should be from ¾ to 2 liters daily, and it also appears that radiotherapy can be combined with advantage. This treatment is perfectly logical, since it aims at the functional suppression of the pathological gland, while antithyroid treatment neutralizes the toxic secretion only. Surgical treatment should be reserved for those cases in which medical treatment has failed or where the gravity of the condition necessitates urgent action.

Fournier, J. C. Optic Neuritis with Hypothyroidism. [Semana Med., Feb. 6, 1919.]

In a woman 24 years old a bilateral optic neuritis developed. She had had three pregnancies in each of which the thyroid function seemed to come up to average, but in the interim for seven years or more mild hypothyroid symptoms were evident. Three months after her last two pregnancies vision became impaired. The optic neuritis was ascribed to the thyroid insufficiency and opotherapy. Vision improved under it, but started every time it was suspended the vision dropped from ⅓ to ⅙. One eye was blind for four years. There was a family tendency to obesity, and the visual disturbance was assumed to be a polyglandular syndrome with hypothyroid predominance.

Dock, George. Myxedema and Hypothyroidism. [Journal of the Missouri State Medical Association, May, 1919.]

The author discusses some of the common difficulties in the diagnosis of myxedema. This condition is frequently mistaken for nephritis, although the swollen lips, the boardlike hardness of the swelling, the dry, rough skin should put one on guard. Changes in hair growth are like those of senility but come on before the usual senile age; they may be alopecia, especially at the edges of the scalp, and thinning of the outer part of the eyebrows. An important symptom is the sensation of coldness or the sensibility to cold, with actual low internal temperature. The speech is slow and the voice muffled or leathery. The writer's practice is to begin with a small dose of thyroid extract, about one grain three times a day, increasing rapidly until physiological effects appear and then reducing until the desired condition is reached.

Loeper, M. Flatulent Dyspepsia and Hyperthyroidism. [Progrès Mèd., Oct. 12, 1919.]

The increased vagotonia in certain autonomic types of exophthalmic goiter are responsible for the four of forty cases of exophthalmic goiter, with diarrhea and the thirteen cases with dyspepsia reported upon by this author, although he is inclined to place more weight on mechanical and toxic factors resident within the organ; overlooking the

vegetative nervous system analysis of the mechanisms involved. In ten there was a tendency to spasm of the esophagus.

Link, G. Preliminary Thyroid Operations. [Journal of the Indiana State Medical Association, March 15, 1919.]

Two procedures to be employed in cases of thyrotoxicosis in which thyroidectomy would endanger the patient's life, are here described. One is injection of boiling water into the gland, the other ligation of the thyroid arteries. The injection of boiling water into the gland destroys a portion of the secreting substance and thus reduces the amount of thyroid secretion and the toxicosis. The chief objection to the method is that subsequent thyroidectomy is extremely difficult as the gland is held solidly in the neck by adhesions and the hemorrhage is severe. Its use should be limited to those cases in which we never expect to be able to do thyroidectomy. His technic for boiling water injections is as follows: With local anesthesia a horizontal incision one inch long is made through skin and platysma in the middle of the line of the regular incision for thyroidectomy. The gland is uncovered on each side over as great an area as possible by blunt dissection. Two or three injections of boiling water, one half to one ounce each, are made into each side, one in the middle of the lobe and one toward each pole. The syringes are taken out of the boiling water and the injection done as quickly as possible so as to get the full effect of the heat. To facilitate the handling of the hot syringes three pairs of gloves are worn, rubber, chamoisette, and rubber. Glass syringes with asbestos plungers are best. At the instant when the boiling water is injected there is pain; this may be obviated by a few inhalations of gas.

Rondoni, P., and Bellini, A. Epidemic of Goiter. [Riv. Crit. d. Clin. Med., March 15, 1919. J. A. M. A.]

Rondoni and Bellini relate that goiter suddenly appeared in a district near Florence where its endemic presence had not been previously known. Eleven of those affected were given ten drops of tincture of iodin daily, and three were treated with salol and benzonaphthol, each 2 gm. per day and later with 1 gm. of thymol. This intestinal sterilization did not show any effect on the goiter, while in all those taking these small doses of iodin the goiter retrogressed, and in some completely disappeared. No factors could be discovered which could be regarded as responsible for the novel epidemic. The authors expected to find it in iodin growing plants but apparently paid no attention to psychogenic factors, which are invariably found in hyperthyroid states.

McCaskey, G. Tests for Thyrotoxicosis. [Am. Med. Assoc. Medicine Section, Med. Record, June 21, 1919.]

The present status of the study of thyroid disease, he said, was what the study of diabetes would be without laboratory data. Often in

thyrotoxicosis the thyroid gland was not even palpable. One had therefore to look beyond the goiter. The differentiation of borderline cases and the determination of toxicity were two important points. The tachycardia, nervousness, hyperhidrosis, and later digestive disturbances were simply the expression of the toxemia. The clinician was constantly confronted by doubtful cases and there must be some measure of the rise and fall of the thyrotoxic symptoms. Basal metabolism bore relation to the neuromuscular and secretory phenomena, such as respiration, circulation, secretion, a hyper-state corresponding to increased metabolism and a hypo- to decrease rate. Metabolism corresponded to heat consumption or oxygen consumption and the apparatus of Benedict had been designed to measure this production, as estimated by the number of calories per square meter of body surface per hour. A 10 to 20 per cent. increase in consumption was coincident with the mild cases, up to 50 per cent. moderate, 60 to 70 severe; 70 to 100 very severe. The metabolism tests were subject to marked variations and the reading was good only for the time of the experiment. It was, however, of undoubted value in studying the course of the disease. In regard to the hyperglycemia tests—100 gms. of glucose fed to normal persons did not produce hyperglycemia in one hour; in hyperthyroidism there was an increase of 100 to 200 per cent. in one hour. Every reading of over one-tenth of one per cent. represented hyperglycemia when tested with fasting stomach. Even in border line cases a marked hyperglycemia was noted. An increase in basal metabolism and a hyperglycemia, while not actually pathognomonic, formed most valuable corroborative evidence of thyrotoxicosis.

II. SENSORI-MOTOR NEUROLOGY

1. PERIPHERAL NERVES.

Byrne, J. The Mechanism of Referred Pain, Hyperalgesia (Causalgia), and Alcoholic Injections for the Relief of Neuralgia. [Am. Med. Assoc., N. and M. D. Section. N. Y. M. J., June 21, 1919.]

Dr. Byrne referred to his former papers on the subject and then defined referred pain as that due to lesion of the somatic sensory pathways anywhere from the periphery to the optic thalamus, the resulting sensation being referred to the peripheral area of distribution of the injured pathway. This type of pain was to be distinguished from the reflected variety wherein disease of a viscus was attended by pain and hyperalgesia in certain related somatic areas. In the peripheral nerves two separate systems were found: 1, the affective system, which mediated the "hurt" element of prick, heat, and cold, and, 2, the critical system, which mediated the critical elements, that is those elements which involved in some way comparison and analysis. The axones of

the affective system were unmyelinated and sprang from the smaller neurone bodies of the dorsal root ganglia, whereas the axones of the critical system were myelinated and sprang from the larger neurone bodies of the spinal ganglia. Notwithstanding an apparent community of function at the periphery these two systems were anatomically and functionally separated until the optic thalamus was reached, and here for the first time the critical system by means of collaterals or main stems impinged upon the affective system, controlling this latter in the interests of cognitive or reasoned methods of protection from nocuous stimulation, *e.g.,* by analysis, judgment, and forethought. Through the medium of the proficient receptor mechanisms noxious objects were avoided without risking actual bodily contact.

The localization of pain arising from any cause was a function of the critical system. Sensation of the purely affective type, such as alone was mediated through the affective system, represented merely the hurt element of painful stimuli and was attended by overreaction, radiation, reference, poor localization, and inability to name the stimulus. Under normal conditions the critical system exercised inhibitory control over the affective system. This was well seen in the stage of recovery after nerve section and suture. Here hyperalgesia (protopathic sensibility) appeared owing to the more rapid rate of regeneration in the affective system. This persisted for some time and then subsided, step by step, as function became restored in the critical system. The dynamic factor underlying pathological pain and tenderness resided in the neurone bodies of the dorsal root ganglia, since nerve section distal to the spinal ganglion did not always relieve pain, whereas section of the pain paths anywhere proximal to the ganglia gave lasting relief.

Longwell, S. E. A New Method for Investigation of the Peripheral Nervous System, Muscles and Glands. [Science, Ap. 19, 1918.]

In preparing and preserving animals for investigation of the gross anatomy of the peripheral nervous system, muscles and glands, simple methods commonly in use have not proven very satisfactory. For the study of anatomical structures alcohol does not differentiate sufficiently either to separate the parts from each other or from surrounding tissues. Aside from its cost, moreover, alcohol is open to the objection that it makes the parts brittle. Formalin has been used with better results and is now the standard means employed in preparing, and particularly in preserving, portions of the central nervous system. While both these reagents are preservatives of the peripheral nerves, muscles, and glands, neither is a satisfactory preparative for their dissection. A most serious objection to formalin is the adhesive effect it has upon tissues, so that parts are not readily separable.

A temporary preservative, and, what is of much more importance, an almost ideal preparative, for the investigation of the peripheral nervous system, muscles and glands, is found in hydrochloric acid. The fresh animals may be first put in a 5 per cent. solution of *hydrochloric acid ice-water* and left for twenty-four hours. They may be skinned or not, as the problem in hand requires, but the body and chest cavities should in any case be opened to allow the fluid to penetrate through the tissues.

After treatment with hydrochloric acid the animals are washed in the coldest water obtainable from the faucet, and put in receptacles deep enough so that the material can be kept covered with ice-water or at least cold water. These receptacles are then stored in the refrigerator when the specimens are not in use.

In using animals so prepared it is found practical to wash them first in running water, leaving the pan partly filled, and then to add pieces of ice sufficient to surround the specimen while observation and dissection are going on. In tracing the smaller nerve divisions, details are brought out better if, occasionally, dilute acid is added, by means of a pipette, directly to the parts under consideration, since by this treatment the transparency of the muscle fibers is increased. The 5 per cent. acid solution increases the whiteness of the nerves bringing them into sharp contrast with the natural reddish, or reddish-brown, back-ground of muscles, but if much stronger acids are used, even 10 per cent., it tends to whiten the muscles and dissolve the fibers without improving the color of the nerves.

Animals are also put in good condition for dissection if treated with a 6 per cent. acid solution. If a specimen is to be used during a long period it is better to give an initial twenty-four hour treatment in an acid solution not stronger than 3 per cent. and subsequent immersions in the same strength of acid for shorter periods. In any case the water left upon the specimen while it is being kept in the refrigerator should be changed at least once a day.

Small unmedullated sympathetic fibers, however, are not favorably affected for dissection by this method and consequently are not as easily traceable as are medullated fibers. That sympathetic fibers are not dissolved by the solution is certain, since the larger ones, and even a few of the smaller ones related to the blood vessels in the orbit, can be traced with accuracy for some distance. This method, therefore, cannot be recommended for study of the sympathetic system, other than of its grosser parts. In such investigations it is decidedly useful, in locating all the larger ganglia in the body cavity and elsewhere, together with many of their gross connections.

One of the greatest advantages of the method, whether applied to nerves, muscles or glands, is finally to be mentioned, namely, it permits the use of the camera lucida for drawing. It has been found entirely

practicable to mount a camera lucida (Abbé type) over the right eye-piece of a binocular microscope and to reduce the field of the left eye-piece by a superposed cylinder 1.8 cm. long, the upper aperture of which is 3 mm. in diameter. This arrangement prevents the observer from shifting the eye to a different view from the one desired and from thus throwing out of position the lines already drawn, as the work proceeds.

Bayliss, W. M. The Electrical Changes in Active Tissues. [B. M. J., May 31, 1919.]

The phenomena of electrical changes in active tissues have been a favorite subject of investigation by physiologists, no doubt greatly on account of the accurate methods of measurement available, even at a comparatively early date. Although electric fish were known to the ancient world, and the effects of their discharges were described by Aristotle and Pliny, it was not until about 1780 that Galvani discovered similar properties in ordinary muscle, naturally much less intense, and requiring delicate methods to detect them. Matteucci in 1838 appears to have been the first to use the galvanometer in their investigation, and the work of Du Bois-Reymond was only a little later. Before long, these properties were shown to exist in nerve, in glands, and in smooth muscle. Since the introduction of the theory of electrolytic dissociation of conductors in watery solution, it has been realized that one must look for the explanation of the facts on the basis of the movement and redistribution of ions. The body may be regarded as a framework of non-conducting material, immersed in and soaked by solutions of electrolytes. Evidence derived from many and various sources shows that living cells are surrounded by delicate membranes, which allow water and certain solutes, such as urea and the lower alcohols, to pass through freely, but refuse passage to the majority of salts, to sugars, etc. It was pointed out by Ostwald in 1890 that if a membrane is impermeable to one of the ions into which a salt is dissociated, it is indifferent whether the oppositely charged ion can get through or not, because this latter can only leave the neighborhood of its fellow for a very small distance on account of the great magnitude of the electrostatic attraction between them. It will therefore form a layer on the outer side of the membrane, while the opposite ions form a layer on the inner side. This is the "electric double layer" described by Helmholtz, and is clearly the cause of a difference of potential between the two sides of the membrane. Bernstein in 1902 showed that if it is supposed the membrane of the muscle cell to be impermeable to certain anions but permeable to certain cations, the latter will form an outer layer with a positive charge, while the interior of the membrane will have a negative charge. He showed, moreover, how all the facts of "muscle electricity" are explicable on this view. What the particular ions are it is as yet

impossible to state; but those of potassium phosphate seem to be the most probable.

What, then, are the facts to be explained?

1. Since the whole of the surface of the cell is supposed to be possessed of the membrane in question, it is easy to see that application of electrodes connected to a glavanometer should show that it is equipotential at all points. This is the case with uninjured muscle and also with nerve.

2. Suppose that the two electrodes are placed at different points and that the membrane under one of the electrodes is injured so that it becomes freely permeable to both ions. The double layer ceases to exist at the injured point, the ions freely mix, and the electrode is in connection with the interior of the cell—that is, the negative component of the double layer at the normal parts of the surface. What is called the "current of injury" or "demarcation current," in which the injured spot is negative to the uninjured parts occurs.

3. The current of injury disappears more or less quickly, as it should do if the electrolytes within the cell diffused away at the permeable injured place.

4. There is evidence that increase of permeability is a general characteristic of the state of activity. Details of this evidence are beyond the limits of this account, but, accepting them, what would happen may be examined if one led off from the normal surface and from an injured spot and then stimulated the muscle to contract. The normal surface would approximate more or less completely, as regards its permeability, to the injured spot, the double layer would disappear and with it the source of the current of injury. This was called the "negative variation," that is, the decrease, of this current.

5. If both electrodes are on uninjured spots and a wave of excitation passes along the muscle, as it passes one electrode it makes this one negative to the other, and then, leaving the former, it reaches the second and makes this negative to the first. There is a current first in one direction, immediately followed by one in the opposite direction. This is the "diphasic variation."

Their impermeability to ions makes cells bad conductors of electrical currents. Their resistance thus decreases in the state of activity or when the membranes are destroyed. This is the basis of Stewart's method of determining the proportion between the corpuscles and the plasma in the blood. It also accounts for the high resistance of nerves in the transverse direction.

The main fact that an active spot in muscle or nerve is negative to one at rest is therefore accounted for satisfactorily on the "membrane theory" of Bernstein.

As instances of the use of the fact may be mentioned Lewis's localization of the peace-maker in the mammalian heart and the extensive use of the electrocardiogram in practice.

The passage of impulses along a nerve cannot be detected directly in any other way than by the electrical effect. Einthoven has been able to show the passage of impulses in the vagus nerve when the lungs are distended or collapsed, and also in the depressor nerve when the blood pressure rises in the aorta. Piper has determined the rate of discharge of motor innervation. The method is capable of further extension to reflexes, and possibly the vexed question of the analysis of sounds by the cochlea may be decided.

The electrical changes in secreting glands are more complex than in nerve and muscle, and are not yet completely understood. The main component is undoubtedly connected with the flow of water, as shown by Bradford and Bayliss, and to explain it one may consider briefly the nature of the secretory process in general. The cells possess the same kind of membrane as muscle has, but their impermeability appears to be to certain cations of the cell contents, not to anions, as judged by the sign of the electrical effects. This is, however, a matter of detail. During rest there is formation of complex substances to be used in the act of secretion. This is an automatic process, requiring the supply of energy by oxidation, and comes to an end by mass action of the products. When secretory activity occurs, two things happen. The stored products are split into smaller molecules, so that the osmotic pressure of the cell contents rises and water is attracted. But simultaneously that end of the cell in relation to the duct becomes permeable. Water flows out, carrying the secretory products. The electrical effect is accounted for in a way similar to that in the case of muscle. But there is also another component of the electrical change, smaller in magnitude and opposite in sign to that associated with the permeability effect. This is seen when the sympathetic supply to the submaxillary gland of the dog is stimulated. Its origin is unknown. Sweat glands in the skin show the phenomenon of an electrical change. They are readily excited reflexly and, as Tarchanov and Wells and Forbes have shown, also by psychical events. It seems practically certain that the "nerve-leaks" of Baines are due to local activity of sweat glands. These may possibly be of use in the location of pathological processes in the central nervous system, but there are simpler means of detecting local sweating. Waller has investigated the changes of resistance in the skin, which are associated with mental states, and proportional to the degree of the emotion. The phenomenon is called by him the "emotive response," and he is inclined to doubt its origin from sweat glands. But the evidence derived from atropine is not very satisfactory. The way in which the decreased resistance is produced in active cells has been described above. The reaction may be found useful in the process of "psycho-analysis" and has been used by Wells and Forbes in psychological investigations. Photochemical reactions are associated with electrical changes, and the phenomena in the retina have been the object of much attention. They

are complex in the vertebrate retina, probably on account of its mixed structure. In the cephalopod the effect of light is simple. When better understood, they will doubtless help to explain the retinal processes. The action of light on the green leaf has been shown by Waller to be accompanied by electrical effects. This again requires further work. Finally, the process of inhibition in heart and smooth muscle may be referred to. Since *increased* activity means increased negativity, it is clear that *decreased* activity should be associated with decreased negativity. This was shown by Gaskell to occur in the tortoise auricle on stimulation of the vagus. In the ureter, it appears that a wave of inhibition precedes that of contraction, which propels the drops of urine downwards, a process similar to that described by Starling and myself in the case of the intestine. This would naturally result in a double electrical effect at each electrode and a complicated curve of the total effect, such as is described by Orbeli.

Dubot. Neuritis from Ischemia. [Paris Mèd., Feb. 15, 1919.]

When the nourishment and oxygen have been cut off from nerve trunks a neuritis may develop. Thus the optic nerve may develop a neuritis from ischemia after gastric hemorrhage, and severe general polyneuritis may develop after excessive general hemorrhage. A peripheral neuritis may be traced to injury of the axillary or brachial artery, the femoral or the popliteal. The neuritis is accompanied by paralysis of the peripheral type with reaction of degeneration. Anesthesia, pain and vegetative disturbances may be present according to the nerve trunk involved.

Maurice, C. Influenza and the Nervous System. [Lyon Méd., April, 1919.]

This author calls special attention to the endocrinopathic and vegetative nervous system involvement in influenza and attributes much of the difficulties to a specific action upon the sympathetic nervous system by the influenza toxin, a point made by Jelliffe in his contribution (N. Y. Med. Jl., Oct., 1918) to the study of the action of influenza on the nervous system. Arsenic and strychnine he maintains help to raise the tone of the sympathetic system and thus combat the ill effects, in which they are aided by calcium chloride.

Mees, R. A. Arsenical Polyneuritis and the Nails. [Ned. Tydsk. f. Gen., Feb. 1, 1919.]

Three case histories are here analyzed in which an arsenical polyneuritis developed after suicidal attempt was made by means of arsenic. There developed a broad white band or frame in the finger nails. All of the nails were affected, the white band at the outer edge of the nails being less distinct. The white band is an actual deposit of arsenic in the nails, he believes.

Gordon, A. Diabetic Polyneuritis. [Am. Med. Assoc. Sect. Nerv. and Mental Disease, N. Y. Med. Jl., June 14, 1919.]

Gordon first took up the febrile types of polyneuritis seen in the late war. They differed from multiple neuritis as heretofore known, in their more rapid onset, in the greater involvement of the facial and glossopharyngeal nerves, the loss of sphincter control and the absence of marked sensory phenomena. Other toxic infectious types were then described as seen in the author's experience, including pneumonia, typhoid, measles, influenza, and puerperal cases. Hepatic insufficiency, the author emphasized, was an important factor in the development of polyneuritis. The facts which cluster about the production of levulosuria, hematopophyrinuria, urobilin production, etc., offered suggestive data bearing on the relation of hepatic function to multiple neuritis. Gordon then described six cases of diabetic etiology. [J.]

Moreau, L. Neuritis and Multiple Neuritis of Malarial Origin. [Paris médical, February 22, 1919.]

This paper deals with the history of nine cases of malarial neuritis among French troops sent to the Balkan states. In but one instance did the paralysis follow a comatose form of the disease, one or more paroxysms of average severity having sufficed to bring it on in the eight others. Often the condition is a gradually oncoming, toxic neuritis similar to that met with in the infectious diseases. In cases of sudden paralysis, however, circulatory disturbance due to local vascular lesions appears to be the main factor. Different from alcoholic or lead paralysis, malarial paralysis has no definite, special distribution. Among the author's cases were instances of involvement of the external popliteal, facial, and radial nerves. In one case a paraplegia was accompanied by paralysis of one side of the face. In some instances sensory disturbances were prominent, being manifested in sharp pains along the affected nerves and even, at times, eruptions of herpes zoster, reappearing with each febrile paroxysm. Multiple neuritis involved especially the lower extremities, the upper limbs being less frequently affected. Tingling sensations, numbness, and sometimes edema occurred as prodromes to the paralysis. Sensory disturbances were also manifested in hypesthesia and, at times, complete anesthesia of the parts. Palpation of muscle masses, however, along the course of the nerves, caused sharp pain which, during rest, sometimes persisted in the form of cramps or dull aches. The reflexes were variously affected, and electrical examination revealed all grades of nerve impairment. Marked trophic and vasomotor disturbances gradually appeared in limbs stricken with multiple neuritis. Psychic disorders and amblyopia were also observed in some instances. The prognosis in malarial neuritis is always grave. As soon as signs of multiple neuritis appear in a malarial patient an electrical examination should be made and electrical treatment, prefer-

ably with different forms of galvanic current, instituted. Massage, muscle reëducation, quinine, arsenic, and life at an altitude may be of marked assistance. Quinine, while not a specific for malarial multiple neuritis, is at least capable, through prevention of febrile paroxysms, of obviating the aggravation of the neuritis which generally follows each successive acute attack.

Martin, W. What is Neuritis and How Should it be Treated? [N. Y. Med. Jl., May 10, 1919. Med. Rec.]

Martin discusses the term neuritis as it is understood by various authorities and points out that it is not safe to depend upon atrophy in reaching a diagnosis, as this symptom may take place after a few weeks of involvement or may not appear for years. In terminal cases where the reaction of degeneration is present or atrophy so evident that it cannot be mistaken, differential diagnosis can usually be made by means of the X-ray and this method is particularly applicable in cases of bursitis where diagnosis is not otherwise possible, and in cases of sacro-iliac relaxation and arthritis where the symptoms are so nearly alike. The static machine plays an active part in the diagnosis of neuritis and the writer, believing that many physicians know little or nothing about this apparatus and its use, goes into the matter in detail. The patient is seated upon an insulated platform and he is connected with the apparatus by a wire attached to a flexible metal electrode. This may be of any size selected by the operator, but the usual one is approximately 2 by 4 in. This is placed over the area that is thought to be involved, and the machine started with the poles together, the wire attached to the positive side and the negative grounded. As the poles are separated the current jumps across the spark gap, causing interruptions, which are carried to the patient under the electrode. These interruptions cause alternate contractions and relaxations, and are mechanical in nature. If the nerve under the electrode is at all inflamed the amount of pain produced will be in proportion to the length of the spark. If there is no nerve inflammation there will be no painful response, but merely a contraction effect of the part. This is a positive test of whether there is such a condition present or not, and should always be tried whenever possible. There are cases in which there are areas of pain in parts of the body other than where one would expect to find them; there may be pain in the ball of the foot, due to a sciatic neuritis. Such cases should have the test made over the course of the nerve supplying the part. In case of foot pain the sciatic nerve should be tested, and it will generally respond. Since the pathology of neuritis is the same as that of any other inflammatory condition, accompanied by an exudate, treatment must be directed to the exudate as well as to the muscular spasm. The quantity of the exudate varies with the duration of the condition and in long-standing cases may form adhe-

sions involving the muscular structures; *e.g.*, the difficulty of raising the arm in a brachial neuritis. Without treatment, such cases gradually become worse and end in atrophy, and therefore, prompt relief is of the utmost importance. In order to give prompt relief a mechanical method is absolutely necessary and in the static current we have the practical and only means of cure. The author points out that in an acute neuritis in a nervous woman it is better to start with a soothing application, such as radiant light and heat, given by a properly hooded high candle-powered carbon filament lamp, which should be used to the point of producing active hyperemia. Following this, the high frequency current may be applied by the diathermic method to great advantage and without causing pain. The d'Arsonval current is used for this, and is applied by the use of two electrodes of metal of suitable size, properly placed; that is, one over the painful area and the other on a part of the body opposing it, so that the current may pass directly through and heat the tissues to a certain degree, which must be determined for each case. After some days of this treatment the soreness will be greatly diminished and treatment is then given by the static current as already described, the time application being extended according to the requirements of the particular case. As the treatment advances the strength of the current may be increased, as more current can be used without causing pain; this indicates that progress is being made towards a cure. When the wave current is ended, it is usually followed by indirect sparks. These are short, sharp applications made by the use of a special applicator directly to the area involved, and guided by a special electrode. The results are quick, sharp contractions which aid materially in breaking down adhesions. The method of applying these indirect sparks is as follows: The patient remains upon an insulated stand, which is connected with a metal crook or rod to the positive side of the machine, the negative is grounded as with the wave current, but with both poles wide apart. The operator holds the sparking electrode, which is grounded with a second ground chain attached to the water system or a gas pipe, and not to the apparatus. The machine is started slowly, and as the sparking electrode is applied near the surface, a spark jumps across the intervening distance, which produces a profound contraction of the tissues under treatment. The strength of the spark can be modified by decreasing the speed of the machine, or placing the operator's foot upon the insulated stand. In sparking around small joints, such as the knuckles, a spark director held against the part will give the best satisfaction. Martin states that the majority of cases will be amenable to the methods of treatment outlined. The ionic method, however, is also recognized as of great value, particularly in cases associated with arthritis. The practical application of these methods requires a fair knowledge of their physics. Electricity cannot be used empirically if results are desired and, for this reason, this branch of therapy should receive just recognition and be properly taught in all medical colleges.

Adson, Asa. Ulnar Paralysis. [Minnesota Med., Dec., 1918.]

Three cases of operation on the ulnar nerves are reported in which neuromas developed. The enlargement was of the usual fusiform type with characteristic implication of the nerve fascicles. The ulnar groove was shallow, due to an overgrowth from the olecranon. In one patient a bony spur of the ulna was present. The diffuse thickening of the nerve is due to constant bruising, or stretching of the nerve over some of the bony prominences. Small hemorrhages causing inflammatory reactions and scar tissue occur. The scar tissue contracts, the fibers become pressed upon and a gradual and progressive atrophy of the ulnar nerve results. The surgical treatment is by resection of the ends beyond the neuroma.

2. CRANIAL NERVES.

Moure, J. New Method of Examination of the Vestibular Labyrinth. [Rev. de laryngol., Aug. 31, 1916.]

Moure describes a simple and novel method for testing out the labyrinthine function, employed because of its convenience in tests made on the French soldiers. It is based on a principle contained in a game of children, which consists in turning around a number of times with the head bent over to touch a cane and with the eyes closed. If a person with normal hearing does this five or six times, the feet being kept close together, and then suddenly stops, raises the head and opens the eyes, it will be impossible for him to walk straight forward. He will always take a step in the direction opposite to the first foot employed—that is to say, if the first step is taken with the left foot he will fall or step forward toward the right, and vice versa, if the first step is taken with the right foot he will fall or step toward the left. In the hypoexcited labyrinth the amount of deviation will be more or less reduced, according to the degree of labyrinthine involvement, until in the totally dead labyrinth the patient will have no difficulty in walking directly forward. In case the labyrinth is hyperexcited it will be necessary to do the turning with less vigor and a fewer number of times. The normal reaction will be correspondingly intensified.

Gott. Early Signs of Post-Diphtheritic Paralysis. [Münch. med. Woch., 1918, LXV, p. 669.]

The author points out that one of the earliest signs to appear in diphtheritic paralysis is Chvostek's phenomenon. Another early sign is increased activity of the knee-jerks. Chvostek's phenomenon and increased knee-jerk may be present in the beginning of convalescence from diphtheria before there is any suggestion of paralysis. In the majority of cases Chvostek's sign disappears entirely, and the knee-jerks become normal, without any palatal or ocular paralysis occurring, but children

who show the facial phenomenon and increased knee-jerks after diphtheria, are much more likely to develope paralysis than those in whom these symptoms are absent.

Nicolayson, L. Bulbar Palsy. [Norsk. Mag. f. Laeg., Ap., 1918.]

Following a dizzy attack with nausea and vomiting a healthy man of 62 after two days found he could not swallow. He fed himself by means of a stomach tube and after several months began to improve. He had been a sufferer from severe migraine, but the acute palsy attack was not accompanied by any migraine.

3. SPINAL CORD.

Streeter, G. L. The Formation of the Filum Terminale. [Amer. Journ. Anat., January 15, 1919.]

In an earlier paper Streeter had pointed out that certain areas of cartilaginous tissue in the ear of the human embryo revert to an earlier embryonic type and are subsequently re-differentiated into a tissue of a widely different histological character. He claims that a similar process of de-differentiation takes place in the caudal region of the spinal cord. He holds that in the human embryo the greater part of the coccygeal cord, that is the part caudal to the thirteenth segment, undergoes de-differentiation. The more cephalic persists as the *ventriculus terminalis* and the more caudal part re-differentiates into a fibrous strand, the *filum terminale,* with the coccygeal medullary vestige at the tip. The first 29 segments of the spinal cord are not affected by this process of de-differentiation, but continue in a progressive development. When the embryo reaches 30 mm. in length there begins a disproportion in the rate of growth of the vertebral column and of the spinal cord. The former elongates more rapidly than the latter. This results in a relative displacement of the two structures. The *ventriculus terminalis* in the 221 mm. fœtus (25 weeks) lies nine segments higher than it originally did. By the time the adult form is attained, the displacement is increased by two segments. He concludes that the *filum terminale* represents that portion of the spinal cord caudal to the second coccygeal segment (thirty-first segment) which has undergone de-differentiation, and has finally become converted into a fibrous strand. This strand, like the sacral nerve root, elongates by interstitial growth in its adaptation to the ascending displacement of the spinal cord. The caudal tip of the dural sac maintains its relation to the vertebræ rather than to the spinal cord, and remains attached to the *filum terminale* in the sacral region at a more or less fixed point.

Weed, McKibben. Pressure of Cerebrospinal Fluid. [Amer. Jl. Physiology, May, 1919.]

Intravenous injections of Ringer's solution, according to the experiments carried out by these observers, caused no change in the pressure of the cerebrospinal fluid. However intravenous injections of distilled water or of other hypotonic solutions are followed by a continued rise in the pressure of the cerebrospinal fluid. Injections of hypertonic solutions cause an early rise in the pressure which is soon followed by fall in the pressure.

Barach, J. H. Lumbar Puncture. [Archives of Diagnosis, July, 1918.]

This observer believes that horizontal lateral posture during the puncture is safest for the patient, and he has uniformly obtained fluid with this posture in over 1,000 consecutive punctures. The lumbar region should be made prominent. The skin locally should be thoroughly cleansed with soap and water, alcohol and mercury bichloride or hydrogen peroxide; it may then be painted with tincture of iodine, as may also the operator's fingers. For anesthetizing the skin Barach sometimes uses a fresh sterile one fourth to one half per cent. cocaine solution by infiltration, but also often employs the sharp point of a piece of ice, placed on the exact spot of puncture and kept there with considerable pressure. A needle of eighteen gauge does the least damage to the tissues and is least liable to cause bleeding. For cell counts the second five mils of fluid obtained in a separate test tube is to be preferred. Lumbar puncture should seldom or never be performed in the dispensary or office. The average patient usually has several uncomfortable days after the procedure. Patients with various nervous symptoms are apt to show the more severe after-effects. A delayed reaction may come on after forty-eight to seventy-two hours. Most of the symptoms are relieved by the horizontal position. It is well to have the patient in bed for at least forty-eight hours. The foot of the bed may be raised, and the patient should get along without or with but one small pillow. In some cases the author has had good results from fluid extract of ergot, one dram three times daily, beginning promptly after the puncture. Acetphenetidin, caffeine, bromides, etc., were without effect. Pituitrin and dried thyroids were used in severe cases, the former as general vasomotor stimulant and the latter to stimulate secretion of spinal fluid. When the symptoms persist longer than usual and the patient is up and about he has seen benefit from a tight abdominal band. The author has seen no fatality immediately following lumbar puncture. Accumulated records indicate that the procedure may prove fatal in cases of brain tumor or brain cyst, where the lowered pressure might alter the relationship of the parts, a tumor, *e.g.*, shutting off the foramen of Magendie. Lumbar puncture might induce rupture of a cyst or aneurysm. Deaths have been recorded in cases with edema of the brain such as occurs in alcoholism or uremia.

Bardisian, A. Boveri Test in Spinal Fluid. [Riv. d. Clin. Ped., March, 1919. J. A. M. A.]

The Boveri test as applied to 50 children is here reported upon. They were positive with 13 with meningitis; in 2 of 5 with hydrocephalus; negative in 12 with gastro-intestinal or lung lesions; positive in 1 with tetanus, but negative in 9 others with acute infectious diseases, and constantly negative in 9 with nephritis, inherited syphilis or other disease. The test is applied with a test-tube containing 1 c.c. of the cerebrospinal fluid. The tube is held slanting, and 1 c.c. of 0.1 per thousand solution of potassium permanganate is poured down the wall of the tube. The tube is then straightened and the zone of contact watched. With normal fluid there is no change of tint, but with pathologic fluid the zone of contact turns yellow. On giving the tube a few gentle shakes to mix the fluids, the yellow tint may spread throughout. If the reaction is strong, it occurs in less than two minutes; a medium reaction takes three or four minutes, and after the fifth or sixth minute the reaction has no significance. The response is more sensitive than the Nonne, Apelt, and Noguchi reactions. The most intense reactions were observed in cases of meningitis. He describes four cases in detail in which the diagnosis of meningitis seemed certain, but the negative Boveri turned the scale to exclude meningitis; its findings were confirmed by the course of the cases.

Herrick, W. W., and Dannenberg, A. M. Observations on the Spinal Fluid of Acute Disease. [Am. Med. Assoc., N. Y. Med. Jl., June 22, 1919.]

This is a study of the meningeal choroidal complex in relation to miscellaneous acute diseases other than meningitis and poliomyelitis. Known facts about the anatomy, physiology, and pathology were reviewed briefly. The clinical significance of this complex and its reactions was then considered. Headache, irritability, hyperesthesia, exaggerated reflex activity, and delirium were inaugural features of perhaps the majority of acute infections of any degree of severity. Only when these symptoms of meningeal irritation were prolonged and severe did they ordinarily attract attention. Recorded determinations of globulin, cell counts, etc., in cases of meningismus, were surprisingly few. The cerebrospinal fluid of pneumonia had been fairly well studied by Voisin. Others had found pleocytosis, globulin increase, and pressure changes in isolated examples, or rarely in a small series of cases of scarlet fever, mumps, enteric fever, pertussis, measles, rabies, diphtheria, sepsis with or without meningismus. The speakers had examined the cerebrospinal fluid of over one hundred miscellaneous medical conditions with symptoms of meningeal irritation and had correlated their findings with other clinical and laboratory features of the diseases studied—as temperature, leucocytosis in the blood, degree of meningeal irritation and prognosis.

No direct relation of the reaction of the subarachnoid system to any of these features was apparent. In twelve cases of lobar pneumonia examined, a cellular reaction in the cerebrospinal fluid of from twelve to 200 cells was observed in seven and a globulin increase in eight. In fourteen cases of bronchopneumonia, a pleocytosis of from twelve to thirty cells was observed in five. Of fourteen cases of influenza, five showed from fourteen to forty cells; only three had globulin increase. In three cases of follicular tonsillitis there was pleocytosis, one showing 172 cells. Of twenty-eight miscellaneous acute medical conditions, seventeen showed cerebrospinal fluid pleocytosis, four globulin increase. Among these were examples of sepsis, scarlet fever, smallpox and measles.

Church, A. Cervical Ribs. [Amer. Med. Assoc., Section Nervous and Mental Disease. N. Y. Med. Jl., June 14, 1919.]

The frequency of supernumerary cervical ribs is very much greater than usually understood, one per cent. of all human skeletons showing them according to the findings of numerous anatomical laboratories. No English textbook on nervous diseases made any mention of cervical ribs, for the literature of which works on surgery, anatomy, and radiography must be mainly consulted.[1] These ribs were usually attached to the seventh cervical vertebra but in descending frequency to the sixth, fifth, and fourth. They had never been found arising from the first, second, or third. While the cervical rib had been known historically and anatomically for centuries, it was first recognized as a surgical condition by Cooper in 1818, and first surgically extirpated in 1861 by Coote. Since the use of the X-ray it had been rather frequently discovered and, thanks to this assistance, many times surgically removed. The most comprehensive paper on the subject was that by Streissler, who gave 200 cases and made 297 references to the literature. This was published in the Ergebnisse der Chirurgie u. Orthopëdie in 1913, Bd. 5, p. 280. About seventy per cent. of the cases were found in the female. Symptoms generally made their appearance after the age of ten, although the condition naturally was congenital. Most of them gave rise to symptoms in the third decade of life, with decreasing numbers during later years. The supernumerary cervical rib was bilateral in more than half the cases and when lacking in symmetry or when unilateral appeared more frequently on the left side. Some families presented numerous cases of this congenital abnormality. The disturbance occasioned by the rib was due to its effect upon the roots of the brachial plexus as they passed over the structure and interference with the subclavian artery at the same point. Its presence produced an increased elevation of the thoracic cavity and a modification of the anatomy in the triangles in the

[1] This statement, if made, is untrue, see Jelliffe and White, Diseases of the Nervous System, 2d edit., 1917, in several places with x-ray illustrations and clinical picture.

neck. The symptoms occasioned were not relative to the size of the rib, some being associated with very small ribs, and some instances of very large ribs giving rise to no disturbance during life. A continuance of the rib in the form of a cord which circled the apex of the chest was as likely to produce symptoms as a more largely developed rib. Other abnormalities of the skeleton were not infrequently associated, especially involving the ribs and sternum. Symptoms were usually developed at a time when the bone attained a certain degree of rigidity, or were brought about by contusion of the nerves and artery owing to the carrying of weights on the shoulder or in the hand. In other instances tuberculosis, inflammation of the pulmonary apex, pleurisy, exudation, loss of fat, and neoplasms brought forward the symptoms of a nervous and vascular character in the extremity. The symptomatology presented local signs, the rib was sometimes palpable at the side of the neck, the subclavian much more prominent behind the clavicle, a widening of the root of the neck, a more lofty lung apex, and the demonstration of the X-ray were prevented. X-ray pictures were apt to be misleading and must be carefully studied. Operations had been done for cervical ribs when no rib was present, owing to the misinterpretation of an X-ray negative, and in other instances symmetrical cervical ribs had been mistaken for the usual first thoracic pair. Very small ribs were easily overlooked. The vascular symptoms were due: (1) To the disturbance of the arterial supply; (2) to the impairment of venous return, and (3) to the vasomotor disorder, particularly in the hand, secondary to the development of neuritic changes in the trunks arising from the brachial plexus. The pulse was frequently changed in character or tended to disappear in certain positions of the upper extremity. In some instances even respiration modified the pulse and the circulation in the arm. A combination of this circulatory disorder was frequently mistaken for Raynaud's disease, the blue, sodden, cold, and ill nourished fingers being suggestive of that condition. While the ulnar portion of the hand was the part most commonly involved and the corresponding ulnar fingers, the radial side of the hand in a lesser number showed the principal involvement. The nervous symptoms consisted in sensory defects in the distribution either of a single nerve or in all the portions supplied by the brachial plexus. Neuralgic pains were very frequent and sometimes radiated to the side of the neck, to the back of the neck and shoulder, to the neighborhood of the ear, or down the side of the chest. Subjective sensory disturbances were most commonly felt in the fingers and presented all varieties of paresthesia, with hypersensitiveness and hyposensitiveness of all grades, and even a dissociation of sensation similar to that observed in syringomyelia. The arm, and particularly the hand, tended to be weakened, and this weakness was intensified by the pain induced by the use of the member, so that the patient commonly carried the arm in a position of support when lying down by putting the arm over the head.

Trophic disturbances involved the muscles supplied, particularly the group of flexors originating from the inner condyle of the humerus and the small muscles of the hand, so that various claw positions were induced suggesting a progressive muscular atrophy. Occasionally the sympathetic nerve in the neck was also involved, giving rise to pupillary changes and retraction or protrusion of the eyeball.

Additionally, inequality of the cervical ribs or a unilateral cervical rib was frequently associated with a scoliosis of the cervical spine, with compensatory curves above and below. Occasionally a wedge shaped supernumerary cervical vertebra with an adventitious cervical rib was found in these cases of cervical scoliosis, and in the 200 cases recorded by Streissler sixteen per cent. had alcoholic deviations of the cervical spine. Mild cases were of rather good prognosis and could be readily treated by rest and various local applications of massage, hydrotherapy and electricity, such as were indicated in a low grade neuritis, but the severe cases were only amenable to surgical removal of the cervical rib. This operation was one of great difficulty and considerable danger, and a number of cases were reported in which after removal of a portion of the rib, it had reformed either from periosteum that was not extirpated or else by an outgrowth from the stump of the rib; and failure to remove the cord which represented an extension of the rib had in some instances defeated the purpose of the operation. Every case presenting symptoms of brachial neuritis or persistent pain in the arm, especially in the hand, should be investigated by the X-ray to determine the presence or absence of cervical ribs. Cases of subacromial bursitis, arthritis of the shoulder joint, syringomyelia, phthisis, and bony tumors at the root of the neck have been confounded with cervical ribs. Finally, every case of cervical scoliosis should be investigated with the X-ray to determine the presence or absence of cervical ribs.

Taylor, H. D. Studies in Experimental Poliomyelitis. [Jl. Exp. Med., Jan., 1919.]

H. D. Taylor has made 121 enumerations of the leucocytes on 40 normal monkeys, in addition to blood counts on six series of monkeys before and at various intervals after the injection of active poliomyelitic virus (Journ. Exper. Medicine, January, 1919). Immediately following the injection of the virus there is a diminution in the relative and absolute numbers of lymphocytes. In many animals this condition continues, while in others there is a return to normal on the fourth to the sixth day. With the onset of symptoms the polymorphonuclear leucocytes are relatively and absolutely increased. During the stage of prostration the polynuclear leucocytes return to normal numbers. An increase in the total number of circulating lymphocytes is coincident with the passing of the acute stage. At the time of the leucocytosis the eosinophilic, basophilic, large mononuclear and transitional leucocytes are all increased.

Amoss, H. L., and Taylor, E. Neutralization of Virus of Poliomyelitis by Nasal Washings. [Vermont Medicine, Aug., 1917.]

Tests were made by Amoss and Taylor to determine the effect of concentration of washings on the activity of the virus. Amounts of virus which would certainly produce the infection if injected directly were added to a filtered washing fluid obtained from persons not having been exposed to the infection. The mixtures were separately reduced to small volume in vacuo at low temperatures and injected into monkeys. The results obtained were variable, for reasons which at first were not obvious, but the tests nevertheless showed that the filtered virus in certain amounts may withstand concentration in washing fluids without losing entirely its infective power. The nasopharynx was rinsed with double distilled water and the washings were fractionally sterilized by heating to 60° C. for three successive days. Each person's specimen was handled separately. The virus employed was obtained by filtering a 5 per cent. suspension of glycerolated poliomyelitic monkey spinal cord. To each 30 c.c. of the washings 7.5 c.c. of the filtered virus were added. The mixture was then incubated at 37° C. for twenty-four hours. Control mixtures of virus and distilled water were subjected to the same incubation. Each cubic entimeter of the mixtures then contained 0.2 c.c. of the filtrate, or at least two minimum lethal doses of the virus. The results of this experiment suggest that the nasal washings of a person suffering from acute poliomyelitis may exercise no restraining influence on an active virus, while those from healthy persons, under identical conditions of preparation, inhibit its activity. The secretions of apparently normal persons vary in the so-called neutralizing power. In each series of experiments the potency of the virus was established by control experiments. The secretions of three persons out of the six examined varied in their power to neutralize 0.2 c.c. of the virus filtrate at different times under nearly identical conditions, yet the only known clinical differences consisted in the presence of a rhinitis which appears to remove the inactivating power of the secretions.

Remlinger, E. Transmission of Rabies to Fetus. [Bull. d. l'Acad. d. Med. d. Paris, April 8, 1919. J. A. M. A.]

Remlinger reports some striking experimental experiences which confirm Konradi's statements in 1916. Animals inoculated with rabies may not display any signs of the disease for from one to three months, while their young born in the interim present rabies and may have died before the mother shows any signs of the disease. Remlinger relates that one guinea-pig thus developed rabies 122 days after the inoculation, sixty-eight days after the casting of the litter, and thirty-eight days after the death of the last one of the young. In Konradi's guinea-pigs, rabbits and bitches the interval sometimes was over a year before the animal succumbed to the rabies that yet it had transmitted to its young in the

uterus. These facts throw light on cases in which rabies has been transmitted to man by an apparently healthy animal; it may be harboring the rabies virus in its blood. Young animals may be apparently healthy and yet they may have been infected in the uterus, and they may develop rabies at any moment without further contact. The fact that the young dog or other animal has never had a chance for being bitten, thus does not exclude the possibility of rabies. The experiences related suggest also that possibly the fetus might become immunized by minute amounts of the rabies virus traversing the placenta. In conclusion he suggests further the possibility that the rabies virus might in certain cases induce other clinical pictures than typical hydrophobia or paralytic rabies. We know that it may induce Landry's paralysis, and it is possible it may be responsible for certain other forms of acute mania, etc.

Marie, P., and Chatelin, C. Paralytic Forms of Rabies. [Bull. d. l'Acad. d. Med., Ap. 8, 1919.]

A boy of 11 developed symptoms simulating poliomyelitis, a rapidly acute ascending paralysis, and died in a few days. He had been bitten five weeks previously on the lip. He first began to be agitated, then had screaming attacks and then paralysis in the legs. Acute polioencephalomyelitis, with the findings of rabies, confirmed by inoculation of rabbits were obtainel on autopsy. The authors' report on the extreme frequency of the disease since Jan., 1919, citing that at least 220 cases of rabies in animals have occurred in three months.

Fournier, J. C. M. Echinococcus of Spinal Cord. [Rev. Med. d. Uruguay, Sept., 1918. J. A. M. A.]

Fournier reports a case of paraplegia in a boy of twelve developing suddenly with no other symptoms except pains in the back for the last two weeks, and a similar attack of pains in the upper dorsal vertebræ for two weeks three years before. The motor disturbances were more an ataxia than paralysis; the spinal fluid seemed to be normal and the Wassermann and tuberculin tests elicited no response, but roentgenoscopy showed a process of rarefaction in the fifth dorsal vertebra and sixth rib, the seat of the pains and of some tenderness. A syphilitic osteitis at this point was assumed, but no benefit was derived from specific treatment, the paraplegia growing constantly worse. A successful operation revealed echinococcus cysts in the muscles close to the fifth and sixth dorsal vertebræ and in the posterior perimeningeal space, in the spinal canal, and also in the subpleural tissue on one side. The process was evidently of two or three years' standing and it had eroded vertebræ and yet had caused no persisting pains or root symptoms while the extreme hypotony of the paraplegia was in marked contrast to the exaggeration of the bone, periosteum and tendon reflexes and the foot clonus.

III. PSYCHOSES, PSYCHONEUROSES

Fürnrohr, W. The Psychogenic Element in War Neurosis Tremors. [Deut. med. Woch., 1918, 44, 241–4.]

In the experience of this author tremblings and giant shakiness have proved the most widely spread and the commonest of all the objective manifestations of functional nervous disorders; at the same time he has found them the easiest symptoms of which to rid the patient. Examples of this sort have occurred in Fürnrohr's practice amongst soldiers of all ages and of all degrees of experience. Such disabilities have made their appearance and required treatment not only in soldiers from the front-line trenches, examples of so-called "shell-shock," but not infrequently also amongst soldiers recently called to the colors, on home service or garrison duty. From his observations he has formed the opinion that anxious "expectancy" is a fundamental factor in their development; that they arise in the majority of mankind as maladaptations to situations which are disagreeable or dangerous; but that in those who are nervously disposed they tend to become fixed; and that the degree of their fixation is some index of the severity of this nervous disposition. Hence, after their removal, the patient is not cured, and if he has again to face situations presenting what is to the patient a similar disagreeable expectancy, shakiness will reappear. In the author's opinion rarely have such manifestations anything to do with mechanical damage or derangements due to concussion.

Piéron, H. The Mechanism of Psychotherapy in Functional Contractures. [Prog. Méd., Apr. 13. 1918.]

Piéron takes exception to the explanations of contractures commonly current since the beginning of the war. He sees in them a psychical causation, partial at least, and finds therefore that psychotherapy is physiologically justified. He criticises the view that these contractures arise as hysterical difficulties in the narrow sense of pithiatism, that is dependent on the will. Likewise a "physiopathic" or "reflex" origin in the conception of Babinski or Froment seems untenable. Some authors, particularly Roussy and Boisseau, believe that suggestion can effect a cure both in the physiopathic and in the purely pithiatic cases. The fixed cases cannot be of a pithiatic origin but psychotherapy aids in these cases. Piéron does not consider that pithiatism, a voluntary attitude, can be a contracture. The voluntary attitude has to do with an active clonic condition not with a clonic one of the muscle or muscle group. Pure alteration of tonus cannot be voluntarily produced.

Instead the condition is produced through the sympathetic. Irritation, whether peripheral or intramedullary, proceeding by the sympathetic pathways, causes more or less lasting hypertonus and the interruption of the causes hypotonus. He suggests that these be called physiopathic disorders. When under cortical influence the antagonists of a

hypertonic muscle group are set in motion, there is an inhibitory influence upon the tonus. There will then be an opposition between the irritative influence and the indirect voluntary influence. As the irritation grows less this latter motor influence will tend to overbalance it.

Wheeler, D. Unusual War Psychoneurosis of Functional Loss of Sense of Smell. [Bull. of Canadian Army Med. Corps, Nov., 1918, 1. No. 7, page 100.]

A psychologically interesting case demonstrating clinically the four primary tastes. The patient was conscious only of acid, salt, bitter or sweet sensations from his food. He was anesthetic to volatile substances, such as strong ammonia, ether, oil of lemon, hydrogen sulphid, rosewater and oil of peppermint. The flavor of cheese, butter, cabbage, potato, beef, jam, mutton could not be distinguished. Considerable pains were taken to explain his condition to the patient and assure him that his sense of smell would be regained. A strong faradic current applied to the back of the neck, and ammonia fortior held under his nose, evoked the remark "ammonia" after about a minute. Later, with the aid of a weaker current he recognized oil of lemon.

Hoven, H. Post Commotional Psychoses. [Arch. méd. belges, 1918, 71, 540.]

The psychical disturbances which may follow concussions run a somewhat capricious course, and in such cases the prognosis should be guarded. After recovery from the initial symptoms of confusion residual mental disorders (disturbances in disposition, character, and intelligence) may persist for many months, and may be subject to relapses. In rare cases, of which Hoven records three examples, concussion may give rise to a chronic psychosis closely resembling dementia præcox.

Hurst, A. F. The Bent Back of Soldiers. [British Medical Journal, Dec. 7, 1918.]

The author points out the fact that this common condition has been much studied abroad, but that no article about it has been written in English. The manifestation is a disabling and partially crippling one and it is always hysterical in nature, being secondary to some form of shock or trauma, but not necessarily a trauma involving the back. The one common feature of the condition is the complaint of pain in the back, or more rarely in the abdomen, which is relieved by bending forward. It is probable that some of the pain complained of is genuine, being due to the constant stretching of the small muscles and ligaments of the back, due to the assumed posture. The bent posture almost invariably disappears when the patient lies down. Treatment by psychotherapy is the only form permissible, and all measures which tend to fix

the idea of disease more firmly in the patient's mind are harmful. Any form of psychotherapy is likely to succeed, but usually persuasion and reëducation yield the best and most rapid results. The patient is to be shown that the position is merely a bad habit, contracted when the originally severe pain was present. He is shown that when he lies down the back straightens and the pain that he had when standing disappears. This is used to convince him that there is no organic disease and he is made to understand that relaxation of the back muscles on standing erect would give the same relief. He is then stood with his heels and back close to a wall and his shoulders are slowly and firmly pushed back until they touch the wall. He is assured that the pain this causes will disappear as soon as he is erect, and that the less he resists the sooner he will be cured. Usually relaxation comes in a few moments and he is surprised to find that he can stand erect without pain Then he is taught to walk in the erect position and the cure is complete. In certain very resistant cases good results are secured promptly by making the patient lie on his back on a long board which has a footpiece at right angles to its long axis. When he is straight the head end of the board is slowly raised until he is brought into the erect position. At this moment he may be told to walk off the board, which he will unsuspectingly do and so, greatly to his surprise, find himself cured.

Vignolo, Lutati C. Precocious Greying and War Neuroses. [Il Policlin., 1918, 25, 680.]

Vignolo-Lutati again discusses the inter-relationships between cutaneous diseases and war neuroses and quotes several instances from literature or from his own experience illustrating whitening of the hair as a manifestation of psychical trauma. Many varieties of so-called rapid accidental premature canities may occur: (1) a form developing in a few days or hours almost simultaneously with the psychical trauma, and affecting all the hairs of the body (complete canities); (2) regional canities, in which the hair of a single region is affected; (3) circumscribed canities, in which only a part of a region is affected; (4) partial and symmetrical canities; (5) hemicanities, in which the hair on one half of the body only is affected. These forms of canities are usually permanent, but in some cases the canities may be transient. In addition to the rapid form, there is an accidental premature canities with progressive course. The canities is sometimes preceded by obstinate neuralgia and headache, and is a necessary consequence of prolonged mental and psychical strain. It is especially liable to occur in aviators. Both the rapid and the progressive forms of canities are to be regarded (says this author) as valuable signs of a neuropathic condition, which, though it may be more or less transitory, may precede a breakdown of the nervous system.

Heinicke, W. Psychogenic Spasms and Nerve Injuries. [Neurol. Centralbl., 1918, 37, 350.]

In this account of a case of injury to the musculo-spinal nerve Heinicke raises a very practical question which should be kept constantly before the minds of those who have to deal with cases of recovering peripheral nervous lesions consequent upon war injuries. A psychical element added to a gross organic lesion causes spasms in the antagonist muscles and thus frequently delays the rate of recovery; this element is fairly easily corrected if its presence be suspected, but too frequently this added factor is missed, and thereby much misapplied therapeutic effort results.

Göpfert, J. Psychogenetic Deafness and Unconscious Hearing. [Deut. med. Woch., Nov. 14, 1918.]

Göpfert gives details of a series of tests to determine the conditions of the auditory functions in simulators and true psychopaths. The patient sings to a piano accompaniment. The pianist then changes the key (from one-half to one tone or more) and if the singer is not really deaf, he is carried along by his singing and changes to the key given by the piano. Playing with varying intensities helps to estimate the degree of dysacousia in a subject having an incomplete deafness.

Morchen. Hysterics and War Neuroses. [Berl. klin. Wchnschr., 1917, 54, Nr. 51.]

Mörchen here deals with the significance in a diagnosis of the term "Hysterical" as applied to the description of a series of manifestations, and states that its use be allowed in the description of all somatic-functional disturbances of psychological origin. Manifestations of this character can occur both when careful examination reveals no certain signs of anatomicopathological interference, and when such an examination reveals definite evidence of organic nervous or visceral disease. In both groups of cases psychotherapeutic treatment will effect a subsidence of the manifestations of psychological origin, but in the two groups of cases the prognosis will differ materially. The diagnosis of a certain set of manifestations as of functional origin should therefore demand a more complete examination of the patient and urgent treatment by psychotherapeutic means.

Herrero, A. S. Hysterical Anesthesia. [Siglo Med., Nov. 23, 1918.]

That persons under extreme excitement, profound emotion, may not feel pain from wounds is a well-known, though frequently forgotten fact. Pain is not registered, but is completely registered in consciousness. Herrero uses the idea of an endocosmos, speaking of the personality blocked as to the capacity to take in peripheral stimuli. His article contains no real new contribution.

Landau, E. War Neuropathology. [Correspondenz-Blatt für Schweizer Aerzte, Basel, Jan. 11, 1919.]

This is a review of the author's experience in France extending over a period of two and one half years and embracing an examination of 8,000 patients with neurological disorders. He dwells upon a superior radiopronator test, obtained by tapping the side of the head of the radius. The Babinski reflex he is convinced is a highly complicated one and as yet unanalyzed. He employs Dejerine's idea of psychic isolation in his treatment of the neuroses and psychoneuroses, with a combination of Dubois' ideas of educating him about his illness and that of his friends, thus ridding him of false sympathy. He then tried criticism and raillery and found the therapy quite efficacious. Mob hysteria was handled by popular lecture methods.

Siebert, H. Left-handedness. [Berl. klin. Woch., Dec. 23, 1918.]

A distinction should be made between "essential" left-handedness and the "occasional" form, the latter resulting from an organic lesion of the left hemisphere in childhood. Both forms can be distinguished by the fact that true left-handed subjects learn to write mirror writing with ease with the left hand, this faculty increasing with advancing years. On the other hand four cases of left-handedness following an organic cerebral lesion presented a marked incapacity for this exercise. There is lesser differentiation of the lower limbs so that both left and right-handed subjects offer less change in their control of the leg movements.

Obituaries

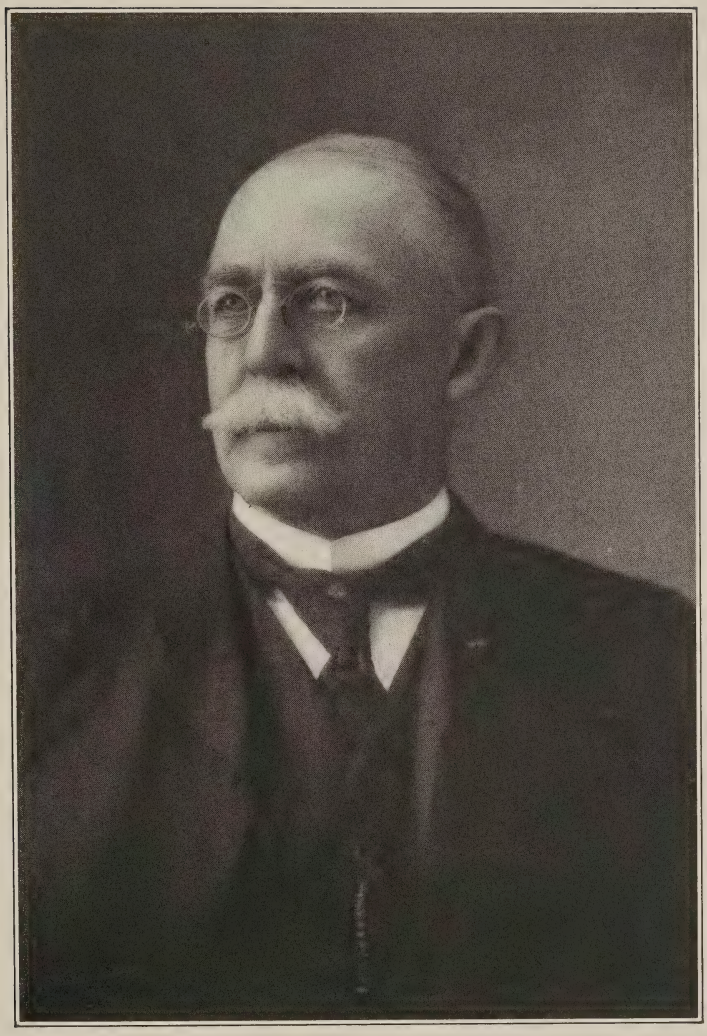
DR. EDWARD COWLES

On July 25, 1919, died Dr. Edward Cowles at the age of eighty-two years. He was a man whose influence upon his time may never be fully appreciated. All advances are made by individuals, and those who come after accept the conditions they find without much thought as to who brought them about. Dr. Cowles was one of those who saw visions and dreamed dreams, and then made them realities. He was far-sighted and broad-visioned. He not only did things himself, but he stimulated others to go and do likewise. It is due to this fact that the extent of his own contributions is likely to be overlooked in the general advance.

He was born at Ryegate, Vermont, on July 20, 1837, the son of George and Mary (Bradley) Cowles. His father served in the Vermont State Legislature for several years as representative and senator. There were many distinguished names in his ancestry and he was a direct descendant of Governor Pitkin, Colonial Governor of Connecticut.

He was graduated from Dartmouth College in 1859, received the degrees of A.M. in 1861, and M.D. in 1863 from the same institution. In the latter year he received the degree of M.D. from the College of Physicians and Surgeons of New York also. He spent a few months at the Hartford Retreat as assistant physician in the latter year, then entered the Army as assistant surgeon and served during the Civil War. He remained in the Army, with rank of captain, until 1872. Then, as he was about to enter upon the private practice of medicine, he was appointed superintendent of the Boston City Hospital, taking up the work in July of that year. His predecessor was a layman, and Dr. Cowles was one of the first physicians to be made superintendent of a general hospital.

In the seven years of his incumbency he organized the hospital so well that his successor, Dr. G. H. M. Rowe, under whose administration the Boston City Hospital became known the world over,



DR. EDWARD COWLES

has told the writer that he had made no changes in its plan of organization, but had conducted the hospital along the lines laid down by Dr. Cowles. In 1878 he established the training school for nurses, the first hospital of any kind to operate a school for nurses as a regular department of the hospital itself. Before this the few schools in existence were financed by private benevolence through separate corporations. They were not integral parts of the hospital, but did its nursing work under contract. There were many conflicts of authority and other sources of friction between the schools and the hospitals. Under the new plan these were done away with. More than that, there is a limit to private benevolence, and hence to the number of training schools that could be financed. The new plan worked so well and was so economical that now there are almost no schools separately supported and almost no hospital except the smallest without their own schools. Thus it is undoubtedly due in large part (how large we cannot say) to Dr. Cowles's initiative that the public is so well supplied with trained nurses to-day.

A few years later, in 1882, Dr. Cowles established at McLean Hospital the first training school for nurses to keep up a continuous existence in any hospital for the insane. He was almost the first to train men nurses, being anticipated by less than a year by the Buffalo State Hospital.

While still at the Boston City Hospital he made a study of hospital construction and built several new word buildings. The older wards of the hospital had been built with arched ceilings, averaging eighteen and a half feet in height, in order to allow for suitable ventilation. In these Dr. Cowles conducted experiments in air currents and demonstrated that the upper five or six feet were practically negligible, thus establishing a height of twelve to fourteen feet as the optimum for general hospital wards with arched ceilings—a standard that has become widely is not almost universally adopted.

In 1879 he was appointed superintendent of the McLean Asylum for the Insane, as it was then called. Before assuming these new duties he spent six months in England, Scotland and France, visiting the hospitals for the insane. On his return he found the asylum one in fact as well as in name, with "boarders" instead of "patients," "attendants" instead of "nurses," locked doors, much restraint, and patients not allowed to see or communicate with relatives until they were considered ready for discharge.

He began at once to hospitalize the asylum. Patients were called such. The attendants were taught to take temperatures, give baths

and do other things that nurses do, and in 1882 the training school for nurses was started. He put night nurses on all the wards, and left room doors unlocked, took bars off many windows and replaced them by inconspicuous screens, left some ward doors unlocked. He admitted friends freely to visit patients in their rooms during convalescence and when not detrimental to the patients, and allowed the latter great liberty in writing to suitable persons. He did much for the occupation and diversion of patients, as well as for their individual treatment. There had already been one woman attendant on a male ward. He put women nurses and ward maids on all but the most disturbed men's ward. He encouraged the voluntary admission of patients. The name of the asylum was changed to hospital.

In his development of the hospital idea Dr. Cowles early saw the institution as a place not only for the care and treatment of patients, but as a center of study, experimental investigation and teaching. He increased the medical staff by the introduction in 1880 of student house officers, replaced since 1897 by junior assistant physicians, who were graduates in medicine. A room was fitted up as a pathological laboratory in 1881 and for several years a pathologist came to the hospital to perform autopsies and give instruction to the staff. In 1888 a resident pathologist was appointed. The following year Dr. Cowles secured an appropriation for a clinical laboratory, and within a year or two had installed some physiopsychological apparatus with which clinical experimentation was begun. Facilities were provided for routine clinical, microscopical and chemical examinations, and the staff enlarged for the purpose. From the beginnings thus made—the first in this country to combine clinical psychiatry with laboratory investigations—there later developed the thoroughly well equipped pathological, chemical (1900), and psychological (1904) laboratories, with competent specialists in charge. He urged the raising of an endowment fund in order that this work might be made permanent. Ever forward-looking, even in his retirement he had hoped to see established at McLean a physiological laboratory, with a trained physiologist in charge, to institute and carry on investigations into the relations of emotional states to the glands of internal secretion and the vegetative nervous system. His thought was that McLean should do, not what other hospitals and laboratories could do, but what they were not doing and could not do,—that it should point and lead the way.

By the success of these plans and by the interest he aroused, a great impetus was given to the laboratory movement for hospitals

for the insane. During the nineties, and especially the latter part of that decade, pathological laboratories were inaugurated in many state hospitals in Illinois, Massachusetts, New York and Indiana, and other hospitals in these and other states soon followed. The Pathological Institute of New York, predecessor of the Psychiatric Instite at Ward's Island, ran its short-lived career, directly stimulated to part of its activities by Dr. Cowles.

This growth of the laboratory and teaching idea was certain to come sooner or later. Whether, had it not been for Dr. Cowles's initiative, it would have come in time to prepare so many psychiatrists for the splendid work they accomplished in the Great War, it is impossible to say. But the writer likes to think of that work as in part a contribution of Dr. Cowles to the results obtained—a part of his "bit" in this war.

In order to better fit himself for the work he had undertaken, Dr. Cowles spent several months in 1887 at Johns Hopkins University, where he especially studied psychology with Dr. G. Stanley Holl, then recently returned from abroad. For the latter's interest and counsel he had high regard and the acquaintance then found ripened into a friendship which he treasured warmly to the end. He was stronlgy influenced by the writings of Griesinger. He early developed an energy-concept as an explanation of the manifestations of the "mania-melancholia" group, and he saw nutritional and other metabolic processes involved. It was for the investigation of these living problems that he wanted his laboratories. With the Kraepelinian concepts, when they appeared, he was not wholly in sympathy, though recognizing that they had a certain value. He felt that they were lacking in a broad biological point of view and in due consideration of the affective factors. He deprecated the widespread and wholesale acceptance that was accorded them. In late years he noted with satisfaction the swing of the pendulum away from them. In his own teaching he held throughout to his early concept, and regretfully saw them largely ignored. He taught for many years at Dartmouth, Harvard and Clark universities. He was professor of mental diseases at Dartmouth Medical School from 1885 to 1914, when he was made professor emeritus. He was instructor in mental diseases at Harvard Medical School from 1889 to 1914, and was non-resident lecturer at Clark University from 1902 to 1917.

For many years before Dr. Cowles became its superintendent, the trustees of McLean had felt the necessity of moving from Somerville, where the hospital was more and more encroached upon by steam railroads and their freight yards. They had bought land at

Waverley, but had plans for an old-type hospital, without so attractive an outlook as they now have. Through Dr. Cowles's insistence, more land was bought and the cottage plan adopted, with buildings widely separated and most of them connected with corridors. The houses for patients were given a sunny exposure to the southwest, and an extensive view across the broad Charles River valley. He urged and secured a home-like type of architecture, different in each building, yet harmonious as a whole, the intent being to do away as much as possible with the effect of an institution and to render the building and the rooms as home-like as possible. The hospital, begun in 1892, was built according to these plans, not only with houses for patients and administration, but with gymnasiums and work-shops for patients, and commodious laboratories for pathological, chemical, and psychological investigations. It was occupied in 1895, and stands to-day a monument to his foresight and efficiency in planning.

The vegetative part of the plant was large enough to take care economically of a larger number of houses than were built at first, and Dr. Cowles advocated one or two additional buildings. But the trustees were reluctant to expend the necessary additional sum, and for several years the hospital could not meet its expenses, as it would soon have been able to do with a larger number of patients. The recurring deficits, and changes in the board of trustees, led to changes in the plan of management, the adoption of a retiring age for the superintendent, and the grant of a pension upon retirement. Under this plan Dr. Cowles was retired in December, 1903. Since then he has lived in Plymouth, Mass., continuing his teaching until the infirmities of age rendered it impracticable to do the necessary travelling, but as interested as ever in the march of events, and still forward-looking till the last few days of his life.

As a builder of hospitals Dr. Cowles leaves an enviable reputation. In the seventies he made himself a master of hospital design and construction, and in the two following decades his advice was sought in the planning of both general hospitals and those for the insane. He wrote authoritatively on the subject in the Reference Handbook of the Medical Sciences in 1886, and for other publications in 1885 and 1893. He planned and built for future growth.

As an organizer he was equally competent. His ability was shown not only at the Boston City Hospital, but at McLean, where the duties of each class of employe, from the superintendent down, were so well defined that there was a minimum of overlapping and of friction. After the new administrator, appointed at the time of

Dr. Cowles's retirement, had looked over the plant, he saw no changes in organization to make.

As an administrator he saw things in the large and was far-sighted, and the best was none too good; there were always cogent reasons for getting the best that could be got. But he was not wasteful. Had he spent less the hospital would have had less reputation and hence less earning capacity to-day. He tried to get about him men capable of doing the things he wanted the hospital to do, and then gave them all the facilities he could, and a free rein. He secured Dr. August Hoch as pathologist, Dr. Otto Folin as chemist, Dr. Shepherd Ivory Franz as psychologist—men who need no introduction. In his relations with subordinates he was always approachable, just and kindly. He never nagged. If he had occasion to criticize, he did it in a way not to hurt. He imbued the whole hospital with a spirit of coöperation and mutual consideration and helpfulness.

In his relation to his patients Dr. Cowles was kindly, thoughtful, considerate, sympathetic. One of his principles was to give the patient time to tell out all that he or she wished to say. He was fatherly, benevolent. His advice was good, his judgment sound.

Dr. Cowles was a consultant in many important medico-legal cases, and would have given much time to such work after his retirement from McLean if his deafness, existing for many years, had not increased to a prohibitive degree. This disability interfered also with private practice and the enjoyment of society meetings and other group gatherings. He bore this affliction, as all other ills of life, with courage and an uncomplaining acceptance of the inevitable, yet with full and keen appreciation of all it meant.

Besides his hospital work Dr. Cowles was a trustee of Clark University for several years, having been a member of its first board. From 1896 to 1900 he was a trustee of the Massachusetts Hospital for Dipsomaniacs and Inebriates at Foxborough. He was one of the founders, in 1880, of the Boston Medico-Psychological Society, now the Boston Society of Psychiatry and Neurology. He joined the American Medico-Psychological Association in 1881, then the Association of Medical Superintendents of American Institutions for the Insane, and was active in its councils, especially during its transition period. He was its president at its Denver meeting in 1895. He was a member of many medical and other scientific and literary societies, including the Alpha Delta Phi, Phi Beta Kappa, American Association for the Advancement of Science, American Academy of Medicine, and in the nineties was elected honorary

member of the Société Médico-Psychologique de Paris. In 1890 he received an honorary degree of LL.D. from Dartmouth. He belonged to the Loyal Legion.

Dr. Cowles published several papers on construction, management and administration of hospitals, on training schools for nurses and nursing problems, on clinical psychiatric subjects, and other medical papers of more general scope and application. His annual reports contain much valuable discussion of the ideas for which he stood and the plans he was advocating at the time. Lately he had it in mind to write a history of the last forty years of McLean Hospital.

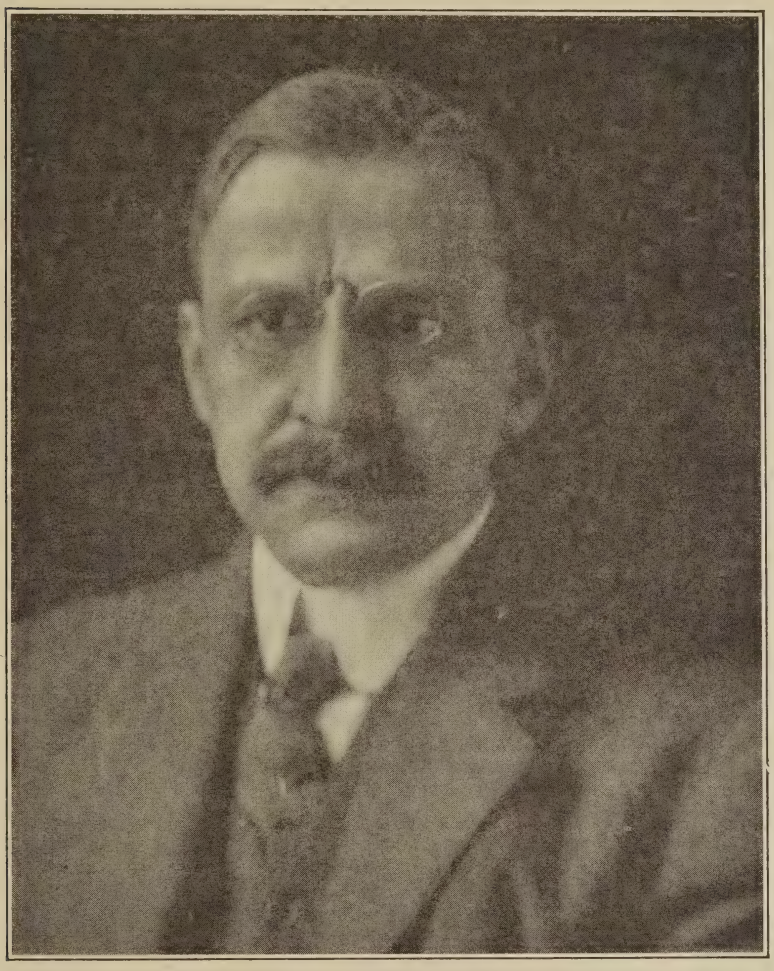
In bearing Dr. Cowles was dignified, gracious and courtly—a gentleman of the old school, but not austere. He had great charm of manner, often enhanced by the play of a quaint genial humor that never wholly forsook him, even on his death bed. He was generous in his thoughts of and feelings for others, advising and helping them in trouble, rejoicing for them in their successes, and wishing them to get full credit for what they had accomplished, sometimes even without claiming for himself the credit which he might well have done. Yet he wished to have the primacy of his laboratories, training schools and teachings recognized and established in the minds of men. He had many personal burdens and griefs to bear for long years, but he never repined. He faced them with courage and a certain philosophical fortitude. He was intensely loyal in his friendships and to the self-imposed obligations towards some who had depended upon him; and in the last few years, as he saw both his income and its purchasing power decrease, he was more concerned for them than for himself. These burdens, and the increasing infirmities of age, he bare cheerfully, however, and never lost a certain optimism. Till within a month of his death he was planning some literary work that would occupy him for the three or four years that he expected to live. He survived all near relatives except a brother, two years his junior.

Dr. E. Stanley Abbot.

DR. AUGUST HOCH

Arteriosclerosis, an accidental infection with phlebitis, which seemed cured, and a sudden giving out of the renal function, carried away one of the most stimulating and beloved psychiatrists of our day, August Hoch, only fifty-one years old. In the midst of the preparation of a monograph on stupors, he was suddenly overtaken by death.

A most genial and lovable character, Hoch was one of the fortunate group of young men who gathered at the Hopkins Hospital before the opening of the Medical School. The son of the director of



DR. AUGUST HOCH

the Basel University Hospital, he had come to Philadelphia in 1887 to study medicine, and he followed Osler, with his friend Chas. E. Simon, and became closely associated with H. M. Thomas, under whose influence he translated Hirt's Textbook on Nervous Diseases. In 1892 he was chosen to prepare himself for the position of pathologist and pyschologist of the McLean Hospital, and after a period

of work at Strassburg, Leipzig and Heidelberg, he returned, having done a noteworthy piece of research with Kraepelin on the effects of tea and its oils. Another period of work abroad with Nissl and Kraepelin established him as one of the leading connoisseurs of the alterations of cortex cells, and an ever-growing interest in clinical psychiatry, at first strongly influenced by the new German nosology, but gradually rising to an important contributorship to the personality-study and dynamic psychology asserting itself in the pragmatically inclined new world, especially after he became first assistant at the Bloomingdale Hospital in 1905. A further period of work in Zürich with von Monakow and Jung preceding his taking the directorship of the Psychiatric Institute of the New York State Hospital, and the professorship of psychiatry at Cornell University Medical School in 1910, brought his natural talents as a teacher and shaper of psychiatric thought to their best and broadest expression. In collaboration with Amsden and later with MacCurdy, he had his most fruitful years, until a severe sciatica and indications of the familial tendency to arteriosclerosis induced him to accept a position in California, where he was able, without enduring the strains of previous positions, to work up the wonderful and unique collection of twenty years of clinical observation.

Hoch's unusually genial make-up, his conscientious devotion to all his obligations, and the keen sense for the evaluation of his observations explain the feeling of an irreparable loss, the feeling that a man destined to remain for a long time an ever-helpful and inspiring and productive representative of the best type of American psychiatry had been prematurely torn from our midst.

Adolf Meyer.

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Original Articles

ATYPICAL FORM OF ARTERIOSCLEROTIC PSYCHOSIS. A REPORT OF A CASE[1]

By Dr. S. Uyematsu

PATHOLOGIST AND ASSISTANT PHYSICIAN, DANVERS STATE HOSPITAL, MASS.

In recent years a number of atypical forms of arteriosclerotic brain disease have been reported. In addition to hemorrhagic areas and softenings caused by sclerotic arteries, there are several different forms of pathological changes due to a sclerotic condition of the cerebral arteries. The clinical symptoms differ considerably from the typical forms and at times make a correct diagnosis almost impossible. There have been a number of these cases reported by various observers. Jacobson reported a case of arteriosclerosis which showed bulbar symptoms and Alzheimer described perivascular gliosis, claiming it to be the result of the arteriosclerosis. Buchholz found wedge-formed arteriosclerotic degeneration of the cortex. The encephalitis corticalis of Binswanger and the vacuole formation in subcortical white matter as described by Buchholz, are also of arteriosclerotic origin. Rossbach described another peculiar alteration in the cortex of the brain due to arteriosclerosis, to which he gave the name, "état vermoulu Pierre Maries." Schob reported similar pathological changes, which clinically showed paralytic symptoms. Still later Alzheimer reported a pathological condition of the cortex of the brain, showing a spongy degeneration

[1] From the laboratory of the Danvers State Hospital. The writer wishes to express his gratitude to the staff of the Danvers State Hospital and Drs. Southard and Canavan for their valuable coöperation in preparing this paper.
Danvers State Hospital Contribution No. 67.

due to arteriosclerosis, but which could not be diagnosed clinically. He named this form of arteriosclerosis "*atypical,*" to distinguish it from the typical, just as Lissauer's paralysis is called atypical to distinguish it from the typical form.

But how can this number of different forms be explained? The alterations are no doubt due to the sclerosis of the cerebral arteries. But the different locations, the different grades of sclerosis and perhaps the different durations of the disease, probably explain the various changes. When, for instance, pial vessels show a greater involvement than other vessels, it may cause the anatomical picture of "état vermoulu of Pierre Maries," when on the other hand, superficial vessels of the cortex are more attacked, it may result in the formation of the wedge-shaped degeneration of Buchholz or the spongy degeneration as reported by Alzheimer. Encephalitis subcorticalis of Binswanger and the vacuole formation in the subcortical region described by Buchholz, may also be the effect of arteriosclerosis of the medullary vessels. In the same manner, the involvement of the different stems of the brain arteries may cause different clinical symptoms; for instance, sclerosis of the basilar artery showing the bulbar symptoms as reported by Jacobson. Sclerosis of the anterior and middle cerebral arteries showing the paralytic symptoms as reported by Schob and Alzheimer, changes in the cerebellar arteries showing the cerebellar symptoms, etc.

The following is a report of a case, which was clinically diagnosed, "probably brain tumor," but pathologically showed an atypical form of arteriosclerotic degeneration.

Clinical Observations

Family History.—Mother died at the age of sixty-eight; cause of death unknown. Father died of stomach trouble. Two sisters died during childhood; one of intestinal trouble and the other of diphtheria. Another sister died of pulmonary tuberculosis at the age of twenty-four. One brother died of pulmonary tuberculosis at the age of twenty. Three brothers and one sister living and well.

Personal History.—Early development normal. Patient attended the public school and graduated from the grammar school. At the age of eighteen she came to the United States from Canada and entered the employ of the General Electric Company. She later worked in a shoe factory. At the age of twenty-one she married and her life was uneventful until the onset of her present condition. No history of venereal disease. At the age of forty the patient began to have difficulty in doing her work as well as she formerly did. She also complained of headaches which were very constant and gradually became

more severe. A year before her admission to the hospital she showed considerable memory loss. Following the death of her mother which occurred about the same time as the loss of memory, her mental condition became much worse. She became more forgetful and kept repeating, "Oh, I wish Ma was alive." She gradually grew worse and, when spoken to, repeated this sentence many times. Her memory became still more impaired for both recent and remote events. Later she began to walk with a great deal of difficulty and finally became bedridden, not being able to stand. Occasionally she was untidy. A tremor of the hands developed and it was necessary to feed, dress and care for her. She was admitted to this hospital October 5, 1918.

Physical Examination.—General Appearance: Patient was a very well nourished individual. Complexion was very muddy and colorless. Muscles were very well developed but of poor tone. Skin, moist. No jaundice. There was a mottled condition of the arms, back, legs and feet. No bruise marks. No syphilitic evidences.

Thoracic, Respiratory and Circulatory Organs: Chest, broad and well developed. Respirations, 18 per minute. Lungs negative on percussion and auscultation. Heart: Apex beat was palpable in the 5th interspace about an inch to the left of the mid-clavicular line. Radial pulse was very poor quality, at times irregular. There was no sclerosis of the peripheral arteries. Blood pressure, 160–80.

Digestive and Abdominal Organs: There was considerable fetor oris. Tongue coated. Abdomen large but showed nothing on palpation. Liver and spleen were not palpable. Digestion, good. Bowel movements, normal.

Genito-urinary Organs: Negative.

Urine: Negative.

Wassermann: 10–12–18. Reaction in blood serum negative.

Spinal Fluid: 10–9–'18. Wassermann reaction negative. Globulin slight ring. Albumin 2 in 20. Cells, 96. Gold, 1233421000.

Nervous System.—General Sensations: Patient had a feeling of exhaustion; was unable to express herself very clearly.

Eyes: Expression dull, listless. No nystagmus present. Pupils irregular and unequal, the right being widely dilated. They reacted very slowly to light and not at all to accommodation. Ophthalmoscopic examination was very unsatisfactory on account of the patient's inability to coöperate, but so far as could be ascertained the fundi were normal.

Ears: No discharge. Hearing good.

Taste and Smell: Test could not be performed as the patient would not coöperate.

Cutaneous Sensibility: Tactile appreciation was slightly impaired, although it was rather difficult to say whether she realized when she was touched by a pin or a pencil. She was unable to localize readily for touch or space. Responded to pin pricks by wincing.

Deep Sensibility: There was no sensibility over the nerve trunks.

Stereognostic Sense: Patient was unable to tell the objects which were put in her hands with her eyes closed.

Vasomotor Conditions: Dermographia was present and there was much mottling of the skin of the arms, shoulders, legs and feet.

Reflexes: Knee jerks were exaggerated. Ankle clonus was present on the right side but not present on the left. No Babinski. Gordon and Oppenheim not present.

Involuntary movements: There was a marked tremor of the hands, tongue and lips.

Sleep: Patient was somewhat restless in the hospital but as a rule slept fairly well.

Mental Examination.—Patient was in bed during her entire residence in the hospital. She was very restless, frequently pulled out handfuls of her hair, gathered up the bedclothing and threw them off, and picked at her face. All motions were meaningless and performed with considerable effort. Her movements were slow, deliberate and lacked coördination.

Speech: Patient's speech was retarded, slurring and at times showed elision of whole syllables.

Consciousness and Orientation: Patient was not oriented for persons, place or time. She did not realize where she was, nor recognize anyone about her.

School Knowledge: It was impossible to gain any knowledge from the patient. Could not give the names of the New England States and could not give any information about her school work whatever.

Calculation Ability: Could not be tested.

Handwriting: Could not be tested, her hand shook so badly.

Hallucinations: Apparently she did not react to any hallucinations.

Memory: There was marked memory loss. She was unable to recall recent events, did not know how long she had been here nor where she came from. She was unable to state even a few facts concerning her remote past. She usually answered by repeating the questions that were asked her.

Association of Ideas: There was marked retardation and looseness of thought connection. Her attention wanders so that it is almost impossible for her to concentrate for over an instant.

Judgment and Conclusion: There was no apparent delusion formation although at times she seemed a little apprehensive and suspicious, attempting to strike the examiner when approached. Had no insight whatever.

Emotions: Patient showed no increased emotional excitability. At times she was somewhat irritable but was usually dull, seclusive and listless.

Social Relations: Patient was untidy. At times aggressive, scratch-

ing the nurse and pulling her hair. It was necessary to spoon-feed her, as she was unable to help herself in any way.

Course of the Disease.—October 8, 1918. *Untidy. Helpless.*

Patient remained in bed unable to help herself in any way. Plaited the bedclothes or picked or pulled at her teeth and hair. Had no grasp on her surroundings and did not appear to comprehend what was said to her. Conversation was a repetition of what she heard. When an attempt was made to induce patient to stand, her legs could not support her and she would have sunk to the floor if not assisted. Was spoon-fed and seemed to have a very good appetite.

October 15, 1919: *Weak. Unable to articulate distinctly. Untidy.*

Last night about nine o'clock patient had an attack of syncope. Seemed very weak, dripping with perspiration; pulse feeble, rapid and irregular, 150 per minute. There was visible pulsation of vessels of neck. Was given a stimulant and revived, but since then she seemed dazed and practically inaccessible. Lay on her back with her mouth open, right leg drawn up. The mottling of the skin on the right foot was much more pronounced. She would not straighten her leg out and when attempts were made to do so for her she resisted and cried out. When questioned she kept repeating what was said to her, seldom giving an intelligent reply. Was constipated. Very untidy. Had a very good appetite.

October 20, 1918: *Died to-day.*

Patient has been unconscious for the past twenty-four hours and died to-day at 12:30 P.M. Cause of death was given as organic brain disease.

Postmortem Observations

The autopsy was performed ten hours after death by Dr. Canavan and Dr. Uyematsu. The anatomical diagnoses were as follows: Beginning gangrene of fingers and toes; claw-like position of hands, especially the right; sclerosis of coronaries; beginning sclerosis of aorta; cirrhosis of liver; chronic diffuse nephritis; fatty replacement of pancreas; submucous hemorrhage of stomach; chronic perioöphoritis; a small fibroid in uterus; bony elevations of inner table of the calvarium; chronic pachymeningitis; chronic leptomeningitis; external hydrocephalus; universal atrophy of the convolutions (first and second convolutions of temporal lobes, orbital portion of frontal lobes and pyriform lobes are relatively in good condition); brain sclerotic; brain weight, 970 grams.

Macroscopical Observation of the Calvarium and Brain.—Calvarium was rather thin with no diploë. Measurements: F. 0.4 — T. 0.3 — O. 0.6 cm. Inner table showed small bony elevations. Grooves for middle meningeal arteries were shallow. Base of skull showed nothing notable.

Brain weighed 970 grams. Dura mater was thickened and particularly adherent over the frontal region. By pleating back the dura

mater, the pia mater could be seen lifted from the cortex by a marked quantity of clear fluid; 5 c.c. could be easily collected between any two convolutions. Pia mater was slightly opaque over the vertex and congested, especially over the occipital lobes. The atrophy was very marked over the vertex, involving the posterior part of the frontal, entire parietal and occipital lobes. The anterior inferior cerebellar artery on the right side was missing. The vertebral arteries, basilar

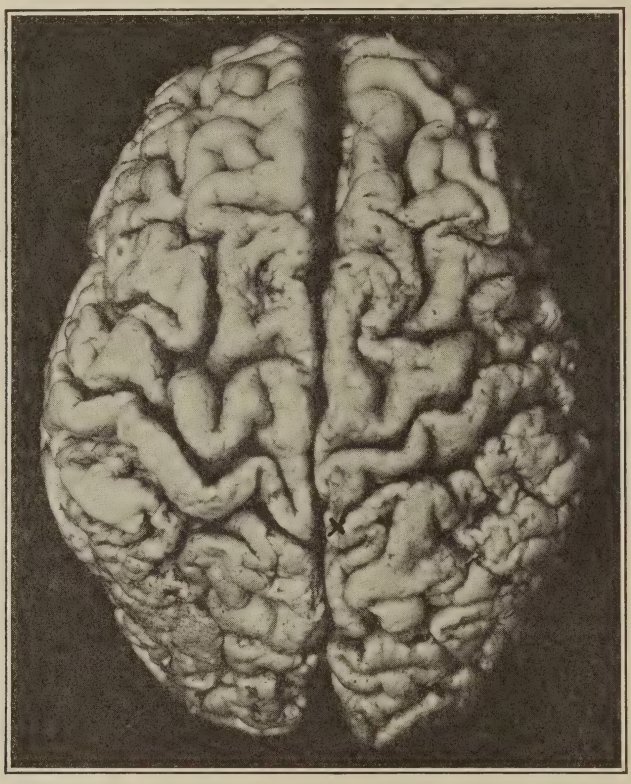

FIG. 1. The superior surface of the brain, showing the atrophic convolutions and the softening.

artery, internal carotid arteries and major arteries of the cerebrum and cerebellum were all very markedly sclerotic. There was marked excess of cerebrospinal fluid at the base as well as the vertex of the brain. Cranial nerves were negative.

Spinal Cord.—The dura mater was slightly thickened. There was an excess of cerebrospinal fluid. Otherwise nothing of note.

The brain was put into a 10 per cent. solution of formalin for fixing. The following is the description after two weeks' hardening: The pia

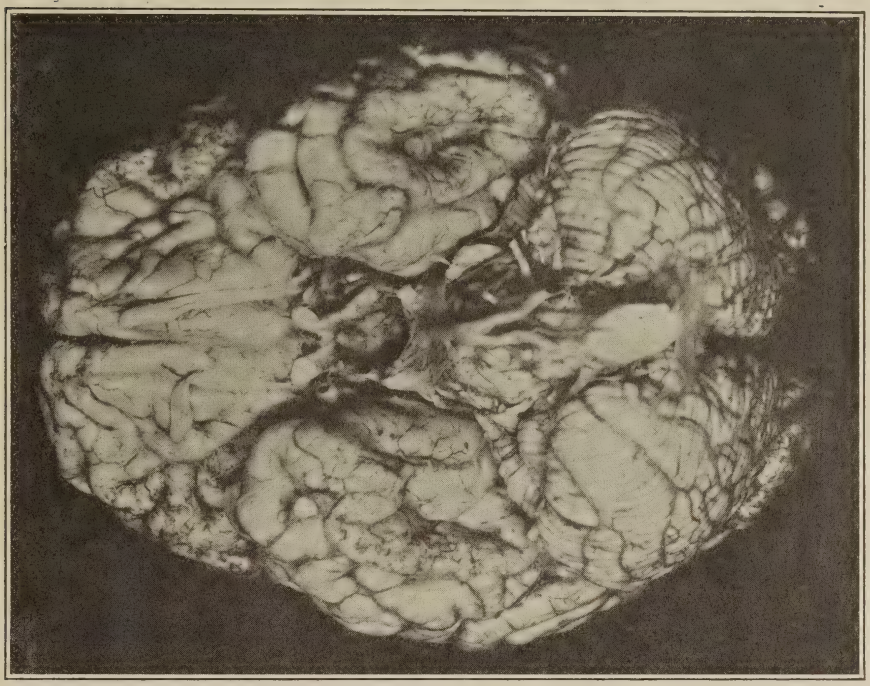

FIG. 2. Base of the brain, showing sclerosed arteries, thickened pia mater and atrophic convolutions of both cerebrum and cerebellum.

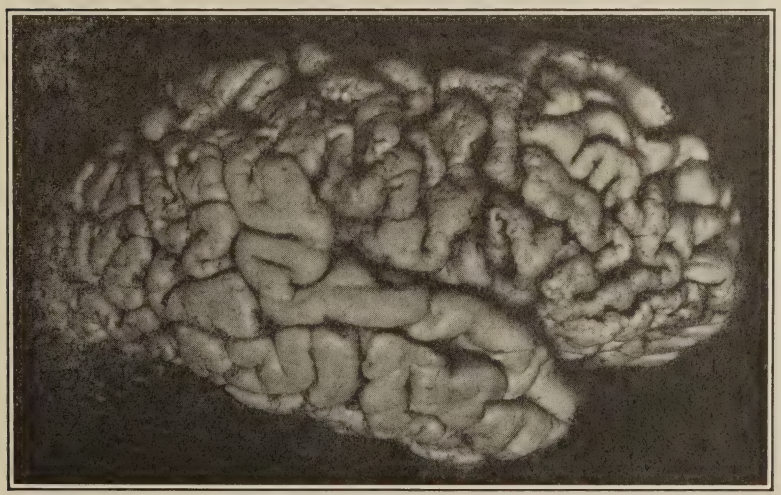

FIG. 3. The right hemisphere of the brain. The anterior part of the superior frontal, superior and middle temporal are apparently normal.

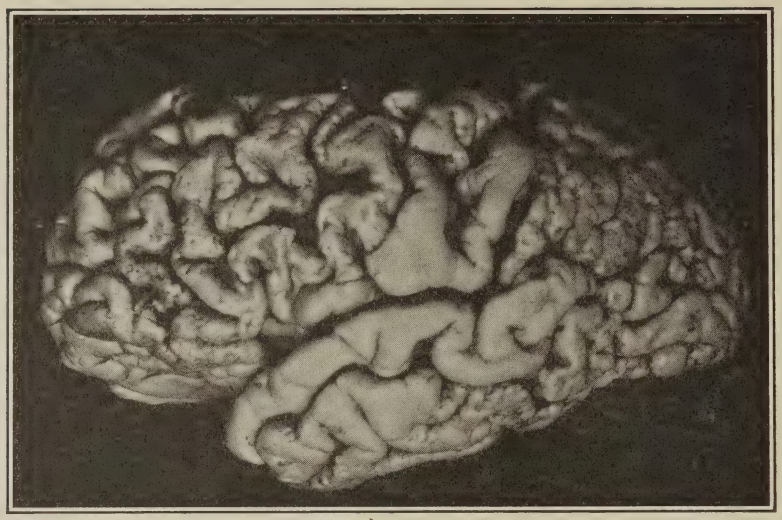

FIG. 4. The left hemisphere. The anterior part of the superior frontal, the superior and middle temporal, the lower part of the posterior central and the anterior lip of the supramarginal convolutions show apparently normal appearance.

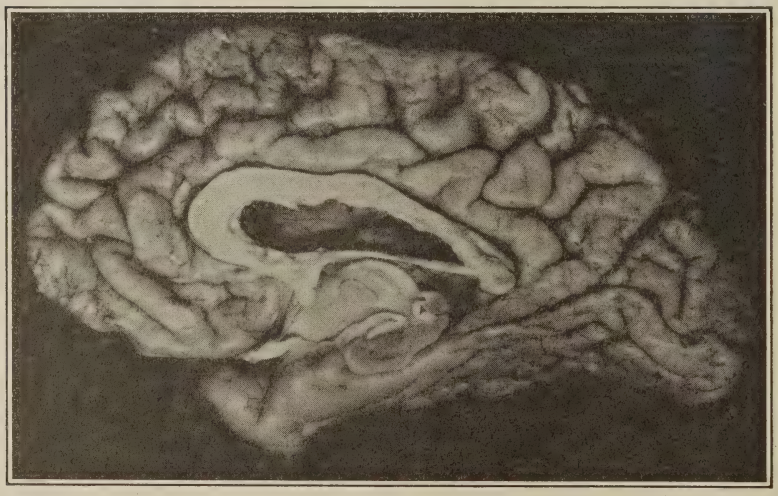

FIG. 5. The median aspect of the right hemisphere. The gyrus fornicatus, the neighboring convolutions and the uncus are not atrophied.

mater stripped easily, except over occipital lobes, where it was firmly adherent to the cortex, the vessels were markedly congested. The convolutions of both hemispheres were extremely atrophic, as may be seen by pictures (Fig. 1–6). It is well to note that the atrophy of both hemispheres is almost symmetrical. The atrophic convolutions over both hemispheres were as follows:

Right:	Left:
Anterior central,	Anterior central,
Posterior central,	Posterior central,
Posterior one third of superior frontal,	Posterior one third of superior frontal,
Middle frontal,	Middle frontal,
Inferior frontal,	Inferior frontal except the opercular portion,
Superior parietal lobule, *Softening, ing,*	Superior parietal lobule,
Inferior parietal,	Inferior parietal,
Posterior portion of supramarginal gyrus,	Anterior portion of the supramarginal gyrus,
Angular gyrus,	Angular gyrus,
	Posterior part of middle temporal.
Inferior temporal,	Inferior temporal,
Occipital convolutions,	Occipital convolutions,
Paracentral lobule,	Paracentral lobule,
Precuneus,	Precuneus,
Cuneus,	Cuneus,
Isthmic part of gyrus fornicatus,	Posterior one third of gyrus fornicatus,
Lingual gyrus,	Lingual gyrus,
Fusiform gyrus,	Fusiform gyrus,
Posterior part of hypocampal gyrus.	Posterior part of hypocampal gyrus.

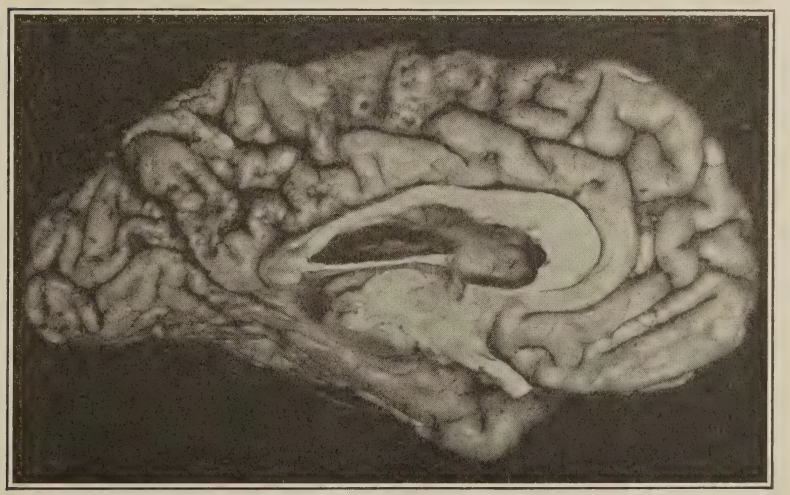

FIG. 6. The median aspect of the left hemisphere. The superior frontal convolution, the anterior part of the fornicatus and the uncus are apparently healthy in appearance.

The only portions of the brain that did not show this curious atrophy, were the orbital portions of the frontal lobes, the anterior part of superior frontal convolutions, the anterior part of gyrus fornicatus, superior and middle temporal convolutions, opercular portion of the left hemisphere, the convolutions of the island of Reil and both uncii. At the points of the greatest atrophy in the cortex there was a process showing a motheaten appearance and some speculation as to the causation of this widespread atrophy might be interesting.

Those who are well acquainted with the anatomy of the cerebral arteries will know how closely the healthy portions of the brain are related to certain regions of arterial blood supply. The anterior part of the superior frontal convolution, a larger part of gyrus fornicatus, a part of paracentralis and precuneus, gyrus rectus and the bulbus and the tractus olfactorius remained relatively healthy in this case. These portions of the brain are a zone nourished by the anterior cerebral artery. This artery suffered much less from the pathological processes than the other large arteries, *i. e.*, the middle cerebral and the posterior cerebral arteries. The other healthy portions of the cortex were all located in the course of the middle cerebral. Each healthy portion was closely associated to certain branches of this artery. The uncus and the island are nourished by special arterial branches, according to Duret. The superior and middle temporal convolutions are supplied by the fourth branch of the middle cerebral artery. Though the opercular portion and the supramarginal convolution belong to regions of other branches, they are all in the neighborhood of the above mentioned healthy parts and this condition can readily be understood by an assumption of anastomosis.

Although the atrophy of the convolutions seem to correspond to certain regions of arterial supply, the alteration of the brain is so peculiar that at first it was difficult to associate the disease with an arteriosclerotic process.

Vertical sections of the brain were made according to Dalton's method.

The cut surfaces showed atrophy of the cortex corresponding to the atrophic convolutions. In the highly atrophic parts, the surface of the cortex presented a motheaten appearance. The width of the cortex over the atrophic parts was noticeably narrow. Where the atrophy was pronounced the markings of the cortex and the medulla had entirely disappeared. The lateral ventricles were somewhat dilated. The centrum semiovale seemed to be atrophied on both sides, and was smaller than normal so that the entire cut surface of the vertex appeared strikingly smaller than that of the basilar portion. The corpus callosum seemed almost thinner than normal.

In the left hemisphere there was an old hemorrhage, occupying the head of the striate nucleus, internal capsule, globus pallidus and puta-

men, extending from the cut surface "through the corpus callosum and lenticular nuclei, and in front of the anterior commissure" (Dalton's ventral section, Plate VI) to the cut surface "through the corpus callosum, optic thalamus and crura cerebri" (Dalton's ventral section, Plate X). This hemorrhage destroyed the knee and the larger part of the crus posterior of the internal capsule which is supplied by the lenticulo-striate artery. This artery is considered to be the most common seat of arterio hemorrhage in the brain. There was no history of cerebral hemorrhage in this case, however, her inability to walk, the exaggerated knee reflex, the ankle clonus of the right side and the claw-like position of the hands indicate a hemorrhage, previous to the admission.

The cut surface of the parietal and occipital lobes show congestion of the vessels both in the gray and the white matter. There were also tiny hemorrhagic areas in the white matter around the posterior horn of the lateral ventricles.

Where the atrophy of the parietal convolutions was most marked there were areas of softening.

The systematic atrophy of the convolutions, the hemorrhage and the softenings point to arteriosclerotic brain disease. The question is, is this curious atrophy so extreme in character, so universal in distention due to arteriosclerosis, only? or are there other diseases which show such atrophy? Wassermann reaction being negative both in the blood and spinal fluid, these changes do not correspond to general paralysis. The patient was 48 years old at the onset of the diseases and it could hardly be a senile atrophy.

Microscopical Examination

The Cerebrum.—Sections derived from several convolutions of both hemispheres were stained by thionin, Bielschowski's method of silver impregnation, Mallory's glia method, Weigert Pal's modification for myelin-sheath staining, Sudan III, Marchi method, hematoxylin-eosin staining, Van Gieson's method and Dabrowski's modification of Mann's method for demonstrating perivascular connective tissue. Although the cornu ammonis, Heschl's transverse convolution and anterior part of frontal convolution appeared relatively healthy, the atrophic parts showed a peculiar process of degeneration.

This peculiar process of degeneration although appearing in various forms of alteration, seemed to be related to the diseased vessels. The pia mater was irregularly thickened over the posterior part of the brain and over the cerebellum it was adherent to the cortex by brush-like glia fibers which arose from the surface of the cortex where the glia fibers were thickly interwoven. The vessels of the pia mater were sclerotic, partly calcified and partly degenerated. Fat corpuscle cells were seen around these vessels.

In atrophic parts the surface glia layer was remarkably thickened. Spider cells with large protoplasmatic body and thick fibers were numerous. The body of these spider cells contained fat corpuscles which stained both by the Sudan and Marchi methods.

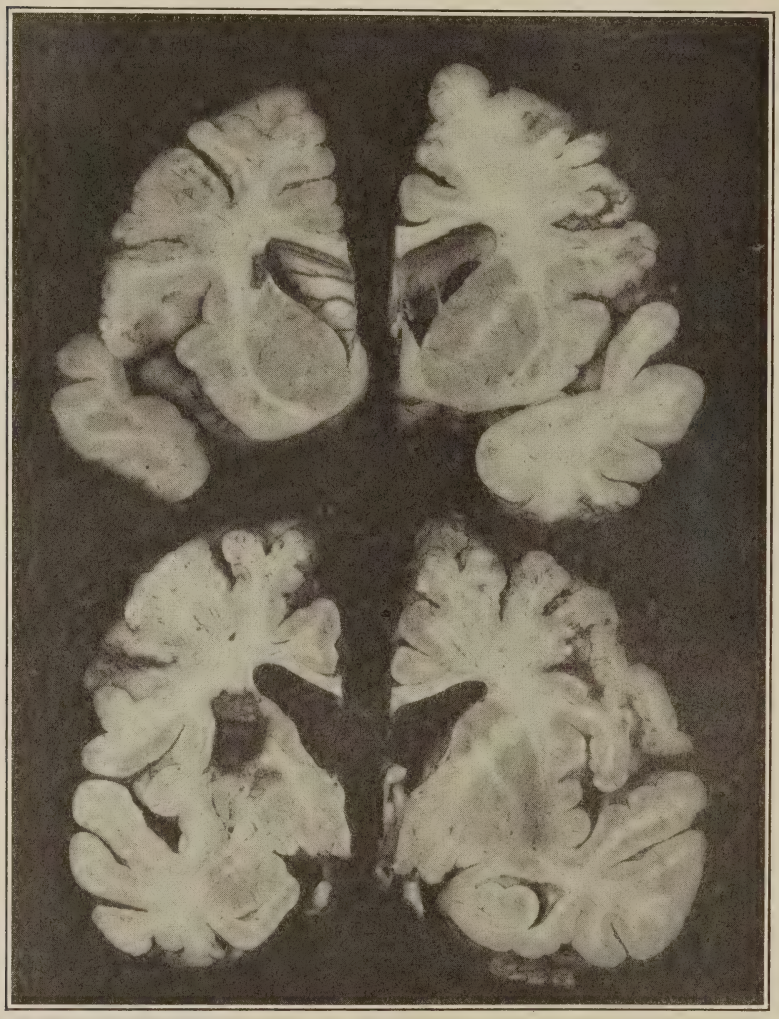

FIG. 7. The cut surface of the brain, showing contrast between atrophic and healthy convolutions and the hemorrhage of the internal capsule.

The degeneration of the cortex was not uniform but varied in its appearance. It could be divided roughly into four forms.

1. *Cystic Degeneration of the Cortex* (Fig. 8 and Fig. 9).—There

were a large number of small cystic areas immediately under the glial surface. Most of them were triangular or wedge-shaped, while others were quadrangular or irregular, but in all cases the base or the broader part of the cyst was against the surface. The smaller number of these cystic areas were, however, situated in the deeper part of the cortex, generally under the valley between two convolutions. These cysts

FIG. 8. The cystic degeneration of the cortex. Paraffin section. Hematoxylin-eosin staining.

were surrounded by a luxuriant growth of glia cells and glia fibers. The inside of the cyst was not of empty space but was occupied by net-like structure. This structure was made of capillaries, perivascular connective tissue, glia fibers and a small number of cellular elements. The cells were glia cells and fat corpuscle cells, the protoplasm of

which contained waste products which were stained brownish red by Sudan, a muddy color by the Marchi method and metachromatic by methylen blue. The cysts were under the glial surface which was densely interwoven by newly formed, thick fibers, but in certain parts of the cortex was connected with the subarachnoidal space (Fig. 8).

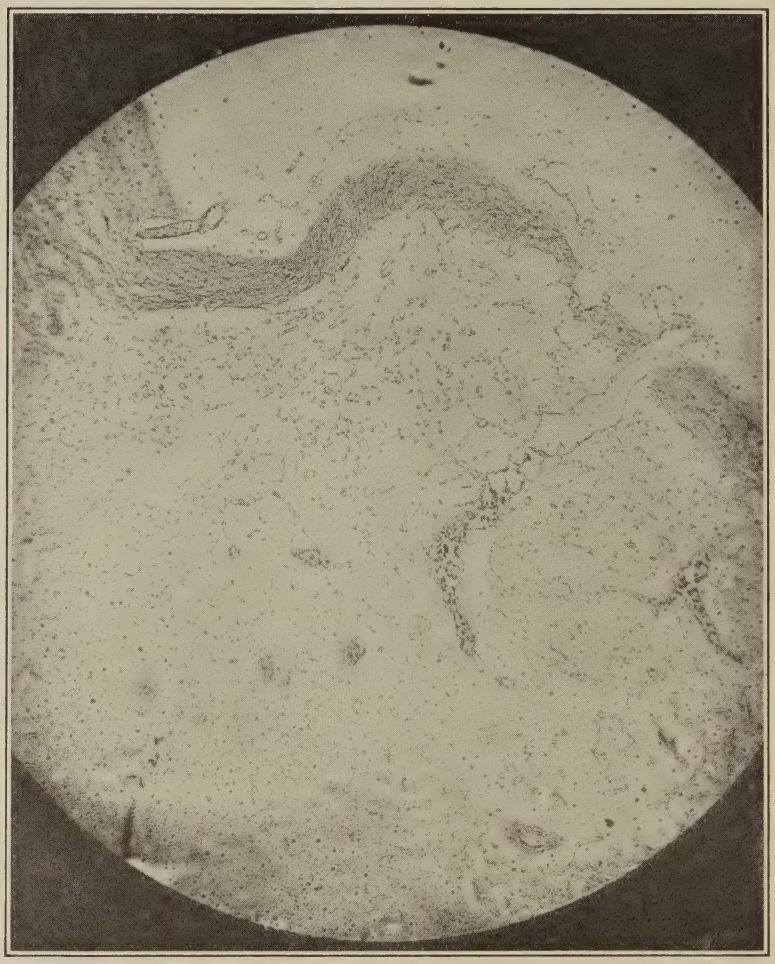

FIG. 9 "Spongiöser Rindenschwund." Mallory's glia staining. Paraffin section.

This latter condition is the same as described by Pierre Marie as "etat vermoulu" and reported as such by Rossbach in a case of arteriosclerosis. The cystic cavity with net formation corresponds to the second stage of the "spongioeser Rindenschwund" which was described by Fischer. But in his case the areas of spongy degeneration were

situated mostly corresponding to certain cell layers of the cortex and were not absolutely associated with the sclerotic vessels. In the present case vessels of the pia mater and those of the inside and the direct neighborhood of the cysts show marked sclerosis and arterio-fibrosis. The characteristic localization and specific form of the cysts in this case are also different from Fischer's "spongioeser Rindenschwund." But as the "spongioeser Rindenschwund" is the name given to a certain appearance of the degeneration and is not the name of a specific disease, there is no reason why this term should not apply in the present case.

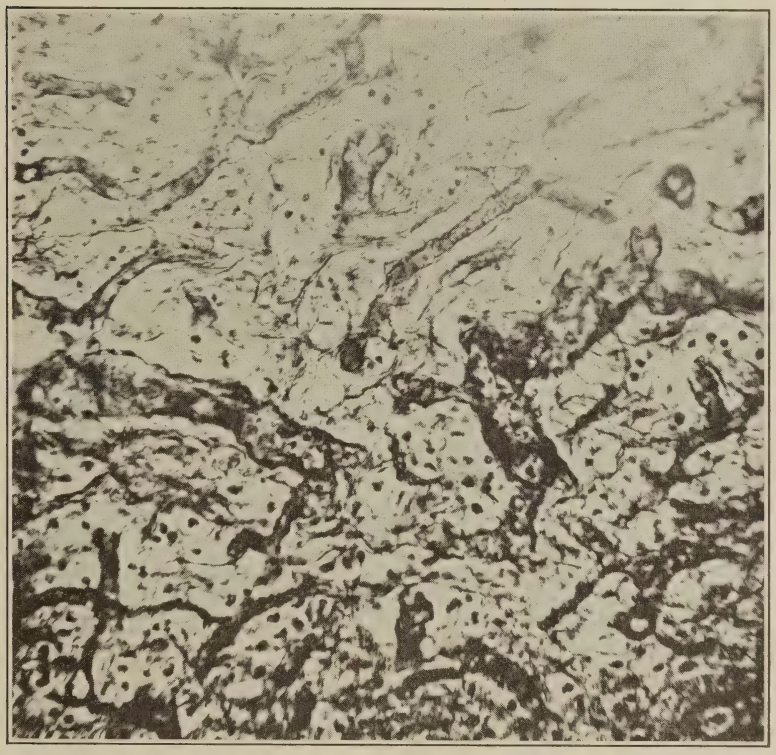

FIG. 10. The packet formation of the vessels. Bielschowsky's silver impregnation method.

2. *Packet Formation of the Vessels* (Fig. 10).—Accompanying the arteriosclerosis of the larger vessels of the brain, the microscopic examination showed a remarkable alteration in the smaller vessels of the cortex, such as proliferative elements, fatty degeneration of the adventitia, splitting of the elastica and arterio-fibrosis of Friedmann. These smaller vessels showed here and there packet formation, usually in the upper part of the cortex and including the first, second and third

layers of Brodmann but rarely extending down to the white matter. The surface of the cortex over these areas was sunken below the normal level, as was the case of the cyst formation. In the focus of the packet formation the nerve cells and myelin sheath have entirely dis-

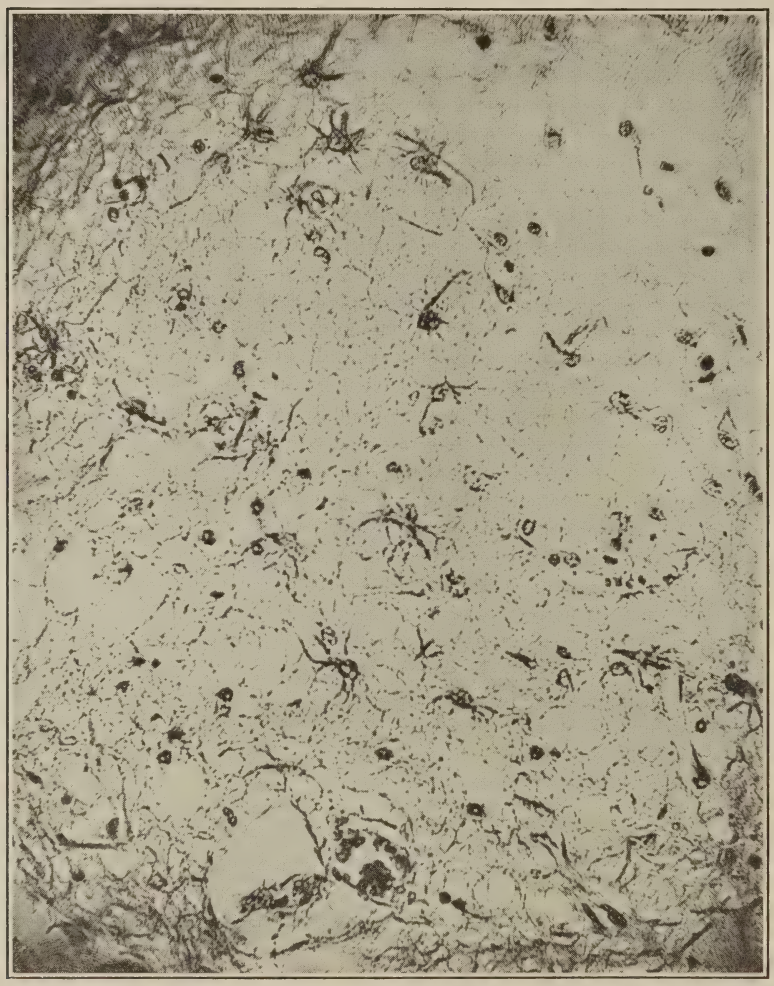

FIG. 11. The scar tissue formation. Frozen section. Weigert's glia method.

appeared and instead of these, the place is occupied by proliferated larger and smaller vessels with connective tissue elements which consisted of glia fibers and perivascular connective tissue fibers. This kind of change is not described in the cases of Rossbach and Schob or Fischer. The packet formation could hardly be seen, as the relative increase of the vessels in consequence of the atrophy of the nerve elements.

3. *Scar Tissue Formation* (Fig. 11).—This variety of alteration was also found in the cortex where the surface was sunken below the normal level. The form of the scar tissue was usually wedge-shaped and was situated principally in the upper layers of the cortex and perpendicularly to the surface. But some of these were further down in the cortex or even in the white matter but were always situated according to the course of the vessels. The scar tissue was formed by increased vessels, glia cells and fibers. The glia cells were spider cells having large protoplasmic bodies and thick fibers. The protoplasmic bodies contained waste products. The thick fibers of the glia formed a network which was denser around the vessels than any other parts and gave a characteristic spongy appearance. This condition corresponds exactly to the third stage of Fischer's "spongioeser Rindenschwund." This scar tissue was found side by side with cystic areas suggesting the same etiological factor. Yet the former seems to take place where the wasting of the brain matter is not complete enough to allow regeneration of the glia tissue.

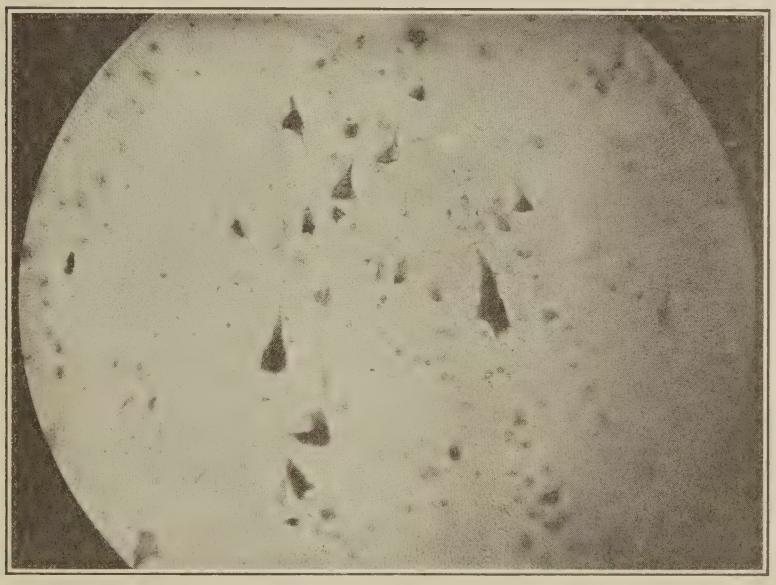

FIG. 12. The cell island in the atrophic part of the cortex showing sclerotic changes. Paraffin section stained by thionin.

4. *Changes Pertaining to Ganglion Cells* (Fig. 12).—Excepting the general changes of the ganglion cells which consisted mostly in sclerosis and granular changes, there were small circumscribed areas where the ganglion cells had entirely disappeared. By thionin staining this condition was plainly observed. The cells about these areas showed marked

fatty degeneration combined with sclerotic changes. Fat corpuscle cells and increased numbers of glia cells were seen inside and around the focus. The ganglion cells of the healthy parts were relatively in good condition, so at Hescl's transverse convolution, cornu ammonis and

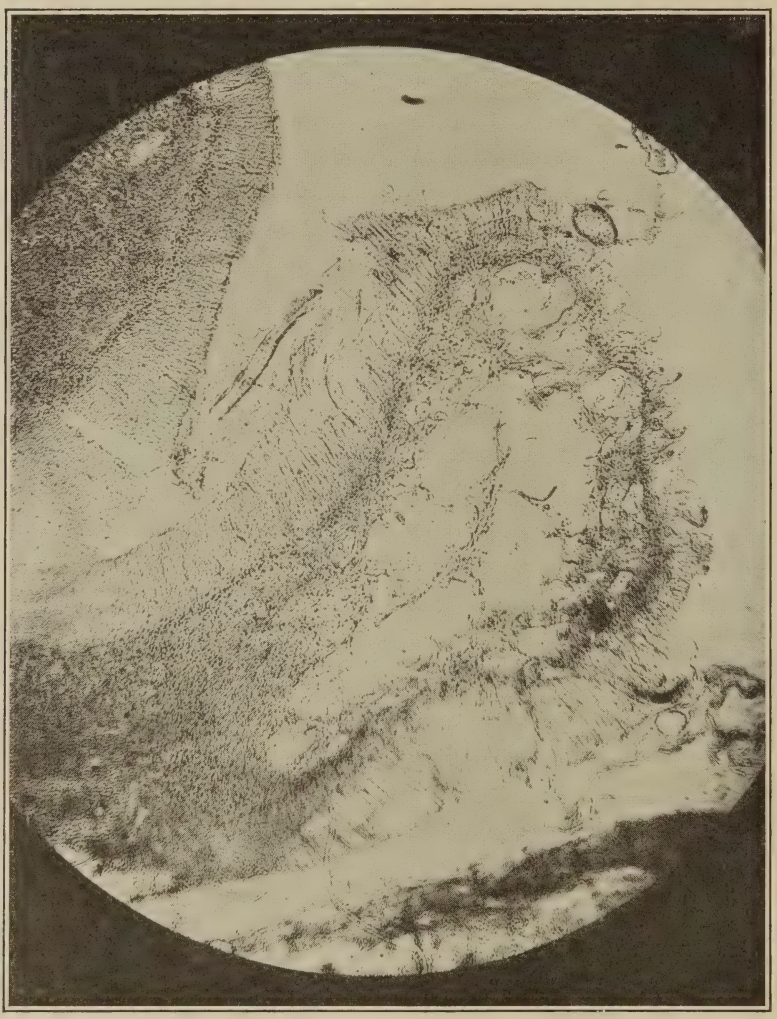

FIG. 13. The cyst formation in a lamella of the cerebellum. Paraffin section. Mallory's glia method.

orbital part and anterior part of the superior frontal convolution. Betz's cells had partly disappeared and partly remained with more or less marked degeneration. The posterior central convolutions and parietal convolutions were most heavily damaged.

The myelin sheath showed a secondary degeneration running from the degenerated parts down to the white matter and also perivascular degeneration according to the course of the long medullary vessels.

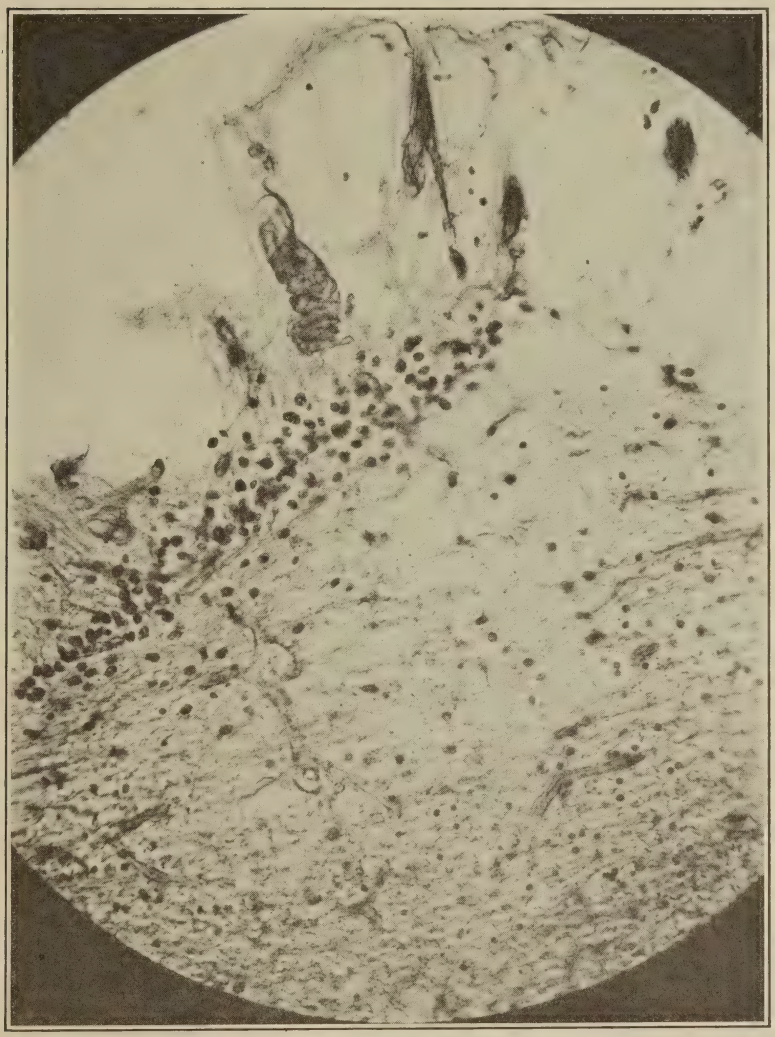

FIG. 14. The scar formation in the granular layer, the cyst formation in the molecular layer and arterio-fibrosis of the vessels. Bielschowsky's method.

There was perivascular gliosis in the white matter as well as in the cortex, but there was no perivascular infiltration of lymphocytes or plasma cells as is the case in a chronic inflammatory process.

The Cerebellum.—Pieces were taken from several parts of the worm

and hemispheres and examined by the same staining methods as for the cerebrum. The lamellæ of the lobulus quadrangularis and superior lobulus seminularis were found most atrophied. Alterations in the

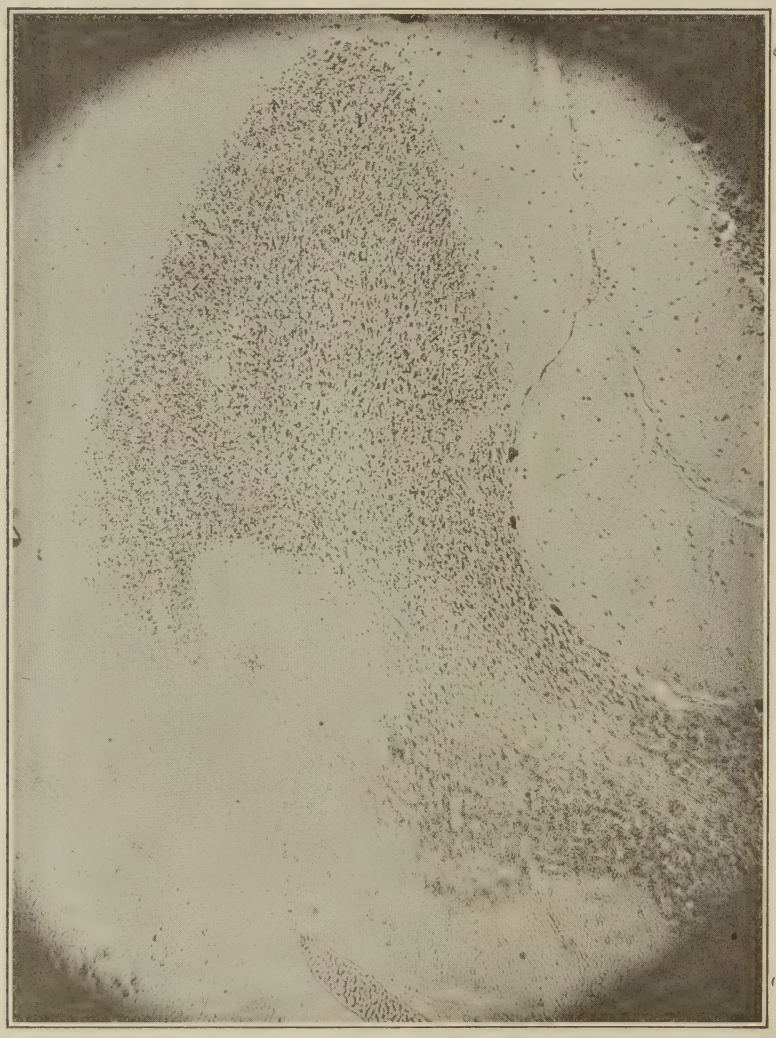

Fig. 15. Disappearance of the Purkinje cells and the ganglion cells of the granular layer. Thionin staining.

cerebellum differed a great deal in appearance. The most marked and extreme one was the cyst formation (Fig. 13). These cysts were located principally in the molecular layer but also in the granular layer

and in the medulla. They were not particularly wedge-shaped but rather of irregular form and were found usually in the summit of the lamellæ. The inside of the cysts were not empty but showed a very peculiar appearance. Where the cysts lay in the molecular layer the nerve elements were entirely gone, and the remains of Bergmann's fibers running across the molecular layer reaching the thickened glial surface, gave a remarkable resemblance to a slat fence. When the cysts were in the granular layer they formed a loose network of glia fibers with very few cellular elements. They had the same appearance as the cysts in the cerebrum. The glia fibers around these cysts were thinner and denser than those in the cerebrum and the cell elements in the glial wall were not as numerous as in the cerebrum. The cell body contained fewer waste products. These conditions indicate that the degeneration of the cerebellum had taken place probably more or less earlier than in the cerebrum.

The next remarkable change was the scar-formation which was however somewhat different from that of the cerebrum. The molecular layer, where the scar was formed, was very much narrower than the healthy part, and showed no more nerve elements, such as tangential fibers, basket fibers, basket cells and dendrites of Purkinje cells. The glia fibers grew densely in this place in the form of Bergmann's fibers, *i. e.,* running in parallel order, perpendicularly to the surface and further into the pia mater in the form of a brush. The scar formation in the granular layer and medulla was practically the same as found in the cerebrum except that the glia fibers were thinner and more densely interwoven.

The third kind of alternation was the disappearance of the cell element, especially Purkinje cells and the small round ganglion cells of the granular layer (Fig. 15). In the highly degenerated parts no Purkinje cells were observed. The degeneration of the ganglion cells of the granular layer was found focally, as is seen by illustration.

The smaller vessels of the cortex were as sclerotic as those of the cerebrum. In general, the Purkinje cells were more or less sclerotic; the cell body was emaciated; the endocellular and epicellular network was not well defined; by thionin staining the protoplasm and nucleus stained dark showed no Nissl's bodies; dendrites had for the greater part disappeared. The axis cylinder of Purkinje cells was thickened; in certain parts, mostly in the neighborhood of the cyst formation or scar formation, the peculiar swelling of the axon was observed. Fatty degeneration of the Purkinje cell were not marked, except in those near the degenerated focus. Fat corpuscles were found around the thickened vessels in the Purkinje cell layer and around the area of disappearance of the nerve elements.

Spinal Cord.—By myeline-sheath staining, the left anterior pyramidal tract and the left lateral pyramidal tract were stained considerably

paler than in any other places. The glia fibers seemed to be increased in these areas, but no lipoid matter, either by Sudan III or by the Marchi method, could be demonstrated. The secondary change resulting from cerebral hemorrhage, should, therefore, be considered fairly old as the lipoid matter had been completely resolved and had permitted the glia tissue to grow in its place. Abundant amyloid corpuscles were found about the posterior root and in the degenerated pyramidal tracts.

Comment

The patient began to fail seven or eight years ago and could not do her work as well as she formerly did. She complained of constant headache, which gradually became more severe, especially during the past year. At this time her mental condition became much worse; memory was very much impaired; she became demented, disoriented, showed stereotyped conversation and echolalia. Physical examination revealed irregular, unequal pupils, which reacted very slowly to light and not at all to accommodation. She also showed exaggerated knee jerks, ankle clonus of the right side, tremor of the hands, tongue and lips, impaired stereognostic sense and disturbance of tactile appreciation. Her speech was retarded, slurring and at times showed elision of whole syllables. Although there is no history of any dizzy spells or hemorrhage, she has been unable to walk for the past year and at the time of her admission she was not even able to stand. The hands, especially the right, showed a claw-like contraction and there was beginning gangrene of the fingers and toes at the time of her death.

The whole history, physical and mental examination show, therefore, much likeness to general paralysis with focal symptoms, *i.e.*, the Lissauer's paralysis. But the course of the disease is perhaps a little too long for the general paralysis and the negative Wassermann of blood and spinal fluid are also against the presumption of this diagnosis. So the case was left undiagnosed, being probably a case of cerebral tumor, because of the constantly increasing headache and more or less conspicuous focal symptoms.

Autopsy showed sclerosis of the coronary vessels, beginning sclerosis of the aorta, cirrhosis of the liver, chronic perioöphoritis, chronic diffuse nephritis, etc. The brain was found extremely atrophic and at the point of greatest atrophy there was evident a process resembling motheaten result in the cortex. A careful examination indicated that the atrophy of the convolutions was intimately related to the sclerotic brain arteries which occurred mostly in the basilar, posterior and middle cerebral arteries. In addition

to small areas of softening, there was an old hemorrhage occupying the internal capsule of the left side. So this curious atrophy of the brain seemed to be related to arteriosclerosis of cerebral vessels.

The microscopical examination showed arteriosclerosis, especially of small vessels of cortex, such as proliferative changes in endothelium, regressive processes in proliferated elements, fatty degeneration of adventitia, splitting of elastica and marked arteriofibrosis. The degenerative process of the cortex which seems to be a result of arteriosclerosis, was exactly the same as described by Fischer as "spongioeser Rindenschwund." He observed this special alteration of the brain, most commonly in general paralysis and less so in senile dementia, tabes and presenile psychosis. He assumed it to be an independent specific disease due to some unknown toxic agent. He divided this alteration into three different stages: first, disappearance of the ganglion cells in circumscribed areas; second, loosening of the tissue of these areas, and third, growth of the glia fibers in the loosened tissue. He took also great pains to explain that this kind of alteration has nothing to do with the sclerotic vessels. But the "spongioeser Rindenschwund" is the name given to a certain appearance of the degeneration and not to etiological factors or symptoms of the disease, so that we could reasonably apply this term in the present case. In fact, Alzheimer reported a peculiar degeneration of the brain due to arteriosclerosis and in which the histological findings were described as "spongioeser Rindenschwund."

In the present case the alteration is divided into four different forms. I do not mean that they are different stages of one and the same process, as were explained by Fischer, although they are found side by side in the same convolution. They must, at least in this case, depend upon the occlusion of the vessels. If this occlusion is sudden and complete, a cystic cavity may be formed, showing a reactive growth of neuroglia on its peripheral portion. If on the other hand the occluding is slow and progressive, it might show various stages of reactive growth of neuroglia and removing process of the wasted products, according to the grades of the destruction. In the same way the budding of the vessels or the packet formation in the different parts of the same convolution might be explained.

The brain alteration due to arteriosclerosis, as was already mentioned in the introduction, may have occurred in various ways. But the spongy degeneration of the cortex is one of the rarest findings of this nature. So far as I have been able to find, the case of Schob

(1911) and the case of Alzheimer (1913) have been the only two which have been reported as such. The former was not described as spongy degeneration, but the findings are almost exactly the same as Alzheimer's and this case should readily be classified into this form. Strictly speaking, his case showed also the condition which was called by Pierre Marie "etat vermoulu" and was described as such in a case of arteriosclerotic brain degeneration by Rossbach. "Etat vermoulu" and "spongioeser Rindenschwund" due to arteriosclerosis are considered as the same process, the former involving the surface of the cortex, the latter somewhat deeper part, *i.e.,* beneath the glial surface.

The clinical symptoms of the two reported cases were similar to the present case, that is, general paralysis with more or less apparent focal symptoms. In Schob's case the patient was 26 years of age at the onset of the disease and showed progressive dementia, marked disturbance of speech and handwriting, disturbance of gait and later epileptiform seizures. The patient died at the age of forty-one. In Alzheimer's case the patient was 55 years of age when he showed the first symptoms, which consisted of loss of memory, stereotyped conversation, disturbance of speech such as stumble of syllables and scanning speech, amnestic aphasia, handwriting with many paragraphs, retarded pupillary reaction. exaggerated knee reflex, etc. This patient died at the age of 60. In both of these cases Wassermann's reaction in the blood serum was positive, while the reaction in the spinal fluid was negative. Schob's case was diagnosed as a demented form of general paralysis, while Alzheimer's case was diagnosed general paralysis or presenile dementia. But in both of these cases the negative findings of the spinal fluid made the diagnosis very uncertain.

The question is: why should the arteriosclerotic psychosis not have been considered in these cases as well as in the present one? Are there no characteristic symptoms which would lead one to suspect an arteriosclerotic process?

Let us first consider what symptoms may be attributed to arteriosclerosis. According to Alzheimer the onset of the disease is usually in the sixth decade. In the beginning there are headaches, dizziness, loss of memory, listlessness, irritability, and later more and more increasing dementia, which requires a longer period of time to develop than in the case of general paralysis. Active symptoms of mental disturbances such as delusions and hallucinations are always transitory in character and are not even frequent in this form. One of the most remarkable symptoms is the insight into the

condition which is kept even in the later stages. Loss of accommodation to light, disturbances of speech, handwriting and gait, tremor of the hands, lips and tongue and other symptoms are described as less common.

In the present case, the headaches in the beginning of the disease, which constantly became worse, loss of memory, gradually increasing dementia, listlessness and irritability are quite typical of cerebral arteriosclerosis. The relatively young age of the patient (40 years at the onset of the disease), stereotyped conversation, echolalia, disturbances of speech, slow reaction of pupils to the light, tremor of the hands, lips and tongue, impaired stereognostic sense, disturbance of tactile appreciation, etc., are rather unusual for arteriosclerosis, if not absolutely against it. Disturbance of gait especially with ankle clonus of one side and the claw-like position of the hand, especially of the right, would rather point more to hemorrhage than tumor. Insight was absent when she was admitted and the history is not accurate enough to judge on this point, previous to her admission. The case is very similar to the two cases reported by Rossbach and Alzheimer.

But in this case and perhaps in Rossbach's case, the relatively younger age of the patient and the normal blood pressure would account for the diagnosis being made without the consideration of arteriosclerosis. Sclerosis of the cerebral arteries, as is well known, is not always parallel with that of the peripheral arteries. Advanced arteriosclerotic changes may be present in the vessels of the brain when the condition is not marked in the radial arteries. The gangrene of the fingers and toes must signify circulatory disturbance of the peripheral arteries. At the autopsy the coronaries showed sclerotic changes, the aorta very slight change, but all of these suggest only beginning arteriosclerosis. So it may be impossible to judge the condition of the cerebral arteries by the condition of those of the peripheral arteries or even by the blood pressure. This makes accurate diagnosis in arteriosclerotic condition of the cerebral arteries very difficult and at times impossible.

In the reported cases and in the present case the disease occurred at a relatively young age and lasted for many years—Rossbach's case fifteen years, Alzheimer's case five years, and the present case seven to eight years.

The etiology of arteriosclerosis occurring in the cerebral arteries of relatively young persons is very obscure and cannot be explained. In the two reported cases the Wassermann reaction of the blood serum was positive, but the sclerotic changes of the arteries were

quite different from those as a result of syphilis. The microscopical examination of the thyroid, ovaries and other organs of internal secretion, which are sometimes supposed to be the cause of the early occurrence of senility, showed nothing to account for the arteriosclerotic changes.

Finally we have to explain the correlation between the clinical symptoms and the anatomical findings. The reader may have already recognized the striking similarity of the process of destruction in this case and those already reported to that of general paralysis. The progressive and extreme wasting of the brain in this case must have given the same clinical features as in cases of general paralysis. The disturbance of the speech, the tremor of the hands, lips and tongue, the dementia, the diminution of tactile appreciation, can all be attributed to the extreme degeneration of the areas of the cortex, which are associated with these functions. The ankle clonus of the right side and the claw-like position of the right hand must be the effect of the hemorrhage in the knee and anterior two thirds of the crus posterior of the internal capsule.

Conclusion

1. The presented case is one which showed clinically paralytic symptoms, but with a negative Wassermann's reaction both in the blood and spinal fluid.

2. Constantly increasing headaches and focal symptoms made one suspect brain tumor.

3. By autopsy the brain was found extremely atrophic, giving a motheaten appearance.

4. Major arteries of the brain were found markedly sclerotic.

5. The microscopic examination revealed a peculiar alteration of the cortex, which is called by Fischer "spongioeser Rindenschwund." (The writer attributes this peculiar alteration to the result of malnutrition caused by sclerotic brain arteries.)

6. An old hemorrhage was found in the left internal capsule, which also points to the arteriosclerotic nature of this peculiar atrophy.

7. The paralytic symptoms are believed to be the expression of the progressive and profound wasting of the cortex, which resembles the wasting process of general paralysis.

8. As for the etiology of the sclerosis of the brain arteries the writer is not able to give any satisfactory explanation.

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THE SYMBOL AS AN ENERGY CONTAINER: A PRELIMINARY STATEMENT[1]

By Smith Ely Jelliffe, M.D.

Modern thought and modern investigation are forcing us into a concept of energy in its relation to the human individual which is beyond complete comprehension. That is, the whole idea of it is beyond the grasp of any one man, its unexplored ocean is too vast and too minutely filled with fact for its exploration by any single investigator. At the best each worker must trim his own little airship and set forth on some particular current and search there for the details of life, health, effort, power, in short of human dynamics. In medicine alone there are many such pathways. One may pursue some definite nerve tracts with this energy concept in mind, another the interrelations of the somatic pathways in their general physiological functioning, the attention of another may follow more fully the psychical relations of any or many of these. Each such current pursued will yield untold revelations in regard to the story of the capture, transformation and release of energy by which human life no less than any other form of life proceeds. And these currents will cross and yield of their interest the one to the other and draw the one from the other so that the complexity of the interchange of energy as well as the added power and interest thus obtained for life, resulting in ever increasing opportunity, will gradually come to be appreciated.

As we really press into this subject in the future it must mean an intensive interest upon every detail. Some of these facts we begin to sense and many are yet to be discovered, which make these pathways in the unmeasured ocean of human interests and human existence vibrant and teeming with the energy process.[2]

The theory of the Brownian movements was hardly the beginning of the story. Our current phrases of the measure of human energy in terms of calories, or force of gravity, or atmospheric pressure are but the few chips, which broke from the workman's initial blow when he first dreamed of penetrating the fastnesses of

[1] Read at Forty-fifth Annual Meeting American Neurological Association, Atlantic City, June 16, 17, 18, 1919.

[2] Osborn, H. F., Origin and Evolution of Life, 1917.

the mountain interior where the heat and energy of centuries lay buried. Only here we are coming to no buried slumbering material. While we have slept or begun to look with the scarcely opened eyes of a timid, untutored intellect the process has gone on in all its detail; in all its power, yet with defects and limitations which it should be the labor of this intellect in the future to clear away.

One pathway at a time is enough on which to attempt to point out something of the unseen but ceaseless capture, transformation and release of energy and the effort, now foiled and disturbing, now successful and health-producing, which has gone on in the individual and in the human race.

The present discussion would follow that of speech and the dynamic power of the word symbolism. Energy containers, energy carriers have had to be prepared all along the way of progress. Energy was there in light, heat, gravity, chemisms, motion, inertia (for the sake of discussion some things have to be assumed without further argument),[3] then somehow elements were grouped together under the action of these forces so that life as we know it was formed. This life had certain properties in its constitution which made it dependent upon the energy about it and which gave it the power of taking hold at once of this energy. Life, however, is marked chiefly by the quality of growth in extension and intensification. This determined its pathway of action toward the energy about it. It must not only seize the energy through its protoplasmic structure, transform it there and then put it forth, in this very process and as either cause or effect of its power of growth it must unceasingly devise new means, new carriers for all three processes upon energy. It must obtain more from the universe around it, this increasing amount of energy must be more completely handled, this action upon it must force new pathways of discharge and the cycle begins again with further expansion. Therefore in the course of ages these transformers of energy, human machines devised various means of intercommunication, which in its elaborated human form we call speech.

Not all at once could life's necessity arrive at the marvelous power and variety and effectiveness of language as it is used to-day, nor energy find itself in such highly extended and perfected yet plastic form. A long road had to be pursued, a mechanical pathway laid down and established with all the experimental caution and exactitude, and safeguarded by all the apparent and practical fixity which are the admiration and wonder of the neuroanatomist of

[3] Schiller, F. C. S., Riddles of the Sphinx, 1912.

to-day. Yet in this security, this apparent fixity of the work of ages what is actually taking place? What took place there while the pathways for sound production and for sound reception were prepared? The process is one and the same, an unending dynamic movement. The chemistry and physics of protoplasm are ceaselessly at work and always have been. They have reached out after the energy which spread around, they have seized it, stored it and transformed it and sent it forth and in so doing have enlarged the capacity for these selfsame processes, so that the world steadily gives greater opportunity to the human being, his capacity grows, his psychic hunger and need too, and his need for more perfection and for clearer understanding in this energy process in which he is engaged.

Thus the perfected mechanism of speech and hearing were prepared and over this passed and passes in activity another factor which the chemical and physical properties of protoplasm took to themselves as an aid and it might be said as a reward. A psychic element entered somewhere, at the start it would seem, which was the reaction upon the acting protoplasm of this energy process with which it was occupied. This inevitably became then a stimulating factor and with increasing complexity of form and function it grew to the immeasurable extent of feeling reaction and fresh stimulus, which to-day is the *desire of the individual as a whole*. The combined series of tropisms of the human machine, coördinated throughout by the entire nervous system in its adaptation to the herd. It has far outstripped its predecessors and must be recognized by neurology and psychiatry to-day, or more broadly by all who study human effort, as the chief of energy agents. Protoplasmic chemistry and physics must serve the larger purpose of the psychic in the seizure, transformation and fresh release of energy.[4]

Its part in the establishment and fashioning of speech and hearing pathways must be largely conjectured.[5] Its share in the present use of these, its involvement in any disturbance of these, its satisfaction and the power that accrues from this in the successful and increasing use of them is a large part of our study. Sometimes this is obvious. Wagner is the recognized master of sound as expressed through the poetic word and through divinest harmonies of music. Yet he says that he was a poet first and when he began his work music as a form of expression was to him like an unaccustomed language which he had only acquired. It was not his mother tongue.

[4] Ritter, The Organism as a Whole, 1919.

[5] Ariëns Kappers, Location of Nuclei of Midbrain. Jour. Nervous and Mental Disease, 1919.

But so well did it and it alone express what must supplement the message of his speech that he learned it more thoroughly, made it more completely his and it became to him the language, he says, in which he thought and felt and through which his feeling found adequate expression. To speak in our energy terms, his psychic interest reached out for further expression and stimulated him consciously to find and prepare new pathways for wider outpouring, wider effect upon humanity; and the psychic interest, which was his innate love for music, formed itself into energy pathways which time is proving inexhaustible.

So is it in a less marked degree with all speech and language. Not consciously but unconsciously man has made words, with the aid of his prehuman ancestor, no doubt, because he has felt though not understood the necessity for a larger and wider self expression. Not that alone, but he has come to this need of a larger expression because first there was the constantly increasing need for more capture of energy, more work upon it within himself and then followed the giving of it out. In all this the sound apparatus, through hearing and sound production, were playing their part and building up a most important and extensible group of energy pathways, that of the more vague, less definable area of music and free sound expression and the more definite but still immeasurable one of speech.

That which makes this fact in the realm of all three of the greatest psychic importance is the kinetic value contained. This exists, perhaps to a slight degree, in an imitative sense in sound, more subtly in music, but most definitely kinetisized in the realm of speech and language. It is this that gives these latter their wide and peculiar power and it is in the symbolism which language represents that we must seek for the real psychic meaning and value. For the symbol is just this from the energic point of view. It is in its turn the simple container of energy. The history and development of desire and its striving through growing ages of cultures shows continually how it overflows any container or pathway by which it may be expressed. So the symbol must be that which in the course of time comes to express the first direct chemicophysical needs, the more complex organic wants which have grown out of these and far more the social reactions. This is the interpretation in feeling and the further desire that arises in it and sweeps the gamut of human experience from the lowest reactive sensation, through all the range of more primitive passions and their concrete expression on up into the most remote resymbolizations of human intellectual thought with its ever present emotional accompaniment.

Now it is well known that this cannot all become conscious. Conscious awareness could not attend to all this at once even as it might appear in one line of action. The various cultural psychic layers, layers which constitute the individual mind are too numerous and far reaching and the physical accompaniment or basis of sensation and activity which would accompany all these would be too vast. Besides they are for the most part too inacceptable to the cultural standard which exists at the top. Yet they cry for expression by the force and vitality which they preserve within themselves no less than because of the multiplicity of stimuli which constantly call them forth through our fellow beings and other objects of the external world. We may not paint, we may not dance nor write, we may not shout nor sing nor speak with all or with a large part of the feeling we would express. Not only the feeling, but, to a great extent, the idea which accompanies it, and which would represent it in expression, is more than inacceptable to our own cultural selves as well as to the society in which we move. Yet, on the other hand, as psychoses and psychoneuroses are forcibly revealing, this cannot be safely repressed. The individual is in danger of being overthrown by the force of the "fires which in me burn" and beside this a large portion of the power and force of the individual's life may go unused in a world which needs every bit of his expenditure.

Just here the human brain built up its own great remedy, its own great healthy compromise in the symbol. The symbol in act, in decorative art, in religious custom, in sound but most elaborately and extensively in speech and language has been prepared and is still being prepared and modified with the changes and evolutions of life to perform this great service. It forms the great means, particularly in this latter form of language, whereby the hidden and obscure desire with its idea is touched and its energy secured while it still covers and obscures the actual meaning of these, so that the higher cultural standard is satisfied and has found its own full representation. For language is no static thing. Even while it is in the mouth of the last speaker or under the pen of the writer it must take its color and force from his mental life. In this life intellect plays an alert but most delimited part, that of guiding and selecting and arranging the vast horde of feeling "pressing against the portals which would fain leave it outside." Each word lives and breathes anew then as it passes into action and this means that it performs its physiological function as symbols. In this way it stretches the tentacles of thought and feeling out toward the external world for its energy store, through this it restrains and contains this energy while

it digests and assimilates and transforms it into usable form. Through it it reaches forth again with a satisfaction of expenditure which could come so thoroughly and effectively in no other way. Through it it has poured that energy over into a form which the other objects of the world can and will take for further transformation. A definite creation has taken place, the chief and only really satisfying act of life, and through it a contribution has been made to the process which we have called evolution.

Furthermore this has taken place through a means which has satisfied the various levels of interest without offending any others, a task absolutely impossible with the unlimited gradations of human interest and human desire except through a symbol. For concisely the symbol may be defined again. It is that tool, admirably exemplified in the word, which gathers into itself the feeling and idea from many or all levels of human desire. It so lightly and suggestively expresses them that expression is unwittingly given to those which are hidden and emphasis is laid upon those which are obvious and permitted so that they in turn serve both to obscure and to suggest the others. It is not in the form of the word alone, nor in its definite conscious meaning, nor in its history, nor in any of its characteristics that this symbolic capacity exclusively lies. It is not in the motor expression of the word, though this together with the sight and form of the letters are all factors which give it value, as a means of expression. This is shown by dream analysis as well as by phonetic and orthographic peculiarities. It is all of these and a great deal more. It meets admirably the requirement of the feeling life which has built up the psychic part of the organism—and probably brought about the evolution of intellect to be its guide and control at the top. Feeling and intellect seek always that larger expression, that larger capacity. No other pathway which the organism provides is sufficient. The somatic falls far short. Even the psyche through its feeling and intellect is continually confronted and hounded by the necessity for increasing capacity, the urge to take more, use more, give more, which makes the drive of life. Men and women do not grow sick from this, never from too great energy drive, though plenty of warnings from well-meaning friends surround the busy energy-handling individual. They only do not understand what we have all been slow to understand, that it is only the blocking of the pathways, the hindrance to this innate urge, which is life itself, that causes disturbance and suffering and overthrow. Such blind busybodies would often check the use of the symbol. They fear its possible meaning if one of its obscure facets

peeps through. They are horrorstruck if the blocked impulse has pushed such a facet forcibly into the light, as when for example the failure of repression has sometime forced the symbolic word to turn over and its more primitive meaning has come uppermost, as often has happened in the formation of a neurosis.

No; energy only demands more outlets as well as more inlets and life responding to the stimuli from without and within seeks to discover and to create these and so establishes its power more and more. And so as feeling and intellect, the two divisions of psychic life, find the pathways through the chemistry and the physics of protoplasm too narrow, the organic vital activities inadequate, they must extend their capacity and power through a superkinetic agent, the symbol. The symbol becomes the great energy container, and the great comprehensive device of discharge back to the world outside.

This is repeated that it may be more definitely applied to the language symbol. There is a relative trend toward fixity about language and without this the linguistic symbol would fail of its great value. It must be able to grasp and hold fast much meaning which pertains to ages which lie behind, to possibilities which lie far ahead, and to the limitless territory of the present-day intercommunication. Yet this fixity must be to a large extent only apparent, for the word is the tool of a constantly fluctuating life. Not only must it represent the distinctive use by each individual at each different moment of employment, but it must remain fluid to catch and even to a certain extent to mold into a permanent form the gradual change of social interest and culture. Language is therefore a container of what has been, it is also the suggestive and plastic symbol of what may be. The language symbol has therefore a most important part to play in revealing through its study how much desire, its feeling and idea, have been stored up within it, how much energy expression of the past it contains, how much this is still seeking activity and therefore often causing disturbance through lack of understanding of it. It has also an important function in our carving of our way into the future.

Every word then as a symbol contains in its history in fullest measure "a monograph on the cultural history of mankind," as Mauthner has said. He has been quoted at the beginning of a study of the word "symbol" itself, a study to be found in Schlesinger's "Geschichte des Symbols," and which affords excellent illustration of the symbolic nature of a word in its history in the energic sense in which a symbol has just been defined. Here as everywhere in

the search for beginnings which lie far back in the past one cannot be on perfectly sure ground in regard to all details and much must be omitted as unknown. Some things, however, are indisputable and to these belong the variety of meanings and usages gathered into this particular word, its various forms of feeling expression as it grows over into other words. The study reveals the long history of the word and its wanderings of meaning through the ever changing panorama of human experience and human necessity and desire. It is evident also that the word passes from a more distinctly concrete usage, more clearly related to the simpler physical activities which first occupy man, and then extends itself very gradually, with great variety and gradation of meaning to various indirect meanings. These gradualy grow more abstract but never lose a physical definiteness which breaks out again and again into new shades of concrete meaning, which then again pass into more abstract ideas. Thus it serves excellently to illustrate the meaning we have given to the symbol as the energy vehicle of the past and as containing an inexhaustible capacity as such for the present and the future. As a symbol this word symbol, in the presentation it here receives, is richly suggestive of the many more things which it contains in its symbolic function than those which are outlined in the discussion. Dream analysis and the continually richer wealth of hidden meaning, which a word is there found to contain, stimulate speculation as to how much more fully a complete monograph of this word would have to be written if its symbolism were really exhausted.

The word symbol was simple in its beginning and in its simplicity expressed a common but fundamental physical activity. Its progenitors are the Greek root *bal,* to throw, and the prefix *syn,* together. *Bal* is perhaps traceable to an older *gal,* to drop down, to pour forth. Both of these roots have passed under many forms into various tongues, carrying their original meaning and adding to it as they go down through the years, and altering so that their offspring contain a richly suggestive or symbolic inheritance. It is interesting to note how the original idea of throwing together maintains itself and repeats itself as it returns in some new usage, and with added affective elements. It can be followed in an interesting evolution through a direct reference to the separating and meeting again of friends where the actual physical materials of recognition, such as the halves of a disk or a ring, were the tokens of recognition and received the name of *symbola* as their designation. This idea extends itself into the widely developed principle and custom of guest friendship with all its significance. When the character falls

below the cultural level of the love feast the word is taken to carry on the acceptable idea contained in the assembling together, the banquet.

It denotes very early the confluence of streams and if it may be related in its root to *gal* the original word is found again in a quite separate form but still with the idea of union, or perhaps the result of union. This is in the English well and the German word *quelle,* source, fountain, with their corresponding verb forms. Another sensuous course which the word has pursued lies in its dialectic use, to weave or plait, a fact which gives it close association with the commonly found sexual connection with the idea of nets and plaiting and the like. This use of it appears so far back in the word's history that Schlesinger asks: "Was there in general a kind of work which was practiced earlier than plaiting or weaving, which in earliest times surpassed that in importance, the production and the products of which were constantly before men's eyes? The joining together, winding one into the other, the binding together of the material, is the most essential part of this handicraft and a nimble plaiter appears to move the twigs or straw, rushes, fibers or hair so rapidly that it might in all justice be called throwing them together, that is, *symballein* and the work *symbole.* In this way the original concrete meaning of *symbole* might be given as the uniting of different parts into a whole, which first appeared quite as a sense perception before the eyes in the plaited work." When we consider the many more primitive concrete activities which the savage mind consciously compared to the sexual act and its results, such for example as the worldwide production of fire, is it difficult to suppose that this earlier more important work might have been sexual procreation itself which would have stood forth with the utmost importance?

At any rate if we may accept this on the basis of primitive lore and the testimony of the unconscious through psychoanalysis, we have but a most instructive example of the gradual climbing of a word in its symbolic character up through various concrete physical grades over into its more abstract and advancing cultural meanings, while it retains the force and interest which gives it its lasting and comprehensive value as a symbol. Perhaps no word illustrates so well as this same symbol the extensive territory in thought and feeling which one single word may cover in its journeyings and its transformations. It is found later widely in use in the Christian religion and has come there to stand for the highest religious sublimations and aspirations, yet without losing its reference more or less distinct to its original sensuous concrete character. How in fact may a

word ever lose such reference, since the highest thought process is never independent of its accompanying physical activity and sensations. "Human thinking," says Mauthner again, "which after all is only a hardly perceptible human physical action" (ein leises menschliches Handeln).

Psychoanalytic literature is full of the actual unconscious content of the symbol, that which gives it one side of its energic value. The importance of this cannot be overestimated for the understanding of the inner life that is seeking expression, of the disturbances which follow upon incomplete or unsatisfactory expression. It is equally important for the correct valuation and cultivation of all forms of cultural expression and the continual use of human speech in such unfolding as well as in all ordinary intercourse. Equal emphasis must be laid, however, upon the other side of symbolism and the dynamic significance of this. It contains in abundant and active measure what Maeder and others have called the prospective or preparing function of the dream. Dacien, quoted by Schlesinger, calls the symbol the "cradle of morality," and Glatz (also from Schlesinger) says that its great cultural service lies in the fact that under favorable conditions it may itself further the communal feeling. The examples given of our word symbol would certainly support this latter statement at least, nor could its moral influence be omitted.

It would be well, however, to inquire more definitely what this may mean. Is not this again because as a symbol a word is able to carry with it the vital contact it has had with life at all its stages of development and opportunity? It represents earlier opportunity for simpler and more direct gratification and then the later stages of repression when the force of the desire could still, however, escape to a certain extent under some later guise of the word, and so the word, always close to desire whether gratified or not, obtains a force it would otherwise be without. The word crystal, as it were, contains the very heart of the human impulse like a limpid imprisoned drop, but has added to it also the later accretions of accepted and then discarded cultural standards and through these all there is yet an effulgence, a shimmering force which glows also round about the outer surface of the crystal, radiating upon the present and future and drawing these to its still vital and vitalizing symbolic self. To borrow Bergson's words, "it concentrates in its indivisibility all that has been perceived and what the present is adding to it besides."

Moreover, it is always reaching out toward the environment of the present, through the present into the future. Thus it builds the communal feeling, thus it cradles and nurtures morality. There is

no tool which the unconscious mind of man, later assisted by the guidance of conscious intellect, has so well devised as this of human speech. There is no more flexible, more concentrated and powerful, no more universally adaptable form of symbol than that which language supplies. Therefore there is no more complete and active energy container. It touches through its use the physical activity and sensory gratification of sound producing and sound receiving pathways. It invites the participation with these of other sensory and motor areas. In its far greater comprehensiveness of psychic response and memory it represents all the varieties of motor activity and sense perceptions of the past. It represents them in their most basic physicochemical forms, in the vital organic activities which may come consciously and permitted into activity to-day or may have fallen under the social ban and so be relegated only to the sphere of memory, even unconscious memory, and of ungratified desire. It includes all the psychic interpretation which may represent only discarded standards and permissions of the past, or those which rise to demand greater consideration and opportunity than conscious thought is able at present to give them. It adds to all these the tendency and trend of human desire toward higher and greater things, so that it prepares a better way for the solution of the unsatisfied unconscious cravings and powers and at the same time directs this tendency and force of desire along new and inspiring pathways, teaching the deeper nature even to alter the character of its desires and strivings after attainment. The word symbol, therefore, cradles all of the past and search must be made carefully and minutely and patiently to find and understand it. It contains in it all the possibilities of the future in its expansion and constant revaluation both of human capability and of the environment where this finds its opportunity. In its past the word symbolism reveals the story of the capture, transformation and release of energy and contains its lessons and its revelations for understanding the complexities of the present and the opportunities of the future. In its own present capacities and future opportunities it is at once the container and the efficient tool for the expression of human life and for the nourishing, stimulating and putting forth of its creative activity. The symbolism of the word is an index of humanity which no historian and no practical psychologist can fail to read and to apply.

64 West 56th St., New York.

Society Proceedings

PHILADELPHIA NEUROLOGICAL SOCIETY

Regular Meeting, April 25, 1919

The President, Dr. James Hendrie Lloyd, in the Chair

BRACHIAL PLEXUS INJURY. INNER CORD

Dr. Chas. S. Potts presented the case of a soldier wounded in July, 1918, by a machine-gun bullet which entered two inches below the clavicle on the right side about three inches in from the shoulder joint. Complete paralysis ensued and there was a slight lung injury causing hemoptypsis. There was also a causalgia lasting about ten weeks when with the disappearance of the pain the motor functions began to improve as well. This improvement continued for another month and then became stationary until March of the ensuing year when the following consideration was observed.

Loss of ability to flex the index finger, weakness of the flexion at the wrist and partial palsy of all of the intrinsic muscles of the hand. There was atrophy and reaction of degeneration of the muscles supplied by the median and ulnar nerves. Pressure, pain, tactile and temperature loss is present on both surfaces of the hand in the middle ring and little fingers in the positions noted for injury of the inner cord of the plexus, due usually to adhesions or cicatrices rather to complete severance.

PERIPHERAL NERVE INJURIES

Drs. G. E. Price, H. O. Feiss and W. B. Terhune gave in detail some of their observations on injuries of the peripheral nerves occurring in Red Cross military hospital No. 1 in France which opened September 4, 1914, with 60 beds. This soon increased to 650 and after July, 1917, grew to 2,000 beds. The greater number of patients were French at the beginning but the ratio was later reversed. Some 857 histories of peripheral nerve injuries are analyzed, with records of 205 reparative nerve operations, of which 151 were followed for at least six months. These may be tabulated as follows:

Cervical sympathetic 3, optic 1, oculomotor 2, facial 16, vagus 1, spinal accessory 2, hypoglossal 1—making of the cranial nerve a total of 23. The brachial plexus was wounded in 60 cases, as follows: complete 5,

partial 51, brachial and cervical 2, brachial and cervical sympathetic 2. The upper extremity gave the following: Circumflex 11, musculospiral 198, median 55, ulnar 150, musculocutaneous 1, more than one nerve 95, three nerves 41, four nerves 4, 555 in all. There were 216 wounds in the nerves of the lower extremities distributed as follows: Lumbosacral plexus 1, sciatic 116, internal popliteal 19, external popliteal 61, anterior crural 14, external cutaneous 1, two nerves 4. Thus the musculospiral was oftenest involved, next the ulna, then the sciatic. The external popliteal twice as frequently as the internal popliteal. As to the results of operations many discrepancies are to be expected in the reports. In general repairs should be done early, at the time of the original injury if possible. The general conclusions they arrived at were [for original paper see Am. Arch. Neur. and Psych., Vol. 1, p. 547]: (1) The musculospiral nerve is most frequently injured. (2) Following operation this and the sciatic nerve make the best recoveries in about the same proportions. (3) The condition of the nerve as determined by touch and sight is usually worse than the neurological findings would seem to indicate. (4) In case of doubt whether to liberate, excise or suture, excise and suture. (5) Neurological surgeons should be stationed near the front and primary repair carried out if possible. (6) Free use of a part aids in its functional repair. (7) The greater the respect shown to nerve tissues the better will be the result. The principle of nerve fasciculus anastomosis should be followed out.

HAND AND ARM MOVEMENTS IN PERIPHERAL NERVE INJURIES

Dr. A. H. Woods described some deceptive hand and arm movements following nerve injuries and emphasized the importance of careful scrutiny of the motor function of the arms which might show substitution movements of a perplexing character. Some of the most striking of these movements were (1) A peculiar and evident elastic jerky rebound in a joint on the same side as the paralyzed muscles which being overstretched by the antagonist muscles are the more readily pulled back by the soft tissues of the side of the paralyzed muscles. (2) Certain inert muscles become tense or tight and thus cause movements due to other forces than their own innervation. Thus in musculospiral palsies the flexing of the digits causes a retraction of the wrist, the wrist extensors really being paralyzed. (3) In ulnar palsies of the interossei the musculospiral innervated muscles may bring about imitative motions of these ulnar innervations. (4) In loss of pronation due to median palsy a movement of the extensors of musculospiral innervation will cause the arm to partially pronate and the weight of the arm may complete the pronation thus masking the median palsy.

IMPACT CONTUSIONS AND NERVE-TISSUE INJURY

Dr. W. B. Cadwallader presented this interesting subject with illustrative cases tending to show how very extensive nerve tissue injuries may result from impact devitalization without actual penetration of the brain, cord or peripheral nerves. In his first case the patient had a depressed fracture from a non-penetrating blow. There was hemiplegia and unconsciousness. Operation showed intact dura and no obvious injury to the brain but on autopsy a large area of softening was found without any evidences of direct injury. In a second case a machine-bullet lacerated the scalp and grazed the vertex, passing across from right to left. The patient became unconscious and paraplegic with the typical signs of an organic paraplegia, with some foot drop and other flaccid signs. The lesion was assumed to be in the paracentral lobules of both sides and the X-ray examination revealed no definite skull injury. Case three was a severe intraspinal lesion from a machine-bullet wound which did not penetrate the bone and was located against the vertebræ. There resulted however impact concussion and paraplegia and later death which autopsy showed was accompanied by swollen and softened cord tissues which on macroscopical inspection resembled the well-known impast contusion and softening. Another case report was given of similar injuries occurring on peripheral nerves. Here impact contusions can produce similar softenings without the nerve itself being involved in the injury directly. A number of interesting points along these lines was brought out by the speaker allying his work with that of older as well as more modern observers who have emphasized the importance of the same situation.

NEUROPSYCHIATRIC PROBLEMS AT THE FRONT

Dr. J. H. W. Rhein, major serving in the A. E. F., called attention to certain features among the American troops which he thought were sufficiently different from those reported as occurring among other soldiers to merit record. Hysterical manifestations seemed frequent among the English tommies while the officers seemed to show anxiety states more in evidence, whereas a large number of anxiety states seemed to be present with both soldiers and officers among the American troops. Hysterical manifestations seemed to be much less frequent, and few marked conversion hysterias were observed. Excessive fear reactions when handled promptly by removing from the front lines and treated by common sense measures with food rest and reassurance, passed away and nearly 70 per cent. returned to the front line within two weeks. Evacuation to the rear and consequent psychic contagion seemed to be most responsible for the major hysterical developments as well as the more fixed neuroses. They congregated in the base hospitals where they picked up new symptoms from the milieu. Shelling was the most im-

portant single traumatic factor. The symptoms developed without there being any direct evidence of injury. Family history studies showed a 50 per cent. prevalence only.

SPINAL FLUID IN PRIMARY AND SECONDARY SYPHILIS

Dr. J. McIver presented the results of his studies of 91 patients with primary or secondary syphilis and the spinal fluid findings accompanying these stages in the syphilitic process. His investigation was undertaken chiefly to determine the reliability of cerebrospinal fluid tests by the usual laboratory methods, Wassermann test reaction, determination of protein and cell count. The subjects of his tests were patients who manifested lesions all the way from early chancre to a faint secondary rash or in a few cases were already well past the second stage. There had been only a little previous treatment in some of the cases a comparatively small proportion of the cases. A blood Wassermann was taken first to decide whether the cerebrospinal test should be undertaken. The cell count in the fluid test ranged from 9 to 17 cells per cubic millimeter. This was considered as of only partial significance, for increase of cells may be due to a number of cases.

The protein test was negative in every case except two and these showed only slight increase. One of these was in the chancre stage and the other had had syphilis for two years without treatment. The Wassermann reaction was positive in only two instances, patients of four and six years respectively, with very little treatment. The speaker concluded that the increase in protein content manifests itself later than that of the lymphocytes. He believes that the examination of cerebrospinal fluid in florid cases of syphilis is not a conclusive test of the probability of involvement of the central nervous system.

WAR NEUROSES

Colonel Samuel Leopold briefly opened a discussion upon war neuroses of which he had had some 200 cases at one station. There was some hysteria among these which he found responded easily to treatment. Other cases he characterized as fright or terror cases with exhaustion and as these did not respond so well he believed that these might represent a potential or incipient neurosis. Fifty per cent. of all the cases made a very quick recovery and returned to the front.

Major T. H. Weisenburg spoke from a particularly close and protracted association with the men such as was afforded by residence at the General Hospital at Plattsburg Barracks and from a later experience at Base Hospital No. 1 in New York City. The clinical manifestations at Plattsburg were hysterical, neurasthenic and anxiety forms of neuroses and of those which have been termed intractable hysterics.

The first group came mainly from camps in this country, the second group included those men who had been abroad but not in the fighting, except that officers from the combat line presented also anxiety types. The other combat patients were largely of the intractable hysteric type. These neuroses all proved themselves very amenable to cure and this was largely aided by the psychic attitude created around them through the medical officers and their aids. It was an interesting fact that the patients lost their susceptibility to suggestions of new symptoms after the armistice went into effect.

In the hospital in New York Major Weisenburg's work lay principally in the field of the peripheral nerve injuries. One most noticeable feature in these cases was the substitution of the action of the healthy muscles for the loss of action of those paralyzed. He used the condenser apparatus instead of the faradic or galvanic batteries because by it the amount of current necessary for nerve or muscle could be better measured. He learned by experience that exploratory operation was a justifiable procedure when progress toward recovery was prevented or delayed.

Lieut. George Wilson reported from his experiences in France that 75 per cent. of the psychoneurotic cases which he saw if kept as far as possible in a nearby hospital could return to their posts in ten days. The last few weeks of the war such cases were few, either as he suggests, because already weeded out or from the different aspect of things.

Col. Wayne Babcock reported a large operative experience on something over 200 patients at Ft. McPherson, Georgia. There was surgical exploration of about 260 nerves of which the greater number were sutured and the remainder were subjected to neurolysis. The former treatment triumphed still more over the latter as time went on. At least the sutured cases seemed so far more promising. Suturing was tried with certain neuromas in continuity with physiological interruption where paralysis had not yielded to neurolysis and massage. There had been an interesting mapping out of nerve courses in exposed trunks by the electric current. Also some interesting facts were discovered in regard to the correspondence between the localized area of the lesion and the partial nerve palsy resulting. It was found also that extensive gaps could be bridged so that an end suture could be made. This could be accomplished by the displacement of the nerve from its normal location, by flexion or extension of adjacent joints, by adding an appreciable measure of slack to the cords by position, such as adduction of the arm, and by the normal slack and elasticity of nerve trunks. One case was observed in which an extensive laceration and subsequent suture had elongated so that three months later additional 10 cm. and 6 cm. could be excised repeatedly from the median and ulnar nerves and an end-to-end apposition be secured with suture. Rapidity of healing of nerves was demonstrated on a patient who had torn the sutures

apart accidentally but in whom union had quickly taken place while the nerve was supported by the adhering muscles.

Major K. W. Ney reported upon head surgery at evacuation hospitals or in mobile units. The operations were performed after as careful an exploration as circumstances allowed. Local anesthesia was used preferably even when general anesthesia had to be given for treatment of other wounds. First the scalp wound was completely excised. Then the bone injury was also completely removed. The injured brain portion was removed by the aid of the patient, who increased the intracranial pressure by blowing against his lips or coughing. Drainage was never employed but the dura was sutured whenever possible and the cranial opening was covered by scalp. The chief aim was to prevent fatal infection and the result of this complete manner of operation brought the mortality from infection to 10 per cent. There was marked benefit derived in some cases also from preoperative neurological difficulties, this being at times quite astonishing and unexpected.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

Regular Meeting, April 17, 1919

Dr. George A. Waterman, President, in the Chair

CONDITIONED REFLEXES AND PSYCHOANALYSIS

Dr. Donald Gregg spoke of the conditioned reflex of Pavlov and expressed the opinion, already a formulation principle, that psychoanalysis was a study of the mechanisms of the origins of such reactions. He then set to work to destroy a straw bogey of his own manufacture relative to what he called the "glamour and mysticism" of subconscious buried complexes. He asked whether psychoanalysis should not be the effort to have patients understand their mental life in terms of the mechanism which produces the excessive or bizarre reactions which mark the neurotic. The physician himself he thinks should be more clear and simple in his understanding of these as artificially conditioned reflexes in the interests of the impulse of self preservation.

But in his statement that psychoneurotic individuals are those who are sensitive to slight emotional stimuli and to stimuli from all sources, which leads to the establishment of emotional reflexes, and thus to a great variety of reactions, he fails to see the deeper and more comprehensive duty of psychoanalysis to help the patient to go deeper into the reason for such an emotional sensitiveness and reactivity or as psychoanalysis would put it, to touch the deepest emotional content and to help the patient from this center out to make these reactions useful ones and

so the establishment of well-conditioned reflexes. This would necessarily have to lead deeper than Dr. Gregg seemed to be looking, namely into the region of buried complexes for reflexes that have not been conditioned entirely nor chiefly in the open.

A CASE OF CEREBRAL HEMORRHAGE

Dr. E. E. Southard presented photographs of a brain from a case with a history of influenza and a mental lethargy a possible lethargic encephalitis. Localized and diffuse hemorrhages were evident with many polynuclear leukocytes grouped around the meningeal vessels. From the histological point of view it was possible that there was both a hemorrhagic and inflammatory condition.

ENCEPHALITIS LETHARGICA

Dr. C. B. McDonald concluded from a study of eleven cases of encephalitis as well as from a study of the literature that practically at least a Von Econimo's disease entity, such as that established, could be accepted, that of encephalitis lethargica. Dr. McDonald described one case at length and then made a study of symptomatology, pathology and etiology of the cases in groups. Lethargy was present in a variable degree in all cases. In some it was associated with delirium. Each case showed very evidently cranial nerve involvement with the lethargy. There was involvement of the pons, bulb, basal ganglion and spinal cord in some cases. In seven the spinal showed normal variation. Fever was present in each one. Two patients had died.

Like other authors Dr. McDonald saw evidences of increased vascularity in the congestion of the vessels, small punctate hemorrhages and engorged veins where there was no meningitis. No definite organism was found. The disease was considered in its possible relation to infantile paralysis, meningitis and botulism. Its infectious origin is unknown, but it follows infectious epidemics, generally known as influenza.

Dr. E. B. Lane questioned whether this lethargy was continuous or intermittent. He himself had had one case which presented several attacks, the last of which had proved fatal. A case of general paresis had been seen by him which the family declared to have developed after influenza.

Dr. W. E. Paul reported a case of over fifteen weeks' duration with a steady temperature of 101° F. for six weeks.

Dr. F. J. Farnell had seen a large number of varying types of infectious encephalitis at the Providence City Hospital. Somnolence of a week's duration was the only symptom in one case which had improved under the treatment. The Wassermann reaction was positive, and treatment brought about improvement. A child admitted with chickenpox

and lethargy developed blindness two weeks later and afterward mumps and scarlet fever and a cerebral hemorrhage with hemiplegia.

Dr. George A. Waterman mentioned several severe cases of myelitis occurring from one to three weeks after influenza, three cases of which were of the poliomyelitis type. He called attention to the uncertainty as to what might be called postinfluenzal.

Dr. E. W. Taylor agreed that lethargy should be regarded as a separate disease entity or perhaps they should be grouped as encephalitis of varying types according to the symptoms which they most prominently display. Some cases show a marked lethargy, some are perhaps associated with infantile paralysis, some of toxic origin and some are parkinsonian.

Dr. McDonald remarked upon a case of six weeks' duration, but literature mentioned one of nearly three months. Some of the cases proved on continued study not to be true cases of encephalitis lethargica.

Current Literature

I. VISCERAL NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

Dana, H. A. Blood Pressure. [J. A. M. A., May 17, 1919.]

In the examination of a large number of candidates for commissions, largely medical men, and after making allowances for the effects of travel, nervousness from being examined, change of routine, diet, etc., the author was struck with the frequency with which one meets with familial hypertension. Such a condition, he says, of continued elevated systolic pressure in which most members of particular families share seems to have no tendency to cause invalidism or to shorten life. Indeed, it seemed that many such individuals with a sustained hypertension continued to have better than normal health and that the high pressure, if not actually the cause of this, went hand in hand with it. He mentions one physician, six feet tall and weighing 190 pounds, who at forty-eight years of age had a constant systolic pressure of from 190 to 200 with a diastolic pressure from 110 to 120. This physician said that his father, then eighty years of age, was strong and active in spite of having had for years a systolic pressure around 200. This officer showed a negative urine, normal heart, no thickening of peripheral arteries, and normal eye fundus. The family might be considered free from serious organic disease. There is another type presenting abnormal familial tension, in which the hypertension is compensatory for renal or arterial disease. Under this general head come cases of men of 50 years or over, whose blood pressure has assumed a probably normal and physiologic elevation. From his experience, he is unwilling to concede that a high blood pressure, say of 200 mm., necessarily means any of the evil things usually credited to it. Proof is still lacking that the hypertension is necessarily the cause of pathologic conditions in these persons which may carry them off after seventy-five or eighty years—the body is not immortal. He asks why it is that a considerable proportion of men with sclerosis of peripheral blood vessels have a normal blood pressure, and that a like proportion of hypertension cases, there are soft radial arteries. Are we not putting too much weight on the occasional coincidence of hypertension and arteriosclerosis? Dana argues that the systolic blood pressure is maintained by vasoconstricting substances in the circulating blood, and that these

are either toxic substances or excessive secretion from certain ductless glands. He supports this by several arguments and facts, such as the benefit of epinephrin in some cases of severe bronchial asthma, in which there may be a deficient secretion of vasoconstricting substances. With regard to the diastolic pressure we are still more in the dark. He holds that it does not necessarily indicate myocardiac weakness. To his mind the ratio 2:3 for the diastolic and systolic pressure respectively should be maintained in the normal heart regardless of the rise and fall of blood pressure. The more he studies the subject the less inclined he is to be sure of any of the accepted interpretations. His conclusions are summed up as follows: " (1) It is believed that increased systolic blood pressures indicate the presence in the circulating blood either of unexcreted putrefactive products absorbed from the intestine, from the kidneys, from focal infections in the dental alveoli, the nasal sinuses, the tonsils, the genito-urinary tract, or of secretions in abnormal amounts from the glands of internal secretion. (2) It is believed that, in some cases at least, a lowered systolic blood pressure indicates a defective secretion of pressor substances, or an increased secretion of depressor substances by the ductless glands. (3) It is believed that the diastolic pressure, when it fails to conform to its normal ratio with the systolic pressure, is also influenced by abnormal products of metabolism or by abnormal amounts of ductless gland secretion in the blood stream. (4) It is not believed that either the systolic or the diastolic blood pressure gives any certain indication as to the condition of the cardiovascular renal system as such; and that when changes in the vascular system are accompanied by hypertension, neither condition is secondary to the other, both being held to be secondary to the presence of unexcreted toxic products of metabolism in the circulating blood."

Pagniez, Vallery-Radot et Nast. Migraine Prophylaxis. [Presse Mèd., April 3, 1919.]

These authors first lament about the relative hopelessness of a prophylaxis of sick headaches and then, presto, they have it. Peptone injections. The disease they first claim to be of alimentary origin, hence find the offending protein work an anaphylactic. They report 5 cases of migraine, the first of which is in part as follows: The patient naturally sound but of a migrainous family and affected by myopia and astigmatism had suffered from migraine since the age of 10 years and was now 34. However, at the age of 20 he had obtained notable improvement by going upon a vegetarian diet. At 31 he went back to a protein regimen and at once suffered in the original degree and worse, a *status hemicranicus* developing at one time. The vegetarian diet seemed to have lost its efficacy. In addition he began to suffer from indigestion and constipation, which apparently had originally been absent. Upon a theory based upon sensitiveness to foreign protein the authors began

to give the patient small doses of peptone, having learned that in giant urticaria of enteric or food origin this principle is of value. The result was startling, for half a gram before meals during the intervals produced an almost abortive effect. After virtual freedom for some weeks the peptone was suspended and the migraine returned, but in a mild type. Six months later, however, the affection became more severe and the peptone was resumed for a short time. When it was again withdrawn the patient not only remained free but was able to eat freely of meat and eggs. The small doses of protein had apparently removed an anaphylactic tendency, or in other words, were anaphylactic. Of the other 4 cases cited all were of the same type dating from early years, severe and inveterate, unresponsive to treatment and with a tendency to indigestion. All were benefited in the same manner by peptone.

Danysz, J. Anaphylactic Skin, Gastro-Intestinal and Nervous Disturbances. [Paris Mèd., April 26, 1919. Jl. Am. Med. Assoc.]

Danysz remarks that bacteriologists and clinicians are still at variance as to whether immunity and anaphylaxis are the result of reactions of a different or similar nature. He here reports some recent experiments and clinical experiences which throw more light on the nature and consequences of these reactions, and their bearing on certain digestive, cutaneous and nervous disturbances. The difference between the reaction to repeated injection of a toxin (anaphylaxis), and the reaction to repeated injection of any other antigen (immunity), is due he explains, to whether the mixture of toxin and antitoxin forms a precipitate or persists clear. If there is a precipitate and if the antigen was a virulent microbe, the reaction will be manifested both by immunity and by anaphylaxis; by anaphylaxis alone if the antigen is an albuminoid food substance. If no precipitate forms, the reaction will be manifested by antitoxic immunity without any phenomena of anaphylaxis.

He explains further that the production of antibodies in excess of what is needed is liable not only to fatigue the cells, but the continuous production of an excessive amount of antibodies may induce various chronic morbid conditions, digestive or respiratory disturbances, dermatoses, "rheumatism," etc. These various disturbances can be arrested only by checking the excessive production of antibodies which is keeping up a chronic anaphylaxis. This can be accomplished by the same means which abort an attack of acute anaphylaxis, namely, by Besredka's method of a preliminary injection of a minute dose of the antigen which in a larger dose would unleash the anaphylactic crisis. The same result can be realized by ingestion of a strong dose of alcohol or ether (Roux and Besredka); by ingestion of a small amount of peptone (Pagniez and Vallery-Radot); or by injection of a vasoconstricting drug (epinephrin, Milian). These reactions are not specific, but they

answer the purpose, and the symptoms of chronic anaphylaxis can be cured by the same mechanism of injection or ingestion of nonspecific antigens.

In practical application of this principle, Danysz has treated 159 patients, including 103 with various gastro-intestinal disturbances, 2 with persisting neurasthenic insomnia, 9 with painful menstruation, 8 with asthma, 15 with psoriasis, 10 with other dermatoses and 12 epileptics. The antigen used in treatment was an emulsion made from the bacteria in the patient's stool or a similar hetero-emulsion. The intestinal flora in the pathologic cases always included bacilli that fermented saccharose and lactose, bacteria liquefying gelatin, and certain varieties of streptococci, diplococci and enterococci, so that Danysz recognized a uniform flora, as it were, and he found that the heteropreparations were usually as efficient as those of autogenous origin. Only in the cases of painful menstruation some patients proved refractory to the hetero-antigen but yielded at once to the auto-antigen. The benefit in epilepsy was always pronounced. One boy of 9 who had been having several seizures a day has had no return of them during the eight months to date. The doses were always small, never over 3 mg. in a beverage; for subcutaneous injection, a few hundredths of a milligram of dried microbe bodies of a constant weight. He cultivates separately each of the microbes which grow on slanting gelose, and mixes the emulsions in the proportions in which they occur in the stool, sterilizes at 60 C. or boils up two or three times if there are spores. In the majority of cases the benefit was manifest from the very first, the patient saying, "I felt something like a chill all over, and then I felt very much better at once."

Eiger, M. The Secretory Influence of the Vagus Nerve on the Secretion of Bile. [Zt. f. Bio., Vol. 66, Nos. 6–7, p. 229.]

In these experiments only dogs were used; urethanether narcosis; artificial respiration; blood pressure recorded from the left carotid on a kymograph. After opening the abdominal cavity a cannula was introduced in the usual way into the common bile-duct and connected horizontally with a pipette. The gall bladder was always shut off at the outlet with clamp forceps and was kept closed during the experiment. Both vagi were tied off and severed at the animal's neck before the intrathoracic operation. The severing of the vagi did away with effects of shock in tearing at the esophagus and excluded reflexes from the vagi. An incision was then made on the left side in the fifth or sixth costal space. The two ribs were separated just enough to get the esophagus out with dressing forceps. Usually the two vagi appeared as relatively large strands on either side of the esophagus leading downwards and they may easily be placed in Ludwig electrodes for deeply situated nerves. In the rare cases where the vagus has already sepa-

rated into several fibers at this level, all these branches were grounded in electrodes. Both electrodes were connected in circuit with the shunt. Stimulation was effected according to the Ashner method during the entire longer periods of stimulation in such a way that there was always a minute of interruption after a minute of stimulation in order to avoid exhaustion of the vagus nerves if possible. In addition, when necessary, the stimulation was increased at each successive period of stimulation. The secretion of bile was observed in the graduated pipette during each trial and at the same time accurate account was taken of how long it took to accumulate the same amount of bile, f.e.l. c.c. in the pipette during the periods of stimulation and during the rest periods, when the vagus nerves were not stimulated at all. In a few cases the bile obtained in individual periods of stimulation and rest periods was collected separately and used at once in dried residue determinations. In trials in which 5 per cent. bile solution or 1.5 per cent. erepton (in the physiologic 0.9 per cent. NaCl solution) was injected into the jugular vein throughout the trial, the injection fluid flows at a constant pressure, and at a constant speed, from a burette, arranged in accordance with the principle of the Mariott flask, the injected fluid was always kept at body temperature. The room temperature was always kept very high. At the close of each experiment an accurate section was made to determine that both vagi had really been dissected off and had been correctly grounded in the Ludwig electrodes during the entire experiment. The results were as follows: Intrathoracic stimulation of the vagus nerves, with heart action excluded according to the Asher method produced increased secretion of bile; both the fluid amount of bile was increased as well as the residue. Direct secretory influence of the vagi on the liver cells was indicated. The vagus nerve, as regards bile products, is a nerve that arouses secretions. The vagus nerve contains motor fibers for the muscles of the bile ducts. In individual cases it was possible to obtain closing of the common bile duct by stimulation of these fibers. But the secretory function of the vagus is unimpaired. One and five tenth per cent. eupepton solution (in physiologic common salt solution) produces increased bile secretion, in agreement with Barberas' theory and Loeb's work.

Intravenous injection of eupepton diminishes blood coagulation as is the case in all actions which increase the activity of the liver.

Leriche et Masson. Disease of the Plexuses of Auerbach and Meissner in a Case of Intussusception. [Presse médicale, January 9, 1919.]

These observers report the case of a man aged twenty-four years, upon whom they had carried out an ileocecocolic resection for acute intussusception, in which marked inflammatory lesions of the plexuses of Auerbach and Meissner were found in the resected portion of intes-

tine. They believe these changes in the vegetative nervous supply of the bowel cannot be held as a mere chance observation. Severe involvement of the vegetative innervation of the intestine cannot be considered simply a coincidence in a condition showing manifest perversion of intestinal peristalis. The one must obviously be the cause of the other. Exaggerated peristalsis of one segment of intestine, and atony and dilatation of another, the whole resulting in intussusception, are apparently to be thus accounted for. The observation is at least one which may lead to something definite in the study of the cause, hitherto obscure, of intussusception.

Loeper, M. Intestinal Neurosis. [Bull. de l. Soc. med. d. Hop., March 7, 1919.]

Injury to the vegetative nerve supply of the intestine is usually masked by the symptoms from the inflammatory process in most enteritides. After the severe inflammatory reactions have subsided then the symptoms of vegetative function show themselves. There may be an arrhythmia of the intestine analogous to arrhythmia of the heart. This may be an explanation of certain types of mucomembranous enteritis. The enteroneuritis may even create the enteritis or prolong it. Certain forms of secondary neuritis may be traceable to it, and even remote neuralgia of the cut.

Asher, L. Studies on the Automatism of the Intestine and the Effect of Adrenalin upon it. [Zt. f. Exper. Medizin, 1917, Bd. 5, H. 4–6.]

Intravenous injection of extracts from thyroid tablets in narcotized and vagotomated rabbits had no effect on the blood pressure; intravenous injection of Roche Thyroglandin usually had the same negative effect. The same observations were made after isolation of the splanchnic region. In rabbits with uninjured visceral region intravenous injections of thyroid extract or of thyroglandin sometimes produced expansion of the renal vessels, sometimes had no effect. After disconnection the whole visceral region with the exception of the kidney, thyroglandin produced a marked expansive effect upon the renal vessels. This expansion was accompanied by constant blood pressure, thereby proving that thyroid extract may have a primarily expanding action. Intravenous injection of Roche's Pituglandin always produced a slow, but pronounced, increase in blood pressure. Even after separation of the visceral region the effect is the same. Parke & Davis Pituitrin produced the same effect. Pituglandin sometimes caused expansion, sometimes contraction of the renal vessels, when the visceral regions were uninjured. After removal of the latter both pituglandin and pituitrin contracted the renal vessels only. The primary effect of pituitary extract upon the renal vessels is accordingly one of contraction. Thyroid

and hypophysis are antagonistic in this respect, contrary to the synergic relation observed elsewhere. Neither the injection of pituitary nor of thyroid extract revealed any definite change in the effect of visceral stimulus upon the renal vessels. [J.]

de Langen, C. D. Gastric Ulcer and its Pathogeny. [Med. Tydsk. v. Gen., Jan. 4, 1919.]

Gastric ulcer is here regarded as a localized vagotonia. Statistical studies by the author has tended to show that sympathicotonic states are especially frequent in the tropics. He has already written extensively upon this condition. Gastric ulcer is extremely rare, he believes, chiefly because of this factor and when found it is present with pronounced vagotonic types of individuals. A study of heat factors, indolence and other environmental conditions in the tropics from a psychogenic point of view might reveal some important deductions. The author touches upon these in his earlier paper. The facts observed apparently confirm the vagotonic origin of gastric ulcer.

Alvarez, C. Gastric Ulcer and Operations. [Semana Med., Jan. 9, 1919.]

This is a case of cure of a three-year-old gastric ulcer after a removal of an ulcerated lipoma of the cervical and dorsal region in a woman of 40 years. Since this Alvarez has operated on the sixth, seventh, eighth and ninth pair of sympathetic nerves with striking results in many gastric conditions. Ulcer, hyperchlorhydria, hypersecretion and spasmodic stenosis, even ectasia of the stomach, all showed prompt and permanent benefit from this indirect treatment of gastric ulcer by distance commotion. It has little if any effect on disturbances from organic stenosis; these cases call for a gastro-enterostomy. The benefit of the grand sympathetic confirms the assumption that nervous influences induce the disturbance in the stomach. By severing the vegetative nerve connection, the circulation returns to normal. Notwithstanding the persistence of a hyperchlorhydria, the ulcer does not return.

Franke, M. Behavior of the Vegetative Nervous System during Menstruation. Relation between Internal Secretions and Menstruation. [Zschrt. f. kl. Med., Bd. 84, H. 1/2.]

The writer has tried to determine whether the changes occurring in the vegetative nervous system during menstruation are the cause of menstrual difficulties. During the inter-menstrual period only one case examined gave a negative reaction to both vagotonic and sympathicotonic poisons. The majority of cases showed a simultaneous reaction to pilocarpin and adrenalin, with the emphasis sometimes upon pilocarpin, sometimes upon adrenalin. Cases in which a reaction occurred

only to vagotonic or sympathicotonic agents were almost as rare as those which did not react at all. In all the cases examined the reaction to 0.001 gr. atropin was very slight and did not take place at all during the intermenstrual period. At the onset of menstruation the reaction changes absolutely. A pronounced increase in the reaction to pilocarpin was noted; it is at least one degree more pronounced than during the intermenstrual period. There is increased tendency to react tc atropin in almost all cases. On the other hand the reaction to adrenalin appears to be weaker during the menses. A decrease in excretion of sugar under the influence of adrenalin was observed during menstruation in practically all the women examined, which would point to a diminution of the sympathicotonic condition during the menses. The writer concludes on the basis of his observations on the effect of pilocarpin, atropin and adrenalin upon menstruating women as compared to the intermenstrual period, that during the menses there is an increase in tonus of the nervus vagus, together with simultaneous decrease in tonus of the nervus sympathicus; on the basis of the general reactions produced by vagotonic and sympathicotonic agents, it may be stated that during the menses a condition arises, designated by Eppinger and Hess as vagotonic disposition or vagotonia, a condition in which there is a strong reaction to pilocarpin and atropin, no reaction or only slight reaction to adrenalin. This is a characteristic condition. The behavior of the stomach was of interest. In half the cases the total contents of the stomach was greater during the menses, and in seven cases the fluid contents of the stomach increased during menstruation. This increase in fluidity indicates, though it does not absolutely confirm, an increased fluid excretion in the stomach and a hypersecretio ventriculi. A comparison between the total acidity of the contents of the stomach during the intermenstrual period and during menstruation revealed an increase in acidity during menstruation, *i.e.*, a hyperaciditas menstrualis, in seven cases. The injection of pilocarpin resulted in an increase in stomach secretion and acidity during the menstrual period in half the cases. The writer's observations on the action of the stomach offer a further series of phenomena which support the theory of vagotonia or vagotonic disposition during the menses. There can be no question of the occurrence of eosinophilia or lymphemia during the menses. The fundamental cause of the disturbances occurring during the menses is an increased irritability of the nervus vagus during this period. A vagotonic condition appears which either disappears entirely or retreats when the menstrual period has elapsed. The cause of the menstrual disturbances can not be ascertained definitely. It is probably connected with a change in the glands of internal secretion. By means of the Abderhalden method it may perhaps be possible to prove that during the menses the function of the thyroid and probably of the thymus gland is increased and that the function of the supra-

renal gland is weakened, in support of which theory numerous phenomena have been noted. [J.]

2. ENDOCRINOPATHIES.

Plummer, H. S. Classification of Goiters. [Med. Section A. M. A. Med. Rec., June 21, 1919.]

He said that the normal thyroid developed from prenatal acini with epithelium, and a certain percentage contained fetal rests or cells capable under certain conditions of producing acini. The thyroid elaborated two products: thyroxin and colloid. Colloid was associated with the formation of the hormone, but played no part outside of the thyroid gland. Exophthalmic goiter was a distinct clinical entity sharply differentiated from other conditions of hyperthyroidism. The profession had been slow to accept this theory. The thyroxin was present in all the cells of the organism in quantum of potential energy on the oxidation of the cells, and the amount of energy transformation varied with the amount of thyroxin in the cells, being increased in hyper- and decreased with hypo-thyroidism. Five thousand cases had been studied at the Mayo Clinic with regard to metabolism rates. An average of 39 calories per hour per square meter of body surface was normal. In hypothyroidism, 35 per cent. below normal, 7–10 mg. thyroxin was required to maintain normal balance. Exhaustion of the hormone in normal individuals varied with total energy transformation, and could shift 100 per cent. in normal persons, the basal rate remaining constant. With a dose of thyroxin the basal rate rose, then later dropped back. Under ordinary conditions the thyroid need not eliminate its product. The increase of energy could be met in other ways, by increasing stimulation of the cells, or chemical changes as in the adrenals. In regard to structure, nearly normal glands were removed in mild cases. In the hypertrophic gland there was increase in colloid and number of acini, formation of new tissue with adenomatosis. All this might be found in the same gland. Stimulus of fetal rests resulted in colloid goiter. In adolescence there was often diffuse deposit of colloid and adenomata were often deeply embedded. Two forms were seen: nodular colloid goiter and colloid adenomata. These were clinically indistinguishable from adenomata and had the same clinical indications. Hypothyroidism was associated with low metabolic rates, sometimes it was seen with adenomatous goiter, in a milky form with constitutional states, and not often clinically recognized. Many cases diagnosed as hypo- were really hyper. Myxedematous individuals never gave history of goiter. In the hyper- cases, the extirpation of the adenoma brought the basal metabolism to normal in three weeks. In exophthalmic types there was probably some variation of the thyroid hormone from the normal. These cases were distinct from hyperthyroidism.

In the discussion Dr. Emil Goetsch said that he had been working on these problems for 5 years. The symptoms of hyperthyroidism were due to toxin elaborated by the thyroid gland, and one could assume that there was thyroxin in all the cells of the body, and that the symptoms were an overaction of the nervous system, probably the sympathetic, which would give hyperaction of the body cells, just as, for instance, the cells of the gastric mucosa were stimulated to hyperacidity in this condition. Dr. Plummer's theory that the hormone is altered in exophthalmic types was interesting. No doubt exophthalmic goiter was a clinical entity. The thyroid was stimulated to overactivity by a method not understood. The disease was not primarily in the thyroid gland. Exophthalmos was never produced by thyroid medication, nor could it be obtained experimentally by the hormone. The exophthalmos was probably the result of irritation of the sympathetic system, the patient becoming poisoned and at operation the removal of the poison empirically relieved the patient, but left the exophthalmos still present, though not as the result of thyroid secretion. At Brigham Hospital they had found the metabolism strikingly parallel with the symptomatology of the disease, and the oxygen consumption and incidentally the adrenal in hypersensitiveness ran parallel with the course of the metabolic activity. In cases which improved this rapidly fell. As regards groups, there were the colloid, the hyper, or adenomatous types, and thirdly exophthalmic types. It was hard to tell whether adenomatous types were active or not. These being new tissue, did not follow the laws of tissue growth. The metachondria was not a functional activity of all cells and usually disappeared. Adenomata, becoming cystic, often became inactive through degeneration and a spontaneous cure resulted. Symptoms depended upon the balance between amount of secretion and the tolerance of the individual; when this was exceeded, intoxication resulted.

Dr. L. F. Barker said that one should understand clearly what a man means. Much confusion could be avoided if one recognized that Dr. Plummer did sharply distinguish between exophthalmic goiter and hyperthyroidism. In the literature this division had not been made. Usually Basedow's disease had been regarded as hyperthyroidism. Probably one would come, in time, to speak of "Plummer's Syndrome," meaning classical exophthalmic goiter, as distinct from hyperthyroidism. While both conditions were due to over thyroid activity, the symptoms, prognosis, and treatment of exophthalmic types were different. In regard to classification on the pathological and histological side, one point should be made which affected treatment. Adenomata of the thyroid or nodular struma produced symptoms best treated by surgery, and operation gave quicker results. In the exophthalmic goiter operation also gave better results, but it was difficult to be sure what form one was dealing with clinically. Protrusion of the eyeballs was sometimes

present in adenomata, sometimes not so in typical exophthalmic goiter. Sometimes one saw marked tachycardia, nervousness, and sweating, with obesity and some of the obese patients were improved with thyroidectomy. A study of a large number of cases, such as at the Mayo clinic, was of great value to science.

Dr. Henry A. Christian said that there were three tests of value: determination of basal metabolism; relation of blood sugar to ingested sugar; determination of blood pressure to injection of adrenalin. These were not pathognomonic of changes in the thyroid, but depended upon disturbances in the body, commonly associated with thyroid disturbance. They were more valuable as measures of function than of diagnosis. The basal metabolism tests were of more value than the others as the changes occurred more regularly. It was, however, necessary to sound a warning against measuring the patient in figures of basal metabolism, as the figures only expressed the metabolism at the time of the test. Some such changes were temporary, but some were permanent, resulting from prolonged disturbance, and these would not be modified by removal of the gland. Thus one might see patients with thyroid activity measured by increased basal metabolism of 60 to 70 per cent., showing relatively few of the cardinal symptoms of exophthalmic goiter in marked degree, and operation on these cases would cause a serious disturbance, because without the basal metabolism one would not have recognized the severity of the disease. In another type the basal metabolism is little increased, but the patient showed cardinal symptoms of exophthalmos together with permanent cardiac disturbance—in such a case basal metabolism was less than the clinical picture; operation would not produce any great change because the permanent cardiac damage had been done, as the result of thyroid activity. In considering these points, mistakes could be avoided in the disproportion between the clinical picture and the tests, otherwise many errors would be committed.

Leopold-Levi. Pseudo-Influenza of Endocrine Origin. [Presse medicale, February 10, 1919.]

Levi refers to a number of patients he has seen suffering from a condition characterized by general lassitude, diffuse pains, headache, sometimes general malaise, a sensation as of fever, and congestion of the conjunctivae or of the nasal, pharyngeal, laryngeal, or tracheal mucous membranes. Differentiation from influenza is based on the absence or mildness of fever, the rapid course of the affection, its tendency to recurrence—at times periodically—and its appearance in subjects who have already had epidemic influenza. In these cases of pseudoinfluenza the actual condition is one of disturbed thyroid, ovarian, and adrenal functions, causing vasomotor and congestive manifestations amenable to ovarian and thyroid organotherapy. In view of

these observations the author propounds the question whether, apart from the toxic action of the influenzal virus, an endocrine disturbance may not play a rôle in the appearance of congestive complications, such as those involving the lungs, in this disease.

Giacobini, G. Sterility and Hypothyroidism. [Semana Med., Mch. 12, 1919.]

Sterility from ovarian insufficiency is well known and the interrelationships of the thyroids and gonads well evidenced. The findings of certain sterility cases cured by thyroid by the author are interesting, but not unique. One of the patients after bearing a healthy child developed headache and metrorrhagias, thyroid insufficiency signs, and there was no further conception. Evidences of thyroid insufficiency had been present in the other patient and she had never conceived during eight years of married life. Under thyroid treatment both women became pregnant and the hypothyroid stigmata cleared up.

Tilmant. Ovarian Insufficiency and Dythyroidism. [Presse Mèd., Mch. 27, 1919.]

An interesting family tree of 17 members, 57 per cent. of the 7 men and 70 per cent. of the 10 women have goiters. In 6 of the women exophthalmic goiter symptoms came on at the menopause, a not infrequent occurrence. In all the goiter subsided during pregnancy. One of the goitrous sons married a hyperthyroid cousin. Three daughters have developed exophthalmic goiter but three sons are apparently uninvolved at the time of reporting.

Alexander, A. External Heterosexual Characters in Hypogenital States. [Berl. kl. Woch., October 7, 1918.]

A woman, age 34 years, without children whose menses progressively diminished and ceased after a husband abandoned her. There was a notable atrophy of the uterus and masculine characteristics then developed. The voice had changed, a minute beard developed, as well as other changes in the pilous system. The syndrome is interpreted as a constitutional hypoplasia of the gonadal apparatus and this hypoplasia ends in an insufficiency. At this time the heterosexual characters appear as they are no longer under the control of the ovarian hormones.

Maggiore, S. Calcium in Spasmophilia. [Pediatria, Mch., 1919.]

Intravenous injections of calcium chloride salts were used for the treatment of eight children with tetany, mostly with rachitis. The youngest was 20 months, the oldest 10 years; dose was 1, 2, 3 or 5 cg. of calcium chlorid. Prompt reduction of the galvanic excitability was obtained. This effect was most pronounced three hours after treatment and declines.

Comby, J. Pancreatic Infantilism. [Arch d. Med. d. Enf., Nov., 1918.]

Bramwell's syndrome is here discussed in connection with recent case reported by Bullrich of a typical pancreatic insufficiency but which on autopsy showed pluriglandular endocrinopathies. Comby is disposed to believe the syndromy must be more sharply delimited.

II. SENSORI-MOTOR NEUROLOGY

1. PERIPHERAL NERVES.

Ripert. An Apparatus for Paralysis of the Radial Nerve. [Rev. Interalliée pour les Mutilés de la Guerre, April, 1918.]

Paralysis of the radial nerve is very common among wounded soldiers. Apparatus of many sorts have been proposed for this case. The author has contrived a kind to be used in the case of a definitive paralysis of the radial nerve. It consists of a light forearm piece, on the wrist of which is articulated a specially designed metal attachment, maintained by a steel spring, the purpose of which is to support the hand. This attachment can describe part of a circle, and can be fixed at any desired point on this circle, or left free if requested, or even taken off. Both the thumb and the wrist can move freely, and many kinds of work may be performed with the help of this apparatus.

Neel, A. V. Ulnar Neuritis after Trauma of Elbow. [Hospitalstidende, Jan. 15, 1919.]

Neuritis of the ulnar may develop many years after injury as seen in the cases here reported. The injuries had occurred at 2, 4, 5, 6, 16 and 17 years of age respectively and in a number the trauma had occurred in childhood, the arthritis developing later in life. When the elbow is held partly flexed for long times, the full excursions of the elbow is hindered, and the ulnar nerve is thereby constantly stretched. In five cases, the intervals between injury and neuritic development had been from twenty-five to thirty-five years. Paresthesia and pain spreading through the ulnar distribution and inability to use the thumb are the first symptoms. In one of the cases reported the atrophy was ascribed to an intraspinal process acting on the spinal cord, and a futile laminectomy had been done. After onset the neuritis is apt to develop rapidly, the paresthesias and pains grow more marked and the hand grows weaker. There is little relief from operative procedure.

Cardenal, R. Radial Paralysis. [Rev. Espan. d. Med. y Cir., March, 1919.]

In this patient radial paralysis developed after a stab wound severing the radial nerve. It was cured by means of resection of the cicatricial

tissue and suture of the stumps. In order to bring the stumps together the arm was shortened by resecting 4 cm. of the shaft of the humerus. The functional use was regained in two years.

Rohde, P. Traumatic Neuritis from Labor. [Hygiea, September 30, 1918.]

The author reports three cases of this affection, which he also terms traumatic maternal birth paralysis. The first was one of forceps delivery, thirty-six hours in labor. Immediately after delivery there were severe pains in both lower extremities, which soon subsided in the left, but were persistent and chronic on the right side. Even during gestation there was a sensorimotor paresis in the right lower limb, so that the puerperal affection was merely an epiphenomenon. The case yielded to time or treatment and the patient bore another child without neuritic happening. In the second patient, labor had been arrested for twelve hours and pain in the extremities developed when labor pains were resumed. Labor lasted twenty-four hours more, and was then ended by perforation. One week after delivery both lower extremities were almost completely paralyzed, but after that period there was resolution which lasted much longer on one side—two months on the right.. At this juncture the woman was examined and the right leg was found atrophied, with both motor and sensory disturbances in the peroneal distribution. Six months after delivery she was pronounced well. In the third patient the symptoms were in evidence some while before delivery, the right leg going to sleep at intervals. After labor this symptom was increased. The labor was normal but slightly prolonged and the child was large. The symptoms set in directly after labor, and for the first three weeks after delivery she was hardly able to move the limb. After some improvement was apparent under treatment the patient failed to appear and the fate of her paralysis remains unknown.

Chiray et Roger. Sciatica and Muscular Atrophy. [Bull. d. l. Soc. d. Méd. d. Hop., Jan. 13, 1919.]

These authors discuss the atrophy, exaggeration of the idiomuscular contraction and the electric contractility which are frequently found in certain types of sciatic neuritis, constituting a variable syndrome with more or less fixed sensory signs. When present this indicates that the site of the lesion is apt to be at the roots. In about half the cases the cerebrospinal fluid has a high albumin content, with lymphocytosis, indicating an inflammatory reaction in the meninges. The muscular reactions for a part of sciatic neuritis and sciatic neuralgia.

Schow, H. I. Arthritis Deformans of Spine and Sciatica. [Hospitals Tidende, Mch. 19, 1919.]

Lumbar arthritis as a cause for pressure upon the constituents of the lumbosacral plexus with resulting neuritides of at times very puzzling

character has been pointed out by American writers but frequently overlooked by the physician and thus made a special field for the osteopathic practitioner. In the present communication Schow reports 15 case histories of leg neuralgias due mostly to lumbar spinal arthritides. The femoral was involved in most of these cases, the sciatic next, although sciatica was the most frequently made formal diagnosis. There was tenderness over the sciatic nerve in most, but in two there were no tender points although pains were severe. Roentgen examination of the spine is called for in such cases. The spondylitis was most marked in the lumbar region. Reëxamination a few months to four years later showed that 5 of the 12 patients had quite recovered, 5 still had pain when exercising, and 2 of the patients were still incapacitated by their affection. The exostoses with deforming spondylitis may merely impede the circulation and thus induce the neuralgia without direct compression of the nerve, or the nerve root may degenerate under the influence of compression and the neuralgia finally disappear. In a further series of three cases, Roentgen examination showed a single large exostosis on the spine or sacrum, in men or women between 54 and 56, with symptoms of sciatica on the same side as the exostosis.

Fraikin, A. Physical Therapy in Sciatic Neuralgia. [Journal de médecine de Bordeaux, Feb. 28, 1919.]

This observer regards physical measures as far superior to drug treatment in true sciatica and as being indicated whenever the use of drugs for ten or fifteen days has failed to yield notable improvement. Even where drugs prove beneficial, physical treatment should be added to hasten recovery. Such treatment is likewise useful in sciatic neuritis, though here results are more slow in appearing. Three forms of physical measures are available, electric, thermic, and kinesthetic. In using the galvanic current, the negative electrode, measuring about fifteen by twenty centimeters, is placed on the buttock at the point of emergence of the nerve; the foot is dipped in water, which constitutes the positive pole. The intensity of current should be gradually increased to twenty, or in long standing cases even to forty or fifty milliampères. Daily treatments of ten or fifteen minutes duration are indicated. In sciatic neuritis, when pain has been allayed it is well to add faradic treatment of the affected muscles. In intense and rebellious cases, high frequency treatment should be given every other day, in alternation with the galvanic current. Diathermy is also capable of doing good in such cases. The most important of all measures for sciatica, whether employed alone or in combination with other physical means, is the hot air treatment. For this purpose the ordinary hand operated apparatus, yielding a temperature of 80° to 100° C., is sufficient. The applications should be prolonged to the extent of producing intense rubefaction and be made over each painful area. The hot air should be applied in concentric circles,

excessive heating of any given point being guarded against. Daily treatments should be given. If the galvanic current is being used, the hot air should follow it after a rest interval of one half to one hour. Kinesthetic treatment comprises massage, mechanotherapy, and reëducating exercises. Manual massage is serviceable from the onset of the disorder. Effleurage is the first step, to be followed, as improvement occurs, by pressure, pinching, kneading, and vibrotherapy. The latter, whether manual or instrumental, has distinct analgesic properties. Mechanotherapy consists in extension of the nerve—at first, if necessary, with the knee flexed, later with the knee extended. In the reëducation exercises the patient is made to walk slowly and correctly, each movement made being carefully supervised until the patient is able to overcome all abnormal antalgic positions during locomotion.

Fasano, M. Nerve Injuries in War. [Policlinics, Nov. 10, 1918.]

No time should be lost writes Fasano, on the basis of his work at the Italian front in thorough examination of men with painful paralysis. Operative relief should be given immediately, as this prevents atrophy and ankylosis. When pain is absent it is open to discussion whether the gains compensate the disadvantages of operating before the wound is healed. During operations, the nerve itself should be flushed with warm physiologic serum.

Ricca, S. War Lesions of the Peripheral Nerves. [Policlin., 1918, XXV, 65.]

In paralytic lesions of the peripheral nerves three factors stand out: 1. These lesions have a tendency to spontaneous cure. 2. The clinical signs of such a recovery can only be gathered from the course of the trouble and not from the symptom picture. 3. The tendency to a recovery is conditioned by sufficiency precise facts to enable the trained observer to make a prognosis. The most important of these facts is the one regarding the time of recovered movement (the beginning of which is the most efficacious sign of the curability of the lesion), which almost never begins before the six months after the lesion.

Another important fact is derived from the gross pathologic anatomy, for only in a minority of cases is total severance found. Most frequently there is a lacerated contused wound; the nerve is hard and thickened. Early operation and suture only after an exploratory incision are advised. There is another, lighter form of nerve injury with paralysis, incomplete lesions which correspond to Dejerine's compression syndrome. The prognosis is usually good. The gravity of the paralysis does not depend so much on the intensity as on the duration of the disturbance. The degree of electrical excitability is fundamental in peripheral nerve lesions. The degree of the electrodiagnostic disturbance corresponds to the gravity of the anatomic lesions of the nerve fiber.

Electrodiagnostic changes do not show until after some time has passed, and peripheral nerve lesions cannot be clearly diagnosticated until a few weeks have passed after the infliction of the wound. The problem of diagnosis of peripheral nerve lesions is in the last analysis reduced to the problem of the relations between the clinical manifestations and the anatomic seriousness of the lesions of the nerve fibers. The nerve trunk being composed of fibers, the lesion may be total or partial. In complete lesions we have histologic interruption of the nerve fibers with resulting secondary degeneration. Since a secondary degeneration with its serious results follows, the clinical picture must be considered under two aspects, under that of semiology and that of development (course). On the course depends the curability of the lesion, and to the two eventualities correspond two characteristic periods of the clinical picture: the period of restoration and the period of involution. At first we have three constant symptoms: paralysis, anesthesia and total degenerative reaction. Of secondary diagnostic importance are: (1) Insensibility to pressure on the nerve trunk; (2) muscular atrophy; (3) absence of spontaneous pain and absence of pain on pressure of the muscular masses. The symptom picture of the involution period presents three phenomena: Muscular atrophy progresses until the muscle fibers disappear; there is a gradual diminution of direct galvanic excitability, which finally disappears entirely; secondary postures are developed, due to contracture of the antagonistic muscles. Partial lesions of peripheral nerves present variable symptom pictures, according to the lesion in each case. One fact is clear, that clinically partial lesions have no corresponding partial anatomic picture. The first clinical symptom of nerve regeneration is formication. It may appear a month after infliction of the wound or after suture of the nerve. A majority of writers claim that the first symptom of the return of motion is a modification of atonia into hypotonia, but in the greater number of cases this is not correct. The first sign is rather the appearance of active muscular contractions during an effort. The author gives the details of thirty cases which came under his observation. In twenty-three cases in which an exploratory operation was performed the findings were positive in eight, and negative in fifteen cases, in other words the exploratory operation proved of diagnostic and prognostic value in a little less than one third of the cases.

Levick, G. M. Adjustment of Response to Nerve Stimulus in Voluntary Muscles. [British Medical Journal, March 29, 1919.]

The author bases his statements and conclusions on the results of tests made upon many hundreds of men, and including every grade of nerve injury. Records were taken of the height, rate of rise, and rate of fall of the curve produced by the contraction of a muscle by means of an interrupted galvanic current. In every case the affected muscle

was compared with the healthy counterpart. It was found that when a normal muscle was subjected to a series of stimuli of varying strength it responded by a succession of contractions of varying height, but of uniform duration. The duration of the contraction of a given muscle is the same, whether the stimulus is short and sharp or long and diffuse. Slight diminution of the conductivity of a motor nerve by compression or injury causes a slight lengthening in the duration of the curve of contraction of the muscle which it supplies. Marked reduction, or complete destruction, of the conductivity of a motor nerve leads to marked lengthening in the wave of contraction of the muscles which it supplies. Abnormal and persistent increase in the stimulation of a motor nerve through irritation, leads to a shortening of the duration of the contraction of the muscles supplied. After suture of a nerve and its regeneration the faradic response of the muscle is the first to appear, then the muscle begins to respond to electrical stimulation with a slight shortening of the contraction curve. This is followed by a period of further shortening until, after complete regeneration of the nerve, the muscle contraction curve is lengthened until the normal is restored. The study of the duration of muscle contraction curves promises to prove of considerable value in diagnosis.

Fisher, E. Welby. Plea for Homogeneous Nerve Graft. [British Medical Journal, April 26, 1919.]

The author draws upon an extensive experience when he says that he has seen no instance of recovered nerve function where bridging of a gap has been done with foreign material, or where the nerve ends have been connected with a wrapping of fascia, Cargile membrane, or vein. Something more than a conduit is required for the regeneration of several nerves. Restoration by careful suture gives the best results, but even in suture the conditions are not so simple as commonly thought. The nerve is made up of a series of bundles of fibers, each bundle being largely fibers of a single function. Suture should be carried out to prevent the improper distribution of these fibers within their channels so far as possible and this can be accomplished with considerable accuracy by careful observation of the oval contour of the nerve and approximation of the two ends anatomically correct. All scar tissue distorts the course of nerve fibers in the growth and must be removed and not permitted to reform, the latter being accomplished by accurate approximation of the neural sheaths. Finally, when the gap in a severed nerve is too great to permit direct suture of the nerve, the most satisfactory method is by the insertion of a homogeneous graft, taken, not from one or more small subcutaneous nerves, but from a mixed nerve of equal or larger size than the damaged one and inserted with the greatest care and accuracy. Such homogeneous grafts can be obtained from amputations and from amputation stumps which require secondary

operation. That such a method of grafting may be remarkably successful is illustrated by the record of a striking case.

2. SPINAL CORD.

Meuriot et Lhermitte. Case of Syringomyelia Resulting from a War Wound. [Société de Neurologie, Jan. 10, 1918.]

Guillain has tried to show authentic cases consecutive to distal (finger) injuries, this occurring a long time after the healing of the wound. He thinks that the origin of the medullar cavities might be a peripheral infection, migrating from the nerves to the cord. The extension of peripheral nerve lesions to the cord was also shown by Dumenil. F.... thirty-four years old, no pathologic antecedents, was shot in the left thumb in January, 1915. A felon appeared subsequently, causing the exfoliation of the last phalanx. He went back to the trenches and was sent to a depot as instructor in June, 1916. In February, 1917, he noticed that he had difficulty in certain movements of left hand and arm, and that the hand was getting thinner. This atrophy produced deformity of the hand which caused him to be sent to the Neurologic center in December, 1917, where syringomyelia was found to be quite in evidence. Briefly this man, without any morbid antecedents, many months after an infection of the thumb caused by gun shot, develops progressive symptoms: motor, sensitive, trophic, reflex, vasomotor and oculopupillary, limited to the left side (same side as the wound). This rich and continuous symptomatology imposes a diagnosis of cervical syringomyelia limited to the left side of the cord, same side as the injury. The fact that the lesion appeared only a long time after the infection also suggests the infection as the cause of the disease. The felon itself did not cause any pain, suggesting the preëxistence of a medullar cavity, of which a fundamental characteristic, analgesia, was revealed by the traumatism. The point is not very clear as to whether the felon was the cause of, or simply aggravated, the syringomyelia.

Woodbury, M. S. Focal Infection Cause of Multiple Sclerosis. [Arch. Neur. and Psychiatry, Vol. 1, No. 5. J. A. M. A.]

The basis of Woodbury's paper rests on the observation of six cases of multiple sclerosis. All of the six were symptomatically typical. Two were relatively early, the others were more advanced. Spasticity of both legs and bilateral Babinski sign were present in all; abdominal reflexes were uniformly absent; all, except one early case, showed pallor of the temporal half of each disk; nystagmus and intention tremor were present in all. All had complained of bladder irritability which had appeared early in each instance; incoördination of upper as well as lower extremities was present in all. Sensory symptoms were practically absent. The only possible etiologic condition regionally common to all was

some type of inflammatory disease of the upper respiratory tract. Every one of the six patients had obviously chronically infected tonsils which Woodbury thinks is worthy of note. This was the one pathologic feature in addition to the disease of the nervous system which was common to all, and the only one which seemed to give any definite inkling of etiology except that five of the patients had also—as dentograms revealed —peridental infection. This, however, was not strikingly extensive, either in the number of teeth involved or in the degree of involvement. No dental observations were made on the other case. Therefore, Woodbury offers the theory of a possible localized infective source, distributing its toxic products through the circulation, as a cause of multiple sclerosis. Four of these patients had their tonsils removed. Two relatively early cases report themselves as "well," despite the fact that both had previously been greatly hampered by motor incapacity and bladder trouble; one of these developed infected antrums after the extraction of periabscessed teeth, but reports a favorable convalescence. In one rather advanced case, four months after observation, the patient is walking without a cane for the first time in several years. In another advanced case, the patient walks with much greater ease, one and one half years after observation; is less easily fatigued, and pursues his work in the lumber business daily. These four are men leading active, useful lives.

Gill and Bullock. Hydatid Disease of Spine. [Med. Jl. Australia, April 26, 1919.]

These observers here give a detailed account of a case of hydatid disease primarily involving cysts in the lumbar muscles and one compressed the spinal cord. The patient first developed lumbosacral pains—incorrectly called rheumatic—then he had a paraplegia with loss of bladder control. The lower limb reflexes, except the cremasteric, were lost. There was no eosinophilia. The Wassermann test was negative. A Roentgen-ray examination revealed no bony abnormality. Surgical removal of the cysts was followed by recovery.

Meinema, T. Combined Lateral and Posterior Column Disease. [Nad. Tyd. v. Geneesk., Oct. 5, 1918. J. A. M. A.]

Meinema relates that in the course of a few months recently he encountered three cases of combined funicular myelitis. Examination of the blood gave typical findings in all, but there was anemia enough to attract attention only in one of the three cases. This emphasizes the necessity for examining the blood as a routine procedure in every case of spinal cord disease. In one of the cases the only symptoms had been mental, and the discovery of a grave organic spinal disease was a surprise. Delirium, apathy or somnolency have been noted in different cases. A hysteriform set of symptoms sometimes ushers in the trouble.

Degeneration of the posterior tracts entails atony, loss of certain reflexes and ataxia, while degeneration of the lateral tracts entails increased tonus, exaggerated reflexes and motor weakness. The combination of the two thus induces a picture that it is easy to imagine, the symptoms of tabes or of spastic paralysis obtaining the upper hand as the case may be. This combination, however, is very rare. His patients were a woman of twenty-nine and two men of forty and fifty-one. Tabes was the first presumptive diagnosis, but the Wassermann reaction was negative. There was nothing in the history to suggest a toxic pseudotabes. The blood count in the three cases showed from 1,992,000 to 2,500,000 reds, with a color index of 1.8, 1.35 and 1.75; from 3,500 to 4,500 whites, with 71 per cent. neutrophils and 21 per cent. lymphocytes in the woman. One man showed 75 per cent. polymorphonuclear leukocytes and 25 per cent. lymphocytes. Only one of the three has died and necropsy was not possible in this case. The lesions responsible for the symptoms evidently did not extend into the brain. He analyzes the literature and emphasizes that these changes in the spinal cord do not occur exclusively with pernicious anemia. They have been encountered associated with leukemia, septicemia, ulcerative endocarditis, malaria, cancer, diabetes, tuberculosis, alcoholism, lead poisoning, Addison's disease, pellagra and paralytic dementia. The degeneration in most cases seems to follow the blood vessels. Henneberg thinks that some hemolytic toxin is probably involved which acts to induce both the anemia and the funicular myelitis. The anemia is not always of the pernicious type. MacConnell reported in 1907 a case in which, after a severe hematemesis, atrophy of the optic nerve developed and the combined spinal-cord tracts affection. The latter retrogressed in time, but the optic atrophy persisted. Von Hasselt's case is also instructive, the patient suddenly presenting the symptoms of the combined tracts affection after a severe hemorrhage from a tubal abortion. The woman died in a day or two, but nothing pathologic could be discovered beyond intense anemia of the tracts. Evidently death had occurred before histologic changes had become manifest. If toxins are responsible, we would expect to find the most pathologic changes in the more vascular regions, but this is not the case. The regions with the poorest blood supply seem to suffer most, and these would naturally feel most severely any depreciation in the quality of the blood, and, in these regions, the parts would suffer most which are worn out most.

Woltmann, H. W. Pernicious Anemia and the Nervous System. [Am. Jl. Med. Sc., Mch., 1919.]

In some 150 patients with pernicious anemia the author has found evidences of nervous disorder in at least 80 per cent. In about 12 per cent. of the cases the nervous symptoms occupy the main attention of the patients. These symptoms are chiefly paresthesias, especially of the

hands and feet present in 80 per cent. Occasionally girdle sensations, or that of a tight band drawn around the knees is complained of. Inability to control the arms and legs is frequent. Cramps of the muscles of the legs is a frequent complaint. Diminution in the sense of smell, taste and hearing was noted in a few cases. Some patients had suffered for ten years. The type of lesion of the nervous system is a subacute combined degeneration of the cord, beginning in the posterior or the lateral columns or in both simultaneously, though the columns of Goll and Burdock are in the majority of cases first and most extensively involved. Multiple neuritis was present in 5 per cent. of the patients.

Vellacott, P. N. Spinal Injury with Retention of Urine. [Lancet, May 3, 1919.]

The author reviews the danger to life of infection of the urinary tract in these cases and the several methods of dealing with the retention of the urine. He advocates the practice of manual expression of the distended bladder as the most satisfactory in avoiding infection and promoting the development of the "automatic bladder," but he calls attention to several instances of rupture of the viscus by this method. He has found that temporary paralysis of the bladder sphincter by the passage of a large instrument greatly facilitates subsequent expression of the urine and he suggests its utilization in all cases in which difficulty is encountered.

Watson, Ernest M. The Recognition and Management of Bladder Symptoms in Spinal Cord Disease. [Med. Soc. N. Y., June 7, 1919.]

He stated that there was definite evidence that sympathetic efferent fibers from all the nerves between the first thoracic and scond, third, and sometimes fourth lumbar nerves were concerned in the innervation of the bladder and urethra. In addition, the sacral autonomics through their post-ganglionic fibers with their motor cells lying in the vesical plexus near the surface of the muscles they supplied were intimately associated with above. In the cord proper definite branches from the first, second, and third sacral nerves went directly to the vesical plexus, while along the paths in the cord were in the posterior portion the lateral columns near the pyramidal tracts which were believed to be the path of impulses from the higher cortical centers. From this multiplicity of innervation it could be appreciated the difficulty in attempting to interpret the neuropathology of bladder disturbances. After discussing the mechanics of bladder tension and urination, he stated that any lesion which interfered with the integrity of the reflex arc might give one or more of the so-called group of bladder symptoms. Of the essential bladder symptoms encountered in spinal cord disease, incontinence and, less frequently, retention were the two predominating. The incon-

tinence might be a true incontinence due to relaxed atonic condition of the musculature about the outlet of the bladder, including the internal and vesical sphincter, the intrinsic involuntary muscles of the posterior urethra, and probably also the external sphincter. In this type the bladder was usually of small capacity and there was usually little or no residual urine present. The other form might be of the so-called paradoxical variety in which there was really a retention present and the incontinence was the overflow of a greatly distended bladder. In this latter instance the bladder capacity might be normal, but was usually considerably increased. Before the onset of the above rather characteristic but late symptoms there was usually noticed a hesitancy or difficulty in starting the stream which frequently antedated the more serious complaint for months or years. Another of the early disturbances might be an increased frequency or in some cases, while the bladder was undergoing the process of gradual dilatation, long intervals between voidings. From the atonic state of the vesical musculature and from the not infrequent occurrence of varying amounts of residual urine the condition was one which was very prone to be complicated by infection. When this occurred there might be various degrees of burning, painful burning, and general dysuria. The early recognition of the vesical symptoms in disease of the spinal cord was of paramount importance, as much could be accomplished for these individuals under a careful routine of functional punctuality and rational therapy. In all cases in which there might be question of spinal involvement the deep and superficial reflexes should be carefully studied. In order to determine their exact status several examinations might be necessary. The pupillary reflex, the action of the biceps, triceps, and periosteal radials of the upper extremity; the abdominal and cremasteric reflexes, the knee kicks, plantar responses, and ankle jerk were all of much value. The Romberg test should also be made. In the rectal examination one frequently encountered a very definitely relaxed external sphincter, which was a very suggestive finding. The cystoscopic findings might also add much in the way of positive evidence. The study of a spinal case was not complete without the data furnished by the examination of the spinal fluid, which should include a spinal fluid pressure, cell count, globulin determination, the Wassermann and the colloidal gold tests. The management of the spinal bladder called for a well-outlined plan of procedure covering, in many cases, a considerable period of time. The first step should be to determine the presence or absence of infection, as evidenced by the finding of pus and organisms in the microscopic examination of the third glass of voided urine or of a catheter specimen. Infected cases should be given urotropin. Individuals with residual urine of over 100 c.c. should have systematic catheterization every two days, and the more advanced cases every day for a time. This should be followed by bladder lavage with nitrate of silver solution, ten drops of a 10 per cent.

solution to a quart of water. In addition he had found it of distinct advantage to leave in the bladder a half ounce of 10 per cent. argyrol solution. Individuals who still had some degree of tonicity to the musculature about the bladder orifice might be given periodic dilatation of the posterior urethra once or twice a week. Certain aids might be given by the patient himself. From the beginning he should drink copiously of water. In addition he should be instructed to inaugurate a certain routine of voiding and passing urine at definite intervals, usually not longer than two hours apart. A further effort in the way of gaining voluntary control might be made by practising stopping and starting the stream. By far the most common lesion of the spinal cord one found giving early bladder symptoms was tabes dorsalis. In a recent detailed study of the course of bladder symptoms in tabetics under intraspinal therapy using mercurialized serum, it was found that of the cases having residual serum everyone showed a marked decrease in the amount, and in over 40 per cent. no residual was obtained after several treatments in repeated examinations.

Kidd, Frank. Treatment of the Bladder in Gunshot Injuries of the Spinal Cord. [British Medical Journal, April 5, 1919.]

Before the war the profession was obsessed with the idea that very little could be done for the unfortunate sufferers from gunshot injuries of the spinal cord so far as the state of the bladder was concerned. This was due to an erroneous conception of the conditions and of the physiology of the bladder. He cites the recent work of Head and Riddoch to show that when the bladder has been adequately cared for it can be made to empty automatically at fixed intervals, this automatic action being established in two weeks or more in partial lesions of the cord, in three to four weeks in complete lesions, and in three or four months in sacral lesions. In order to obtain an automatic bladder in such cases two conditions must be met, namely, the paralyzed bladder must never be allowed to become over distended and stretched for it then cannot recover its tone, and the bladder must never be allowed to become severely infected, for this destroys the muscular tissue and leads to their replacement by fibrous tissue. Four methods are available, or have been practised, for the care of the bladder: (1) The intermittent use of the catheter. (2) Immediate suprapubic cystotomy. (3) Regular periodical expression of the urine. (4) The use of the tied in catheter. Of these the two first do not fulfill the conditions and should be abandoned. The author has employed the fourth method with the greatest success when certain very necessary precautions have been observed, but he is inclined to believe that the third method, when properly carried out, may prove to be the best. His plan of using the tied in catheter is to irrigate the anterior urethra thoroughly with a quart of warm water containing two drams of the oxycyanide of mercury and then to pass a sterile soft rubber

catheter of No. 9 or No. 10 English scale. This is tied in by means of a safety pin passed through it, to which two small strips of soft tape are attached and fastened to the penis by adhesive plaster. The urine is collected in a bottle. The catheter should be changed every fourth day, the urethra being irrigated at each change. While the catheter is in *situ* the bladder should be irrigated with the solution of the oxycyanide of mercury twice daily and the patient should be given hexamethylenamine and acid sodium phosphate if the urine be acid and boric acid and benzoic acid if the urine be alkaline.

Figueira, F. Paralysis of the Neck. [Arch. d. Méd. d. Enf., March, 1912.]

This peculiar syndrome which affects infants and young children who, on waking, cannot hold up the head. It falls forward or backward. In some of the cases there had been a preceding pseudogrippal catarrh. The tendon reflexes were usually diminished, and the electric excitability reduced. This acute and sudden loss of power disappeared in four to ten days, without residuals. The cases were observed at Rio de Janeiro, and coincided with an epidemic of 100 cases of poliomyelitis. Figueira regards this syndrome as a mild type of poliomyelitis.

Dejerine, Mme., and Ceillier, A. Bony Exostoses in Paraplegics. [Ann. de Med., March, 1919.]

In an extensive study, illustrated by numerous drawings and X-ray plates, Mme. Dejerine and Ceillier call attention to the resemblance between hypertrophic types of joint affections as seen in tabes and other spinal cord lesions and the joint affections with paraplegia from war wounds of the spinal cord. These *para-ostéo-arthropathies* occurred in nearly one-half of seventy-eight cases of paralysis of the lower extremities. The causes lie in the disturbance of the vegetative arcs passing through the central gray of the spinal cord. Local edema lowers the resistance.

Dumas, R. Treatment of War Injuries of the Spinal Cord. [Paris Letter, J. A. M. A., 1919.]

Dumas is of the opinion that wounds of the spinal cord should be subjected to the same treatment as all other war wounds, that is to say, by excision, removal of fragments of bone, repair of nerve lesions—when that is possible—and closure of the wound. Tuffier, however, does not believe that such treatment should be the rule, because in a large number of cases when the patient is in shock his life would be endangered by operation, whereas after ten or twelve days the operation is no more serious than with any ordinary war wound. Dumas' statistics confirm this statement: In thirteen cases in which operation was done be-

tween the first and the fifth day after the injury occurred, death resulted in five; while only three fatalities occurred in twelve cases in which operation was done some time during the first two months after the wound was inflicted. None of the patients who were operated on early received any special benefit therefrom, nor was there any return of motion or any improvement in sphincter function, and only three showed evidence of slight regression of anesthesia and corresponding return of sensation. Nor did those patients who were operated on late show any evidence of improvement. Nothing, in short, seems to justify the opinion that wounds of the spinal cord should be treated like other war wounds, and early intervention does not seem to be called for. An exception should be made, however, in those cases which present incomplete lesions or compression of the cord by a projectile or a bone fragment, as shown clearly in the roentgenogram. In these cases marked improvement may be obtained by immediate operation, but it must be borne in mind that removing the cause does not necessarily suppress the effect. Even after removing the intramedullary projectile or the bone fragment, or after relieving compression caused by a displaced vertebra, functional disturbances may persist, sometimes indefinitely. Everything depends on how much pathologic change has taken place in the cord. However, it is certain that in all cases in which incomplete division or compression of the cord is suspected, intervention, after the shock symptoms have disappeared, is indicated.

Villandre, Ch. Treatment of Spinal War Traumatisms. [La Presse Médicale, Nov. 7, 1918.]

The author speaks of the importance of rational treatment in cases of wounds of the spine, and gives a detailed account of such wounds. (1) Nervous Shock. A more or less pronounced state of nervous shock usually follows spinal traumatism, demanding immediate and methodical treatment. In cases where such condition persists in spite of the treatment, the accompanying factors, hemorrhage, visceral complications, etc., should be diagnosed, and surgical intervention resorted to as soon as possible. (2) Visceral, Paraspinal and Vascular Lesions. Patients suffering from joint medullar, pleural and pulmonary lesions should not be kept at C. C. S.'s., but submitted to surgical treatment with the least possible delay. (3) Infection. A spinal wound may become infected either by shell splinters, fragment of earth and clothing, or by pathogenic agents from the skin. Purulent meningitis is the most dangerous complication occurring in wounds of the spine. Rapid evacuation of the cases concerned, excision of the wound and removal of foreign bodies, sequestra, etc., are imperative. When primitive suture is impossible, owing to the age or extent of the wound, Carrel's method of disinfection should be applied. (4) Other Complications. (*a*) Eschars: All sources of local infection should be carefully removed and the patient's position

changed every hour. Eschars may be either dressed 3 to 4 times a day with aseptic gauze, exposed to sun or hot air, or treated by means of special solutions. (*b*) Urinary infection may be avoided or at least localized by regular, strictly aseptic soundings, and vesical, antiseptic irrigation. (*c*) Cases with pleuro-pulmonary complications should be immediately placed in warm, well-aired wards, and carefully examined twice a day. Patients should be removed to special hospitals as soon as their condition permits. Surgery. The treatment of spinal wounds requires: (1) Large, superheated wards with special equipment; (*a*) wide, comfortable beds; (*b*) water-beds; (*c*) total suspension devices. (2) Special operative tables, radioscopic installation, etc. (3) An especially trained personnel. For these reasons it could not be undertaken in field hospitals and C. C. S.'s. The author further discusses the value of early surgical action and quotes the opinion of various observers, such as Gosset, Derache, etc. Villandre himself believes that pathologic anatomy is of greater assistance in judging as to the advisability of early operation than clinical data. In cases of spinal traumatism, pathologic anatomy shows that any lesion resulting in the compression of the spinal cord demands early operation. On the other hand, from a bacteriological standpoint, all foreign bodies, sequestra, etc., must be removed within the first 6 to 8 hours and suture performed, in order to avoid primary or secondary infection. As reported by Roussy, Lhermitte, and Sharpe, medullary suture improves the general condition of the patient as regards both trophic and sensitive troubles. Lortat-Jacob, Girou and Ferrand record partial recovery of the spinal motility and sensibility after suture. These observations point out the advisability of suture of the spinal cord whenever it is possible; unfortunately, however, in a large proportion of wounds of the spine met with in this war, the damage done by the projectile is such that the surgeon must confine himself to mechanical disinfection and removal of the causes of medullary compression. Local anesthesia is recommended.

4. MEDULLA, MID BRAIN. BASAL GANGLIA.

Ely, F. A. Lethargic Encephalitis. [Journal A. M. A., April 5, 1919.]

Ely reports two cases of lethargic encephalitis, one of which has undergone thorough laboratory investigation. In his comments on these he remarks that there was no history of previous influenza in either of these cases, unless the mild febrile disturbance which ushered in the illness might be regarded as such. He also notices the bodily lethargy in these cases as similar to that in Parkinson's disease, and says it is only fair to assume that minute hemorrhagic areas in the corpus striatum observed in lethargic encephalitis may produce the same symptoms as the degenerative area in the same structures in Parkinson's disease. Another

point of interest is the fact that when lumbar puncture was made in the second case and 20 c.c. of spinal fluid was removed, the patient at least partially woke up, volunteered statements and asked about some of her possessions which she had put away for safety. This was after five days of absolute silence and apparent indifference, during which time she answered only questions given in an imperative manner.

Grenet. Encephalitis Lethargica and Mumps Meningitis. [Gaz. d. Hôp., Feb. 22, 1919.]

The author relates a case which occurred last June in a boy of fourteen years stricken in the midst of health with symptoms suggestive of meningitis. The parotids were swollen and tender and there was difficulty in opening the mouth. There was also a gingivitis. The diagnosis of meningitis complicating mumps was thought to be fully warranted. During the next few days the situation showed no marked change. There was some tendency to somnolence and lethargy, the boy remaining passive throughout. While the lumbar punctate was suggestive of meningitis there was a singular absence of headache and vomiting and in other ways the meningitis was atypical; and while the temperature, nuchal rigidity and Kernig gradually subsided, the boy did not improve in other respects and his somnolence and lethargy increased. Certain ocular pareses present from the first persisted. After a period during which it was becoming very difficult to nourish the patient, he rallied slightly and from that moment began very slowly to improve. Despite his youth and original good condition, slight bed sores had formed and healed. The lumbar punctate had become normal. After one month of illness the patient had regained control over his lips; he smiled and tried to speak, and in another day had regained his voice. The ophthalmoplegia still persisted. As the child entered the third month of his illness he was still unable to walk because of slight paresis of one leg, his voice was still unnatural and the eye movements still abnormal. By the sixth month he had nearly recovered, the only sequel of the disease being a taciturnity and lessened impetus to play. This case was quite isolated in the community and apparently the diagnosis originally made was not changed until attention had become focussed on lethargic encephalitis, whereupon a retrospective diagnosis of this affection was suggested. The multiple paresis of the facial muscles, which also extended to the larynx and extremities, and even the lumbar punctates were of the types seen in lethargic encephalitis. But what of the mild parotitis and the gingivitis? The patient had seven brothers and sisters and not one of these presented any symptoms of mumps, although such a highly diffusible affection, had it existed, must have spread to some extent, for not one of the seven children had had that malady. On the other hand, Netter, an authority on lethargic encephalitis, has reported that in some of his cases of the latter there was an initial sore mouth and swollen parotids, which should decide the entire question in favor of encephalitis.

Saint-Martin and Lhermitte. Primary Poliomesoencephalitis. [Prog. Med., June 22, 1918.]

This term is probably the authors' to express what Netter and others have called lethargic encephalitis. Two typical case histories are detailed; temperature, narcolepsy and ptosis were the main symptoms observed.

Lethargic Encephalitis. [Editorial, Bost. Med. and Surg. Jl., May 8, 1919.]

A reprint describing the disease known as "lethargic encephalitis" has been issued recently by the Public Health Service. This disease has been made notifiable in England, and it is desirable that it should be determined to what extent it prevails in this country. At a meeting of the Vienna Psychiatric Society in 1917, a group of cases which had occurred in epidemic form were described, under the name "lethargic encephalitis," by Von Economo. The disease was discussed also at a meeting of the Paris Academy of Medicine, and evidence was brought forward which indicated its prevalence in Germany in the late seventeenth and early eighteenth centuries, in Upper Italy and Hungary in 1890, in Europe and the United States in 1895, and in Vienna in the winter of 1916–1917. There was an epidemic in England in 1918, and clinical and pathological investigations have been undertaken by the government and by the Medical Research Committee.

The data collected in the course of these investigations have been published, and indicate that the disease is an acute affection due to a specific virus, probably finding entrance through the nasopharynx, and having a special affinity for the nervous system. Pathologically, lethargic encephalitis belongs to the class of polioencephalitic diseases which are inflammatory in nature. It has been noted that clinically the disease is a general infectious disease characterized by manifestations originating in the central nervous system, of which the most frequent and characteristic are progressive lethargy or stupor and lesion in or about the nuclei of the third pair of cranial nerves. In most cases, a prodromal period may be recognized. Usually the first symptom is simple catarrhal conjunctivitis and sometimes tonsillitis, sore throat, and bronchial catarrh; but the salient system in most cases has been progressive lethargy. There is great muscular weakness manifested, delirium is not uncommon, and irregular nonrhythmic spontaneous movements of the face, trunk, and limps are not infrequent. Ophthalmoplegia is perhaps the most common localizing sign. Seven types of cases have been recognized: (*a*) A clinical affection of the third pair of nerves; (*b*) affections of the brain stem and bulb; (*c*) affections of the long tracts; (*d*) the ataxic type; (*e*) affections of the cerebral cortex; (*f*) cases with evidence of spinal cord involvement, and (*g*) the polyneuritic type in which affection of the peripheral nerves is suspected. The most common diag-

nostic error is to attribute the condition to tuberculous meningitis. Lethargic encephalitis has a very definite clinical syndrome, characterized by progressive stupor or coma, alternating delirium, headache, giddiness, asthma, mental and emotional changes, and, in the majority of cases, by paralysis of the third pair of cranial nerves. No specific method of treatment has as yet been devised. In many cases, transient or permanent relief has been obtained by the withdrawal of cerebrospinal fluid by lumbar puncture. It has been observed that convalescence requires at least six months after the beginning of the illness. The publication of these reprints is of great value in calling to the attention of the profession the salient facts concerning a disease about which very little is known.

Cleland, Campbell. Acute Encephalomyelitis. [Med. Jl. Australia, Mch. 22, 1919. J. A. M. A.]

This so-called "mysterious disease," which first made its appearance in New South Wales, Queensland and Victoria, and which was reported by several clinicians in 1917, is not the same as epidemic lethargic encephalitis, in the opinion of Cleland and Campbell. They believe that the acute encephalomyelitis under discussion is a distinct and hitherto unrecognized entity resembling ordinary infantile paralysis and at the same time histologically resembling hydrophobia. The disease is always present in sporadic form. Investigations carried out during 1918 by Cleland, Campbell and others seem to give strong support to the contention that the disease is a hitherto unrecognized entity. The points to which attention is specially directed by the authors are the following: There is no record of an epidemic of acute poliomyelitis in which signs of cerebral irritation have so strikingly dominated the clinical course, nor of one in which there has been such a high mortality rate (70 per cent.), nor of one in which such a large proportion of adults have fallen victims. Histologic examinations of the brain and spinal cord from sixteen human cases and from various experimentally infected animals have all shown lesions of a similar and, as regards distribution, distinct kind. The first and most important change is a thickening of the veins. The vein wall is surrounded by a collar or sheath or sleeve of cells which sometimes fills and distends the perivenous space. The vessels so affected may be found apparently in any part of the brain or spinal cord, though not necessarily in the same situation in all cases. Some vessels may be affected and others escape. In early cases most of these cells are indistinguishable from lymphocytes, though interspersed among them may be some cells of fixed connective tissue origin. Later the cells may show more protoplasm and an indented nucleus—a stage toward organization. In addition to these perivenous sheaths, there is intense congestion of all vessels and sometimes evidence of stasis. As secondary phenomena degeneration of nerve cells may occasionally be found, probably

due to interference with their nutritive supply. The disease in monkeys, of which the authors have had twenty examples under observation, seems not to agree with that described in these animals when infected with the virus of ordinary infantile paralysis. Altogether nineteen of the twenty monkeys showed varying degrees of incoördination, and thirteen, including twelve of the nineteen, exaggerated muscular movements or convulsions. On the other hand, fourteen monkeys showed paresis or paralysis, consisting of slight paresis of a limb in three, marked paresis in five and apparent paralysis of a limb or other part in six. In two monkeys ptosis was marked and in one it was slight. Two showed squint. In no instance was the disease ushered in by definite paresis or paralysis of a limb or set of muscles alone and in no instance was paresis or paralysis the dominant clinical feature. The virus of the Australian disease has been conveyed to thirteen sheep, a calf and a yearling foal. A histologic examination of the brains of these animals has shown the same pronounced perivenous cellular infiltration as was seen in the human cases and in monkeys.

Flexner, Simon. Encephalitis Lethargica. [Med. Soc. State of New York. Med. Record, May 24, 1919.]

The author made a comparison of the differential points between this disease and poliomyelitis. The anatomical difference was noted; in poliomyelitis it was found that the spinal cord is most affected and sometimes areas in the medulla, but the higher centers of the mid-brain are little or not at all involved. It had been stated that in encephalitis lethargica the spinal cord escaped infection, but this, Dr. Flexner said, had not been his experience; he had noticed involvement of the spinal cord, which, he thought, brought the two diseases more closely together. On the other hand, the extent of involvement of the mid-brain in encephalitis lethargica was out of all proportion to that noted in poliomyelitis. The localization of the disease in certain regions was that which would best account for the symptoms most common in the disease. One early symptom is involvement of the third cranial nerve, with accompanying lesion of the optic thalamus, the origin and direction of which is closely associated with that of the cranial nerve, in such a degree that the affection of both was easily understood. Furthermore, the external stimuli that keep people awake pass through the optic thalamus on the way to the higher brain centers, thus, when this region was blocked it favored the development of stupor and the lethargic state. In regard to infection, poliomyelitis could be communicated to monkeys and induce in them the corresponding clinical signs and pathological lesions which are present in the human being. The speaker quoted one report which was made in Vienna, and was referred to in the French literature of successful communication of encephalitis to a monkey. However, from the description of the so-called "successful transmission" Dr.

Flexner said he felt that no real transmission took place, that the material inoculated was not sterile and that the infection of the animal was of the streptococcus type. They had tried a small number of inoculations at the Rockefeller Institute but in no instance had they achieved unequivocal results. He could not say that no one would ever be able to do so, but never with the ease with which poliomyelitis could be induced in that animal. Another difference to be emphasized was that those individuals who had poliomyelitis and who died, died within the first few days, because of the involvement of the spinal cord and the overwhelming of the respiratory centers and death took place from asphyxiation. In encephalitis lethargica, on the other hand, there are few early deaths, but mostly after weeks or months, and the nervous involvement is progressive; a disphagia takes place and it is necessary to feed the patient by tube. A terminal bronchopneumonia usually supervenes. Attempts had been made to cause the disease in monkeys by using the nervous tissue of old cases, but this was difficult, and so materials had been tried of more recent origin, that is, from cases 8 or 9 days old. This was taken out with great precaution as to complete sterility, but thus far there were no successful results from the inoculation. Dr. Flexner then showed lantern slides illustrating the involvement of cellular tissue and of vascular changes in the brain; involvement of the spinal ganlia; of the lateral ventricle with complete wiping out of nervous structure; hemorrhages, both microscopical and macroscopical, the distribution of which differed much from those in poliomyelitis; infiltration of the pia. The question might be asked, Dr. Flexner said, as to how much influence was noted on the cerebrospinal fluid in encephalitis lethargica, that there were certainly increased cells and globulin but much less, however, than in meningitis or in poliomyelitis. There was no doubt that in this encephalitis lethargica there was a proven disease of the central nervous system. It could be considered as an infectious, communicable disease, but to what extent it had been transmitted would not be know until reports had been made and studied to determine which were really cases of the disease and which were not.

In this discussion Dr. Israel Strauss said that Dr. Flexner had given an interesting presentation of the pathology of the lesion. The neurologists had a very definite clinical description of the disease and of its types. Dr. Flexner had dealt thoroughly with the question which had bothered neurologists and pathologists alike, the relation of this disease to poliomyelitis; some writers had even gone so far as to claim that the diseases were identical. Much experience had been gained in Dr. Sachs' wards at Mt. Sinai in which 40 cases of encephalitis lethargica had been studied. They had been able to exclude syphilis and other diseases of the central nervous system by the study of the cerebrospinal fluids. In one early case 160 cells were counted, which was far less than one would find in poliomyelitis. Another feature was that in many of the cases

there was a history of one, two or three months' previous influenza infection; one case ten days after influenza infection. The British workers, Dr. Strauss said, do not connect the two diseases, but, according to Gibson, there is a filterable virus which is the underlying cause. One point upon which Dr. Flexner had perhaps not laid enough stress was that there were many more hemorrhages in encephalitis lethargica than in poliomyelitis. The aphagia, however, was more prevalent in poliomyelitis than in the other disease. Dr. Strauss said he had studied the brains, though not as yet the cords of these cases and had encountered the lesion so well described by Dr. Flexner. There was more hemorrhage in the cortex, but without perivascular infiltration. In one case, the report of which was published, an unusual feature was the high temperature; the brain showed marked invasion of the meninges, with punctate hemorrhages. Cultures from the brain gave an aërobic and an anaërobic organism; in one case there was probably streptococcus contamination. A monkey injected intradurally and intracerebrally became ill in three days, but this animal had been used in surgical experiments and was not in tiptop condition. It became weak and lethargic. When killed, a hemolytic lesion was visible at the site of inoculation. Of three other Macacus monkeys injected, one became ill and recovered; two others showed no sign. One animal injected with washings of mucous membrane of a patient became ill and suffered paralysis of the hind legs within 8 days; after 11 days it recovered. The various inoculating preparations were passed through a Berkefeld filter. Our animal inoculated developed meningitis and examination showed hemorrhages in the cortex and in the pons. A monkey that had recovered with inoculated with an emulsion very virulent for rabbits, and this animal remained well. A baboon, an animal much more resistant than the Macacus monkey, was inoculated subdurally with the same preparation and became very ill. They could substantiate Dr. Flexner that this disease was not poliomyelitis, but they felt that they had produced a filtrate virus which had given lesions similar to those in human beings; it remained to decide what this virus was and its relation to encephalitis.

Strauss, I., Hirschfeld, S., and Loewe, L. Lethargic Encephalitis. [N. Y. M. J., May 3, 1919.]

A series of experiments are reported which were performed in an effort to establish the etiology of epidemic lethargic encephalitis. Lesions in the monkey characteristic of the lesions found in epidemic lethargic encephalitis were produced by inoculation of human brain emulsion. Washings of the nasopharynx inoculated produced paralysis in the monkey accompanied by spinal fluid pleocytosis. A filtrable virus obtained from the nasopharynx in a fatal case of epidemic lethargic encephalitis produced an experimental hemorrhagic encephalitis in the monkey.

Tucker, B. R. Lethargic Encephalitis. [Journal A. M. A., May 17, 1919.]

Tucker publishes a number of cases, in one of which a postmortem was made and inflammatory conditions around the pituitary body and at the base of the brain were revealed. He gives it as his opinion that epidemic lethargic encephalitis is either a manifestation of the recrudescence or recurrence of influenza, or in certain cases, influenza per se. Since the height of the influenza epidemic numerous nervous sequelæ have been observed, and these are probably manifestations of encephalitis without lethargic symptoms. He can see no relation between lethargic encephalitis and infantile paralysis, and it appears to resemble brain abscess more than any other condition. Three cases were sent to him with that diagnosis. "Epidemic encephalitis lethargica seems to be due to congestion of the pia and the encephalon, chiefly at the base of the brain, and to be accompanied by a slight inflammatory exudate affecting various cranial nerve roots and causing, as a rule, increased intracranial pressure with increased globulin content and increased cell count in the fluid. Examination of the urine reveals nothing of special interest, but examination of the blood presents an almost constant moderate leukocytosis, and commonly an increase in the urea content." Tucker thinks we are dealing with a syndrome rather than with a new disease, and that the somnolence is chiefly due to pressure and inflammation of the pituitary gland.

Burger, H., and Focquet, R. Lethargic Encephalitis. [Arch. Med. Belg., Jan., 1919.]

The clinical picture described as lethargic encephalitis is said by these observers to be confused, the etiological fact is unknown, and the anatomical pathology basis not well delimited and differentiated from influenza poliomyelitis or related toxic encephalieds of the mesencephalon. Epidemics had been recorded at Tübingen in 1712, in Italy in 1890, and at Vienna in 1916. The death rate was found from 25 to 40 per cent. They describe a patient who was found unconscious, apparently in deep drunkenness. He slept and complained of severe headache in the right temple on awakening he also had ptosis of the right eyelid and divergent strabismus. Jacksonian epilepsy developed and he died in about two weeks.

Dragotti, G. Lethargic Encephalitis. [Policlinico, Oct. 6, 1918.]

Since the epidemic of lethargic encephalitis coincided in 1890 with the influenza epidemic, this author believes that the so-called lethargic encephalitis is a mesencephalitic form of influenza. Dragotti regards it as identical with nona, which was prevalent in Italy at the time of the last influenza epidemic.

Claisse, P. Lethargic Encephalitis. [Bull. d. l. Soc. Méd. d. Hop., March 7, 1919.]

Three patients suffering from mild forms of lethargic encephalitis are here described; there was merely great sleepiness. In one patient slight diplopia and ptosis were the first symptoms. Headache and slight fever had been noticed for a week. The patient made a complete recovery in two months.

5. CEREBELLUM.

Vischer, H. Laceration of Tentorium Cerebelli at Birth. [Correspbl. f. Schw. Aerzte., Feb. 22, 1919.]

After a historical résumé of other findings in this condition case reports of 186 infants are given. In 51 of 74 cadavers the tentorium had been lacerated with hemorrhage in 27. In all the tentorium was torn in 27 per cent. of the 186 cases. One adult showed a severe laceration of the tentorium after contusion of the head from severe accident. Laceration of the tentorium in itself is not the cause of death; it is the resulting hemorrhage. Intrameningeal and other hemorrhages are probably synchronous. The birth process he concludes injures the skull contents more than is realized.

6. BRAIN—MENINGES.

Vaidya, S. K. Obscure Epidemic Encephalitis. [Lancet, Sept. 7, 1918.]

Vaidya reviews the American findings which have been reported, especially the phase of the blood, and cerebro-spinal fluid. He finds that the American investigators recorded a leucocytosis of from 15,000 to 30,000 in the blood, combined with an excess of protein. A well-marked excess of mononuclear cells (small lymphocytes) in the spinal fluid is always present in cases of poliomyelitis. In a small percentage of cases polynuclear cells are said to occur in the spinal fluid in the prodromal stage.

He then analyzes eighteen cases of epidemic encephalitis from the same standpoint, and comes to the following conclusions:

1. The very small amount of leucocytosis (8,000–9,000 per c. mm.) in the cases of epidemic encephalitis falls far short of the pronounced leucocytosis (15,000–30,000) recorded at the Rockefeller Institute in cases of poliomyelitis.

2. The cerebrospinal fluid is not as grossly affected as in poliomyelitis, in which often cell counts running into several hundreds and sometimes exceeding 1,000 per c. mm. have been recorded. As a matter of fact, the deviation from the normal is very small.

3. In view of the very small deviation from the normal, both of the blood and spinal fluid in cases of epidemic encephalitis, and especially

in the absence of successful experimental communication of the disease to monkeys with the production of paralysis, we are not justified in asserting that the virus of epidemic encephalitis is the same as in poliomyelitis.

4. Although the results of the examinations of the blood and spinal fluid afford no positive proof in support of a diagnosis of epidemic encephalitis, such negative results will materially help in ruling out a number of obscure cerebral conditions, *e.g.*, pneumonia, tuberculous meningitis, etc., as was occasionally found to be the case.

Bellin, Aloin, et Vernet. Sinus Diseasse. [Lyon Chir., Sept., 1918.]

A report of a case of thrombophlebitis arising from infection from a carbuncle of the neck. The chief symptoms were tetany-like cramps, paralysis of the facial and fourth nerve (Gradenigro's syndrome).

de Petinto, M. P. Fracture of Skull. [Prog. d. l. Clinica, Sept., 1918.]

This is a complete and detailed experimental study and analysis of clinical material derived from the medico-legal autopsy material of the public material of Madrid. The author shows from his experiments of dropping heavy weights upon the skull that the direction of the fissures can be estimated when the hitting instrument is known. The character of the agent and the site of the blow can also be termined from the nature of the fissures. The fracture lines trend toward the opposite and symmetrical point of the skull. The fractures are always direct. The base of the skull is more fragile than the vault and thus when the fissure reaches into the base of the skull it is liable to do more damage than the results of the direct blow which may be overlooked.

Walthal, D. O. Recovery of a Case of Purulent Meningitis Complicating Mastoiditis. [J. Mich. St. M. Soc., 1918, 102.]

The case reported is of a child seven years old who developed a mastoiditis which spread through the petrous portion of the temporal bone and involved a small area of the dura, causing a purulent meningitis as shown by spinal puncture. The infected tissue was removed and the wound closed partially; the patient left the hospital. Fourteen days later she developed fever and other signs of meningitis and returned to the hospital, when the wound opened and discharged very foul pus. The wound was irrigated with saline. It is closing, and the patient is afebrile and playing about the ward. The value of lumbar puncture as a means of early diagnosis and the necessity of early operation is emphasized.

Damaye, H. Meningitis from Otitis. [Progres Méd., Oct. 26, 1918.]

The patient developed acute maniacal symptoms from meningitis, secondary to double otitis staphylococcus infection. The author terms it a mania.

Osler, W. Influenza Meningitis after Pneumonia. [Lancet, March 2, 1918. J. A. M. A.]

Osler cites a case of influenza pneumonia with bilateral rigidity, spinal meningitis with hemorrhage into the vecca vertebralis and nerve roots. The neck was so rigid that the patient could not lift the head from the pillow. The spine was arched, the muscles strongly contracted. Both upper limbs were in tonic spasm, the arms more than the forearms; he could extend and flex the fingers; he could not move the arms from the side; at intervals there was slight tremor. Both legs were rigid; the muscles stood out prominently, and the foot was extended; slight ankle clonus, knee-jerks not obtainable, nor the Babinski sign. On the skin of feet and ankles was a crop of fresh purpura. The breathing was largely abdominal, movements of the chest were very slight, but more on the right than on the left side. Dulness shaded to flatness from the fourth left rib upward, extending into the axilla and as high as the angle of the scapula behind; intense tubular breathing with fine crepitant râles was present. The heart sounds were clear. He had, in addition, well-marked purpura. Lumbar puncture was negative. Blood cultures were negative. Necropsy: Into the spinal theca and extending along the nerve-roots into the foramina was a uniform sheeting of hemorrhage obliterating the spinal veins, dense enough to cover completely the nerve-roots and involving their sheaths; it was more marked in the posterolateral than in the anterior portions. There was no free blood in the spinal canal; the hemorrhage was entirely into the theca.

Paisseau et Hutinel. Malarial Meningitis. [Paris Méd., March 8, 1919.]

Attention here is focused on the occurrence of severe malarial outbreak since the war leading to meningeal localization of the parasite, with mild or severe signs of a localized or generalized meningitis. Vigorous quinine treatment is usually effective but persisting sequelæ may result. The circulating blood may be free from the organisms in these conditions, a fact brought out many years before by Ewing in his studies on severe malarial infections.

Bausa, Jon. Tuberculous Meningitis. [Medicina Iberia, July 20, 1918.]

The almost fatal issue in this distressing infection is emphasized by Bausa. In 60 patients the mortality has been 100 per cent. He argues that the high local pressure rather than sepsis kills these children and speculates on the why, and the methods to overcome it. The lesions in the meninges are not fatal to life; the meninges can be compared to the pericardium, and inflammations of neither are always fatal. The disease is subacute or with a chronic tendency. The cerebrospinal fluid recollects rapidly, the relieving puncture must be frequently repeated,

and large amounts withdrawn without fear. He suggests that canula might be left as a permanent drain.

Fildes and Wallis. Local Treatment of Meningococcus Carriers with Antiseptics. [Lancet, Oct. 6, 1917.]

Owing to the measures adopted in the British Navy to limit the spread of cerebrospinal fever a large number of carriers were detected in the Portsmouth depot and isolated in a special camp. It then became necessary to attempt to sterilize the throats of these men, and, although from analogy with other diseases the local application of antiseptics appeared likely to be unprofitable, it was thought desirable to give these a trial. If the antiseptic did not destroy the cocci in the throat, it was possible that it might prevent the cross infection from one man to another. The antiseptics most thoroughly tested were chloramin-T and acriflavine. Other antiseptics were boric acid, phenol, magnesium hypochlorite, aqueous solution of formaldehyd gas, potassium permanganate, guaiacol and several others. In addition to these, Fildes and Wallis administered to a few men a placebo in the form of tablets of formaldehyd solution. Chloramin-T was applied in two different ways: (*a*) In an inhaling chamber: A 5 per cent. solution of chloramin-T was used in the reservoir of the nebulizer; this strength was found to give as powerful an atmosphere of chlorin as was pleasant. The men remained in the chamber for about fifteen minutes per diem. (*b*) In a nasopharyngeal spray: The chloramin-T (2 per cent.) thus came copiously into contact with the whole nasopharynx and often dripped from the anterior nares. This treatment was applied once a day. Acriflavine in a strength of 1 in 500 in salt solution, was applied daily with the authors' nasopharyngeal spray. The other antiseptics mentioned were all applied with a nasal spray until the drug could be felt in the nasopharynx. The strength of boric acid was 1 dram to the pint, of phenol 1 in 200, of liquor formaldehyd 1 in 200, and of potassium permanganate 1 in 1,000.

Duval, C. W. Epidemic Meningitis. [New Orleans Medical and Surgical Jl., Jan., 1919.]

The disease is pandemic and in the past three years has appeared in practically every European country. The war was responsible largely for its spread and universal distribution. It has often followed the armed camp, having ravaged armies from the earliest times. The meningococcus is unknown outside the human body. It is spread by one individual to another. The meningococcus is disseminated, kept alive and propagated through the medium of the healthy human carrier. Some carriers harbor it for weeks, months or years. To break the circle, the carrier must be detected and isolated. The meningococcus enters and leaves the host by way of the secretions from the nasopharynx he believes. It passes directly back to the meninges *via* the lymphatics or

indirectly through the blood. Therefore, antitoxin should be administered intravenously, as well as intraspinally, in all cases. On the mucous membrane it seems to lead a truly saprophytic existence, since it multiplies in this situation freely, without exciting any response on the part of the host. During this period the patient is a transitory carrier. If infection is not established early the individual becomes a chronic carrier, and one who rarely becomes infected. Why the chronic carrier is refractory cannot be explained on the basis of there having been acquired an immunity during the carrier stage, for, in the absence of serological proof, it is demonstrated to the contrary. It can only be assumed that the human species is not highly susceptible to meningococcal invasion. True, healthy carriers rarely contract the disease and they outnumber, by thirty to one, the persons who develop meningitis in any area. The mechanism of dissemination consists in the dissemination of nasal secretion into the outside world. Infectious material is transferred to others, who, if near, inhale the germ-laden particles. There are at least four types of meningococcus, and possibly others not yet recognized. These types are, serologically, not related; they represent separate and distinct species. The antitoxin produced by any one of the so-called types is only of value in the treatment of the infection caused by that particular meningococcus. What was formerly thought to be a polyvalent serum has, in most instances proved to be nothing more than monovalent, because all the cultures used were discovered later to be of the same type. In treatment, it is essential to determine the type of infecting organism and then to give the monovalent or homologous serum, both intraspinally and introvenously.

Pacchioni, Dante. Cerebrospinal Meningitis. [Pathologica, May 15, 1918.]

Patients suffering from cerebrospinal meningitis suffer also very often from a meningococcic rhino-pharyngitis. It has been therefore generally held that the meningococci invade the meninges after passing through the minute apertures of the ethmoid plate or the sphenoid bone. Following points are now regarded as proven: (1) Meningococci may give rise to septicemia without causing meningitis. (2) Meningococci may be found fairly often in the patient's blood during the first days of the attack of meningitis, and even before the onset of the disease. This justifies the subcutaneous injections that are performed, together with the spinal injections, in cases of severe septicemia. (3) Lastly, why should the meningococci alone penetrate directly from the rhino-pharynx into the meninges, whereas it is known that no other bacteria does this? It seems possible to consider that in the cerebrospinal meningitis, a general infective process is localized in a special part of the organism. Cerebrospinal meningitis does not seem to be very infectious. Epidemics of this disease rarely spread widely. However, it is known

nowadays that about 15 or 20 per cent. of the healthy persons surrounding the patients are carriers of meningococci, and often suffer from a slight attack of meningococci rhino-pharyngitis. Some authors completely deny the infectious character of meningitis, but this really seems exaggerated. Dopter and Paccrioni consider that there are no epidemics of meningitis, but epidemics of meningococcic rhino-pharyngitis, involving septicemia in some cases, this being generally accompanied by meningitis. The meningococcus should be considered as a frequent agent of rhino-pharyngitis, a possible agent of septicemia, and, when this has taken place, an almost necessary agent of meningitis. Children are more liable than adults to suger from meningitis, for the following reasons: They prove particularly weak against all rhino-pharynx infections. General infections develop easily in their organism. A certain specific immunity existing probably in grown-up people fails during childhood. Following facts seem to prove this: (1) The serum of healthy persons has rather a strong agglutinating power, considering that of patients (1/20 to 1/35). (2) Among the soldiers, those suffering particularly from cerebrospinal meningitis are those coming from very aerated and lonely places, where they escaped all attacks of meningococcic rhino-pharyngitis. They failed, therefore, in acquiding the specific immunity. Although it has been said that lice might be active agents in the spread of meningitis, it has never been controlled. Presumed carriers of meningococci should be isolated for a fortnight, and special care should be taken of those with weaknesses of the rhino-pharynx.

Lamb, F. H. Epidemic Cerebrospinal Meningitis at Camp Cody. [Journal of Laboratory and Clinical Medicine, April, 1919.]

The present observer states that a determined effort should be made to carry out a bacteriological survey wherever large numbers of troops are brought together, for under such circumstances epidemic meningitis is very likely to occur. Such a survey was made at Camp Cody, so that it was possible to isolate the carriers in this cantonment, and their isolation is regarded as the measure of paramount importance in preventing the spread of the disease. The percentage of carriers in the total of 20,208 cultures examined was 1.28. On detection, carriers were sent to the isolation camp where the strictest attention was given to camp and personal hygiene. The carriers received a nasopharyngeal spray of two per cent. dichloramine-T four times a day, and they reported to the laboratory for culturing every fourth day. They were not discharged until three consecutive negative cultures were obtained. There were two cases of epidemic meningitis in December, 1917, and three in January, 1918, and during February seventeen cases were tentatively so diagnosed.

Short, J. Epidemiology of Cerebrespinal Fever. [U. S. Naval Medical Bulletin, October, 1918.]

So soon as a patient with cerebrospinal fever was diagnosed, his company was quarantined and cultures from the pharynx made of the entire company; additional cultures were made of all possible contacts, such as hospital corps men, etc. Upon completion of a preliminary examination of the cultures, usually 24 hours, the men who had yielded organisms resembling the meningococcus in cultural characteristics, morphology, and staining reactions, were declared to be carrier suspects and placed in isolation units. Quarantine was lifted and remaining men discharged to duty. A final laboratory report based on agglutination reactions was made, and those whose cultures gave positive reactions were sent to the meningococcus-carrier camp. No attempt was made to distinguish types of meningococci. Flexner's polyvalent serum was used for agglutination tests. Isolated carriers were cultured at intervals of five days, and held until four successive negative cultures were obtained. In taking cultures the open-swab method was used, the medium being peptone blood-agar. In December, 1917, 19 cases of cerebrospinal fever were reported at the Naval Training Station; epidemic proper began in January with 84 cases; incidence decreased during the last week; and February concluded the epidemic with 10 in the first three weeks. Mortality was about 22 per cent. with a marked decrease after the middle of January. Almost exactly coincident with the epidemic in the latter part of December and January, there was a long-continued period of cold weather. Notes from various army camps during the winter show that the cold weather also influenced the meningitis incidence. The great majority of men affected were young, unseasoned recruits who had been rapidly rushed through the regular incoming detention camp at a time when the station was rapidly expanding, and sent to already crowded camps where they were given hard work, and were exposed to severe cold and stormy weather. While with one exception the unseasoned recruits did not develop the disease in the regular detention camp where they were more carefully cared for, they were unable to withstand the combination of circumstances and depressing influences met in the other camps, although these same factors, operating on all alike, did not materially influence the older men at the station.

In regard to carriers and their relation to the epidemic, the author concludes that: The nearly ideal application of a carrier segregation system failed to prevent or appreciably affect an epidemic which ran its course and subsided with the cold weather after general hygienic measures had been instituted. All of the real carriers present are never discovered at any one time, even with the most careful technic. This is best shown in the routine culture of chronic carriers where it is seldom possible to get more than 50 per cent. of cultures positive. Carriers

cannot be traced in relation to new cases, except in a very few instances, and they are not always closely associated with the old ones. New cases occur or fail to occur without apparent reference to carriers who remain or who are taken away. It has been found in general by most observers that the segregation and treatment of carriers does not give satisfactory results in hastening the disappearence of the organism. During the past nine months, 1,363 carriers have been found at this station, and 120 cases of cerebrospinal fever have developed. During one month only has the number of cases exceeded 20, but from 200 to 400 men have been in isolation constantly. When the efficiency of the general measure is not clearly evident, it does not seem consistent with military economy to deprive the organization of 10 men continuously for every one who it is hoped will be protected from a temporary disability. The search for meningococcus carriers and their disposition should not cause neglect of the more generally effective and easily controlled measures of general hygiene. Haste, crowding, exposure and exhaustion in training recruits should be avoided. Other sanitary measures recommended are: The men who have been in indoor contact with a cerebrospinal fever patients should be quarantined in as small groups as possible in commodious barracks, with good ventilation and ready access to available sunshine. Naso-pharyngeal sprays with an antiseptic solution should be given at regular intervals. Special attention and treatment should be given men with "colds" and coughs, including instruction in properly screening others from an unavoidable shower of saliva. Curtains or screens may be placed between the hammocks or beds at nights. Light exercises may be taken outdoors with proper clothing and protection from the weather. After five days or a week, when the temporary carriers will probably have cleared up and the chronic carriers become relatively harmless, the whole group may be discharged to duty. During an epidemic, large and promiscuous gatherings should be prohibited. During a quarantine, cultures may be taken and repeated, with a preceding temporary suspension of antiseptics, and, as a middle course during an epidemic, chronic carriers might be segregated to the extent of preventing contact with others indoors. All usual precautions should be taken in isolating and handling the sick; attendants should wear masks. Recognition of mild and previously unrecognized cases and their prompt treatment will do much to prevent outbreaks.

Book Reviews

Laignel-Lavastine, M., Barbé, André et Delmas. La Pratique Psychiatrique a l'usage des étudiants et des praticiens. J.-B. Baillière et Fils, Paris, 1919.

This is a very comprehensive volume comprising the results of the observation and experience of the authors as given in their lectures including frequent reference to the observations of other workers in psychiatry. It is such a book as would be of special value as a textbook for students and an instructive and useful book of information and guidance in the exigencies of practice, especially in the field of psychiatry.

Each language needs just such a practical compendium and for French students and practitioners especially this will prove itself of value as such. Particular emphasis is laid upon the observance of functional symptoms as indicative of the underlying disorder and in this manner the psychical manifestation is given a prominent place. Each topic under which psychiatry could classically be discussed is given a detailed exposition. Great attention is paid to the care to be exercised in making mental examination of patients with description of the forms of disturbance to be looked for and the practical methods of discovering these. The topics which pass under review comprise every form of nervous mental disorder, those that are of lighter grade and those that represent well developed mental disease.

The first part of the book, after the discussion of examination details, is taken up more strictly with a discussion of the semiology of mental disease and then with an actual description of the various disease forms or their nosology. The latter half is devoted to the medico-legal side of psychiatry. In this the history of this branch of psychiatry is discussed and the problems which belong to it. Here again the subject is presented for the practical help of the practitioner and for the practical meeting of the problems which arise. The various mental manifestations which bring a patient under medico-legal surveillance are dealt with separately and submitted to detailed description. The questions of responsibility and of penalization also enter. The relation of psychic disorders to occupations, the part which they play in military and colonial life are also included.

Though the book presents such a range of material and makes its application in so many practical directions, it is singularly disappointing. Its matter in the first place is too purely descriptive. The reader looks

in vain for the most part for any interpretative help which would enable one to meet the various difficulties so fully outlined and give an understanding of them in their source and in the dynamic individual effort they represent which would aid the physician to coöperate with the patient and bring him out of his disturbance. Of course this is a goal not always to be reached, but one has come to look in these days for a great deal of light which may penetrate into the hitherto unexplained territories of the mind and into the abundance of such symptoms which arise out of these regions. In many instances such approach has already proved its working value. Hence a new book fails to note or too instigate progress if it lets such advance pass with so little notice or with so little application of this point of view as does this one. It rather vitiates the otherwise useful exposition of many of the facts which belong to psychiatric descriptive writing, in which this book abounds, and from which the reader would expect clearer light as to the meaning of the manifestations described and help in meeting and correcting the conditions discussed.

The disappointment is particularly keen since Dr. Laignel-Lavastine himself had led his readers to expect otherwise from him. At the Congress of Dijon in 1908 he promised to open up a more progressive interpretation of psychic disorders in terms of certain functional disorders associated with them, as he has done to a certain extent in a far more satisfactory way in his recently translated book The Internal Secretions and the Nervous System.[1] But in this later work the promise of a dynamic interpretative approach seems to have been forgotten and lost in a mass of merely descriptive material.

Yealland, Lewis R. Hysterical Disorders of Warfare. Macmillan Co., New York and London.

The lessons learned in treating the disorders due to war service are many and varied. No type of disorder and no method of attack fails of its practical interest. There is presented in this volume a series of reported experiences definite, precise, giving both detail and directness of the author's method of treatment and the result that appeared in each case. He explains through the description of cases treated how the various forms of so-called hysterical disorders, those of hearing, vision, speech, along with the various muscular disorders of the same sort were made to respond rapidly, perhaps in one session, to direct assurance of the benefits of treatment, to definite explanation as to what results would follow upon treatment and then an application of the faradic current in whatever degree indicated.

It is of interest first to note the author's method of attack and the almost unvarying success he claims for it. His method seems to be that which has been described as the child and stern parent attitude, which

[1] Translated by Dr. F. T. Robeson. Nervous and Mental Disease Publishing Company No. 30, New York and Washington, 1919.

appeals to the instincts within all of us which demand the confidence and reassurance which authoritativeness gives. Under a response to this, measures for restimulation, redirection of functional energy along nerve paths is more ready to be effective whatever may be the external means which may seem to cause the response.

There may be many cases in the suddenly or specially precipitated war disorders where such a method of redirection of function psychically and physiologically may to all intents and purposes produce a complete and lasting cure, that is a permanent return to a satisfactorily functioning condition. Yet this report loses sight of the importance of a more selective distinction as to the cases which might be submitted to such a simple method and in the classification of these functional cases indiscriminately under the term "hysterical." The differences in personality, individuality in reactive capacity and mechanisms, upon which the actual extent of the disorders rests, plead for a different attitude in regard to their extent both as to internal cause, effect upon the personality, both psysiological and psychical and the complete prognosis in the light of the whole personal equation. Undoubtedly many such patients are suffering from no more than a form of what attempts at practical classification would call "suppression neuroses," where the precipitating external factors have touched the individual less deeply, rousing into action pathways which lie barely out of the range of ordinary conscious awareness. The displacement of energy which has resulted in a deaf mutism, a paralysis, etc., of such a degree can be easily recalled as by the authoritative method of the present writer or some other simple means, and the readjustment back to healthy functioning is easily made.

These cases form only a small proportion however even of the war neuroses here outlined. There is a deeper invasion of the personality by the disturbance produced by the external conditions, which involves modes of reaction and attempted adjustment of the personality lying not merely superficially suppressed but deeply repressed from conscious awareness and activity. Here also a response such as the writer describes is possible that post war experience is proving how often in many cases, as has been the fact in civil practise as well, such a response only means a redistribution of energy on deep lying pathways now roused into activity or given opportunity for activity by the external conditions. This first chosen path of disturbed activity, that perhaps of deaf mutism, is removed from the patient by the physician's authoritative manner and reassuring method, only to have the unconscious wish activity seek at once a substitute for it on some other functional pathway still more incompatible with the patient's later adjustment to life. A deeper psychological penetration with more prolonged and detailed investigation is needed to know that all such possibilities of secret invasion of the personality are understood and guarded against, chiefly through the patient's own understanding of them, before he can be safely dismissed.

The author states that he has quickly cured cases which have had such previous treatment but it is a fair question whether he is perfectly confident that he has not helped the patient to a temporary adjustment which would form a block to his personality and so precipitate in the end a deeper regression under the strengthened repression which his partial adjustment has put upon him. Mental wounds are all too often closed with a deceptive smoothness and perfection of result, when careful exploration and opportunity for free drainage, are the practitioner's duty and the patient's safeguard.

JELLIFFE.

Roussy, G., et Lhermitte, J. BLESSURES DE LA MOELLE ET DE LA QUEUE DE CHEVAL. Masson et Cie, 1918.

The tragic drama of the past four years has not been without certain compensations. Certain of these still remain in the region of spiritual generalizations and will come to fruition possibly with our children's children. Others are more immediate and may be utilized for present-day needs. The contents of this volume is one of them.

Up to the time of its writing, so far as French or English literature was concerned, the war injuries of the spinal cord had been, as Marie has put it in the introduction, a missing chapter in the neurology of war. This had come about from a number of excellent reasons. Up to the time of the war, no single observer had had sufficient material. Furthermore but few physicians had had the opportunity to follow up the cases of spinal injury; and but few had the rare good fortune to be able to complete the study of the vivesection experiments at the autopsy table and in the physiological laboratory.

The authors of this small brochure were particularly fortunate. Not only were they neurologically well equipped for their work but they had exceptional opportunities.

The result has been a short, concise and yet very thorough little treatise on spinal cord injuries, their semiology, general and topographic, spinal cord commotion, and a special chapter on cauda equina lesions of exceptional value, and two other chapters, one on Complications and one upon Treatment.

There are a number of generalizations which push our knowledge of spinal cord injuries up to higher levels. In a work so compressed, one must admire the deep grasp the authors have had upon the complex mechanisms of the spinal cord and the work promises to remain an excellent guide for a long time.

While space does not permit a detailed discussion of the newer material, certain outstanding features should be at least mentioned. The subject of spinal cord "commotion" is worth reading. Our usual term concussion does not quite do justice to the concept that lies behind a group of changes due to the effects of indirect injury either from the

force of violent explosions, from air vacuum changes of such explosions, or from other features as yet dimly perceived. The authors have described these in an especially clear and convincing manner and have done much to clarify the means of distinguishing and more usefully appraising the subtle gradations of psychogenic factors working with intact pathways or with damaged pathways. It is futile to keep alive the old functional and organic antitheses, and the authors have grasped this, realizing the human being as essentially an instrument for carrying out his cravings, which represented at psychical levels constitute the will to power. How such functions portray in action the grade of injury present in the structural pathways developed for their activity is admirably outlined in this chapter on commotion.

As other members of this Collection Horizon have been translated it is highly probable this work will also be made available for English readers.

JELLIFFE.

Roussy, G., Boisseau, J., d'OElsnitz. TRAITEMENT DES PSYCHONÉVROSES DE GUERRE. Masson et Cie, Éditeurs, 1918.

The scrutiny to which the question of hysteria has been subjected during the war is pushed still further in this book and along the same practical lines which follow the definite experience with disorders occasioned by the special conditions of war. These are those which manifest themselves in the various functional symptoms of both a psychomotor and a psychosensory character, and yet which are not associated with evident traumatic lesions. The psychomotor symptoms concern an entire member of several members or they may be located at any one portion of such members. They may result in disturbances of such muscular action as that used in walking or they may be more generalized in tics, trembling or choreiform movements. The sensory disturbances may also show a wide variety. They may be manifest in special sense organs or to a greater or less degree affect the visceral functions.

A brief descriptive cataloguing of these various possibilities with a mention of their relative frequency, is followed by a discussion of the possible origin of the manifested disorders, both as to how they are first created and then how they become "fixed." This is interesting psychological matter in realizing how the mental interpretation of certain accidents, psychological attitudes, conditions associated with discomfiture and temporary disability, when suppressed even just below the threshold of consciousness can be quickly rationalized into a fixed state of incapacitating disorder by the obscure psychic factors which makes use of these disorders. The authors take account in this also of the predisposition which exists through constitutional and hereditary factors to furnish a suitable terrain for such development. While recognizing the part that emotion plays the authors do not lose sight of the actual

occurrence of a local trauma as well as the general "commotion" caused by the accident. Upon this they believe that autosuggestion and heterosuggestion, the latter medical or from one patient to another, work fruitfully for the origin and fixation of the emotional disturbances. Their statement of these conceptions is followed by a practical discussion of the prevention of such psychoneuroses.

The treatment of these psychoneuroses is naturally emphasized as preëminently a psychotheraphy. This the authors believe may differ according to the methods of different physicians. The aim however must be to reach the actual mental factors beneath and not to leave that in a perhaps more suggestible state through the treatment than it was before, a point the importance of which is becoming increasingly evident to the psychotherapist. There is then an outline of the methods pursued by these physicians in their experience, for upon the latter the entire discussion of the book is based. Here again the same emphasis is laid upon the attempt to reach beneath the mere surface manifestation and thus to consolidate or fix the cure once it has been apparently obtained. The effect of military conditions as an aid, various external medical aids, practice and reëducation in the use of the affected parts are all given due consideration.

It is from the lessons learned through their practical experience that they consider the probable pathogenesis of these troubles. They present at some length the "reflex theory" of Babinski and Froment as well as the views which Roussy and others have expressed in regard to this theory and sum up their opinion in regard to these disorders in that they consider "the motor disturbances of the psychopathic syndrome as pithiatic, the other elements as secondary accidents of the hysteria." They distinguish a principal motor element which is pithiatic, secondary elements which are not pithiatic but organic, such as trophic and circulatory disorders, and a third most important element, namely the mental or psychic.

With this emphasis laid upon the third factor the authors insist upon the more thorough recognition of the curability of these disorders on the part of medical men and the extension of this idea in its convincingness to the patients also. This also lays greater weight and responsibility upon the prevention of these forms of disorders through these very means, by prophylaxis directed to these very lines. The authors add a short chapter upon the prognosis of these cases and their further military career, a question of no less interest as relating to the future of these or other patients in civil life.

The matter of the book is treated with a simple clear presentation of the questions involved as they have been met at first hand. The closer connection of the psychic factor with these physiological types of disorder presses attention still closer to the inseparability of the psychic from the physiological in the explanation of these. This should lead

still further into the more detailed inner connection between the two spheres, through the physiology of the finer mechanism of the body and its more concealed working, acted upon by the sympathetic and autonomic portions of the nervous system, so that the mutual relationship may be brought more clearly into light and made more accessible to therapy.

JELLIFFE.

Levi, Leopold M. LES DOSES EN THERAPEUTIQUE THYROIDIENNE. A. Maloine et fils, Paris, 2 F.

This small brochure of 86 pages contains a condensed statement of this author's recommendations concerning the use of the thyroid in a number of obscure chronic disorders primarily founded upon hypothyroid states or secondary hypothyroid conditions due to pluriglandular distortions.

In the earlier days of thyroid therapy, now some 15–20 years in gradually increasing vogue, massive doses—45–60 grains of the fresh gland were in use. This represented the general attitude. Increasing experience has tended to indicate that considerable play of therapeutic possibility is possible and that the indiscriminate use of the thyroid is bad pharmacology. With some observers infinitessimally small doses have seemed to work wonders, and although the case reports are not yet convincingly purged from all suspicion of psychogenic factors as aiding in the therapeutic results, the influence of even homeopathic doses is worth careful scrutiny in a field where dogmatic skepticism and infantile credulity seems so apparent.

The present small volume will be of service in this effort at sifting the wheat from the chaff and aid in the ultimate placing of this phase of opotherapy on a firmer basis.

JELLIFFE.

Claoué, R. LE NYSTAGMUS VESTIBULAIRE. A Maloine et fils, Paris.

The writer is chief of the otolaryngological service of the Clinique Pasteur of Bordeaux and an acknowledged leader in his field. This small contribution, evidently arose out of the needs for quick and practical testing for army purposes, both in its preparatory phases and as a means of arriving at quick diagnoses of war injuries. It deals chiefly with caloric, rotatory, air, and electrical tests. There is little new in it but it is a neat and carefully worked-out piece of work dealing with the main features of the response to these tests in labyrinthine functions.

Gilmore, George William. ANIMISM OR THOUGHT CURRENTS OF PRIMITIVE PEOPLES. Marshall Jones Company, Boston.

Anthropology has become almost a necessary bowing acquaintance to the cultivated physician of the present day. Tyler's Primitive Culture

has been one of the standbys in all humanistic college curricula and many physicians have a speaking knowledge of Frazer's Golden Bough.

An acquaintance with the embryology, as it were, of our present social fabric, for the wide awake student of nervous disorders, has however become a more vital possession, and the general trend of the times has been more and more running to a more intense preoccupation with thought currents of primitive peoples, if one is really to comprehend what is going on about them to-day.

The present small volume is a pleasing and more or less elementary introduction into this field. Conduct is three fourths of life, said Matthew Arnold, and conduct draws its essential activities from the past heritage of habitual and instinctive reactions. The modern study of the unconscious shows that Matthew Arnold's fractional estimate is entirely too generous to our conscious activities. Rationalization has become such an inveterate habit that man may rightly suspect that his unconscious bears almost the entire load of his motor power, and that, in Bergson's phrases the chief functions of the brain is to stand as a sort of filter holding back the pressure of this illimitable past and only permitting useful work to come through.

Somewhat of this past is most entertainingly sketched in this volume and the beginner in the study of the foundations of modern social activities, individual as well as collective, can turn here for pleasure and profit.

JELLIFFE.

Worster-Drought, C., and Kennedy, A. M. CEREBROSPINAL FEVER. THE ETIOLOGY, SYMPTOMATOLOGY, DIAGNOSIS AND TREATMENT OF EPIDEMIC CEREBROSPINAL MENINGITIS. A. & C. Black, Ltd., London, 1919.

Since 1915, in a manner similar to that which has occurred in the United States, mobilization in England has been accompanied by epidemics of cerebrospinal meningitis. The authors, one a neurologist, the other a pathologist, were stationed in the Woolwich district and made extensive and detailed studies of this disorder, the chief results of which are gathered in this most excellent monograph.

Geographical distribution, seasonal prevalence, age, sex and racial incidence are first discussed generally. The microörganisms involved are exhaustively described. Then follow chapters on predisposing causes for infection, incubation time, symptoms, course of the disease, complications, hydrocephalus, the cerebrospinal fluid, the blood, diagnosis, accompanying infections, pathology and morbid anatomy, prognosis, prophylaxis, treatment and sexuelæ. There is an extensive bibliography.

There is little to discuss concerning this disorder since so much intensive study has been given it for the past four or five years. This work ably gathers together the results, not only of these world-wide investigations, but weaves them into a scholarly and orderly whole on a

background of their own observations, giving a model monograph which may be unreservedly recommended to the neurologist.

JELLIFFE.

Velter, E. PLAIES PENETRANTES DU CRANE PAR PROJECTILES DE GUERRE. A. Maloine et fils, Paris. 15 Fr.

This is a 300-page volume dealing with the nervous and ocular symptoms and with considerations of operative technique on 84 personally observed war wounds of the head with a careful follow-up of the late results. The author, a trained ophthalmologist, an interne of the Salpetriére, and a surgeon, gathered these observations during a year's work in the early part of the war when engaged as a surgeon in the field hospitals behind the advance lines. These patients came to him within two to six hours after their wounding. A preliminary report upon this work was prepared by the author and this volume represents the more detailed working out of this material.

It is a series of case histories, accompanied by photos, drawings, charts and critical notes. These cannot even be summarized here, nor commented upon save as indicative of excellent work, the details of which must be gone into case by case by those interested in this type of work. It is a very creditable record of the work done and followed up as to the end results of cranial surgery.

Bing, Robert. KOMPENDIUM DER TOPISCHEN GEHIRN UND RÜCKENMARKSDIAGNOSTIK. Vierte, neu durchsehene Auflage. Urban and Schwarzenburg, Berlin and Vienna, 1919.

We have had occasion to commend this Compendium of Bing's in its original edition and also the English translation made by Allen and which has been before the American public now for some time.

This new fourth edition has been greatly amplified and a large number of new illustrations have been added and the many problems which have been raised and in part solved by the war's accidents carefully gone into and discussed in a practical, concise and definite manner. Most of the additions were made in the third edition which appeared in 1917 but which has not been available before this time by reason of the restrictions placed upon imports of foreign books during the war interval.

We welcome this new edition and hope for a successful Englishing for those who do not read the original language.

JELLIFFE.

Veraguth, Otto. ZUR SENSIBILITÄTSUNTERSUCHUNG NACH VERLETZUNGEN DES MENSCHLICHEN ORGANISMUS. Rascher et Co., Zurich, 1919.

In a series of brochures Veraguth with Brun and Hössly have gathered together a series of extremely interesting and valuable observations on the late consequences of war wounds. Volumes two and four are

devoted chiefly to nerve injuries and their diagnosis, and to the experimental psychology of headinjuries; they also contain papers on the psychology of interned prisoners, on commotion psychoses and on the electrical treatment of paralyses after peripheral nerve injuries. They are well illustrated and together make a valuable series of reference articles on nerve injuries and the war.

JELLIFFE.

Pottenger, F. M. SYMPTOMS OF VISCERAL DISEASE. A STUDY OF THE VEGETATIVE NERVOUS SYSTEM IN ITS RELATIONS TO CLINICAL MEDICINE. C. V. Mosby Company, St. Louis, Mo.

This work is of twofold interest, first as an indication that there is getting to be a recognition of the fact that without a knowledge of the nervous system there can be no real knowledge of clinical medicine, and secondly, that the study of the vegetative nervous system underlies a sound appreciation of the changes that take place in the viscera and of those which are usually called "disease." No sound pathology can be built up without taking the vegetative nervous system into consideration, and, by the same token, since there is little recognition of this important fact, there is little sound pathology other than a pathology at a purely descriptive level.

Pottenger's book blazes a trail into this practically undiscovered country, a field where even the neurologist is only beginning to learn how to wander, and one which only the so-called "radicals" in psychiatry seems to be aware exists. It is a bold attempt and one not without certain excellencies in performance, as well as certain inevitable defects.

Pottenger attempts to interpret so far as possible in terms of visceral neurology symptoms which are found in the everyday clinical observation of visceral disease. He has made a resolute attempt to get away from an organ pathology to a larger concept of a pathology of the human being. Not a series of unintegrated and uncorrelated organs afflicted with this or that particular devil or series of changes, but an attempt to show how pathological changes in one organ affect other organs and the organism as a whole through the medium of the visceral nerves.

This work is to be commended not only to general practitioners but to neurologists as well; for it may be seen, for the latter, that a specialist in diseases of the lungs has done a piece of work in their field of no mean merit; for the former, the reading of this book will give them much stimulus to better observation and a keener interest in the search for reasons about things than being satisfied with a sterile description of their findings.

Bayliss, William Maddock. Principles of General Physiology. Second Edition. Revised. 261 Illustrations. Longmans, Green, and Co., London and New York. $8.00.

Two years only has elapsed since this most excellent treatise appeared in its first edition. In that interval physiological work has been much slowed down due to the war activities, hence the author tells us, there has not been great need for extensive revision. The present volume with a rewriting of the chapters on muscle action, and some revision of the action of the kidney and general reshaping and clarification remains as in its original form.

This original form was so masterly it will be difficult to see wherein it could have been improved, for without question this is the most scholarly, well-informed and ably presented treatise on physiology now obtainable. It is essentially a work dealing with processes and a physiology of things happening. This general dynamic aspect of things is maintained for the most part throughout and the analysis of primary principles is carried to its furthest limit. It is no book for babes. Its mathematics will test the expert, yet at the same time the author's good sense has made him so arrange his material that even the chapters which almost ooze calculus can be read by the non-mathematically trained student without serious deprivation. There are some 200–300 pages of this physical chemistry material, presented in an inimitable manner both as to its thoroughness and yet with considerable literary value.

The student of nervous and mental problems will naturally turn to the chapters on Excitation and Inhibition, Contractile Tissues, Reflex Action, Receptor Organs, Tonus, and Nervous Systems, Peripheral and Central. Here will be found a masterly résumé of our best investigations of the physiology of the nervous system, amply and well illustrated. The synaptic system, the passage of electrical currents over synaptic membranes, as determined by general principles of the permeability of cellular membranes, the forging of the common paths for stimuli discharge, the reflex and controlled activities are all carefully and judiciously presented with wealth of detail and clarity of expression. The general problem of muscle tonus is admirably presented and the part played by the vegetative nervous system in muscle function adequately if perhaps a little too cautiously outlined, since the tendency for a one-sided study—sensori-motor only—of the nervous system has too long held an orthodox sway. The vast field of metabolic upkeep by means of and through the visceral nervous systems is hinted at but not adequately grasped we believe as in places the author relies entirely upon reasoning of principles which have been shown to be valid for sensori-motor pathway stimuli. It is quite possible that effective vegetative pathway stimuli may not be of the same character. Hence many electrical analogies may after all be quite faulty applications, and reasoning based upon experimentation not quite as conclusive as it might appear. The behavior of

kidney, liver, spleen has already been conditioned to many types of stimuli and a failure to respond to an electric stimulus only says that to such a stimulus this organ does not respond; it only tells that about a certain function. To reason concerning the behavior of complex organs like muscle, spleen, kidney, etc., to electrical stimuli as representative of the entire behavior contain some faulty logic we believe. The utilization of the word center in nervous physiology we believe is to be deprecated. A neuron system has various synaptic junctions. The author has already outlined the receptor, connector and effector nature of the neuron system. All stimuli are peripheral, the entire group of neuron chains is constantly in action, and to posit an automatic self-regulating center as the respiratory or vasomotor centers, capable of initiating new stimuli—instead of synapses transforming incoming stimuli, we believe, is not sound neurology. Thus when the author says (p. 547) "Certain nerve centers are in constant activity"—what part of the entire body is not in constant activity if his own idea of dynamism is maintained? All neuron chains are in constant activity—not certain ones—and to speak of the mid brain synapses of the respiratory neurone chains as independent centers, we submit, is no longer tenable. The environmental stimuli—cosmic stimuli of all kinds—start the machine going, the synaptic junctions simply are switching boards of greater or lesser concentration in the structural pathways. This may simply be a matter of terminology, but even terminology has its evolutionary functions to perform.

The book is an essential human document and shows the author's intense interest in every aspect of human behavior. Not the least attractive of this many-sided work are the many excellent portraits of noted physiologists.

JELLIFFE.

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Figures with asterisk (*) indicate original articles and are accompanied with title. Figures unaccentuated, accompanied with title, indicate abstracts.

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A TEXT-BOOK OF

NEUROLOGY AND PSYCHIATRY

BY

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Formerly Adjunct Professor of Diseases of the Mind and Nervous System, New York Post-graduate Medical School and Hospital, etc.

and

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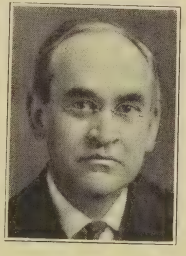

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Part I

The Vegetative Nervous System. The Endocrinopathies. The Neurology of Metabolic Transformations.

Chapter I (pp. 1–119). Methods of Examination of the Nervous System; Vegetative and Endocrinous Questionnaire; Sensorimotor Tests, Mental Examination Methods, Psychoanalysis.

This section of the work gives a concise and yet detailed series of methods for determining the adjustment of the nervous mechanisms.

Special attention is given to the methods of determining endocrinopathic maladjustments which determine defective metabolic integration of the different organs of the body. Vegetative neurology, the foundations of which underlie all disease processes, is exhaustively dealt with.

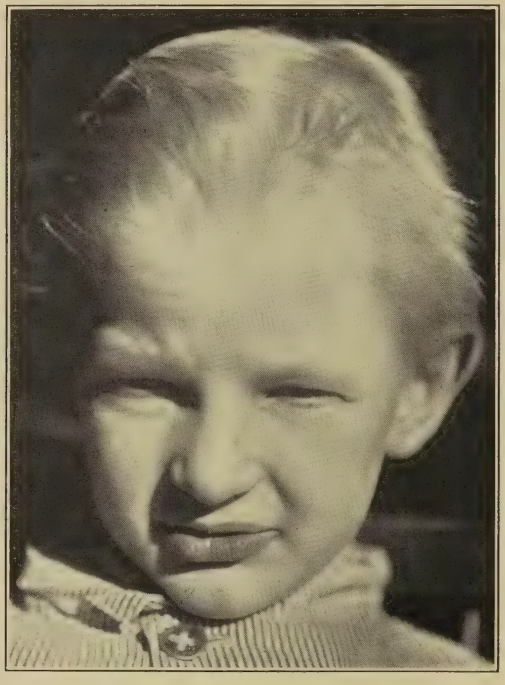

Fig. 4.—Lanugo hair. Hypothyroid disturbance.

From here the student is introduced to methods of examining the various sensory and motor functions of the body. The illustrated charts for determining motor and sensory distributions are numerous and specially chosen.

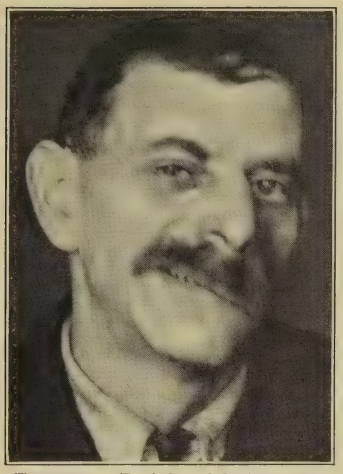

Fig. 190.—Peripheral facial palsy. Smiling.

Fig. 191.—Peripheral facial palsy. Whistling.

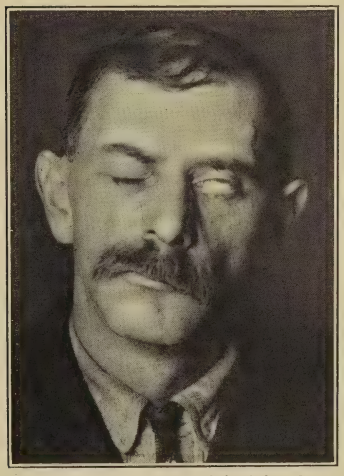

Fig. 192.—Peripheral facial palsy. Closing the eyes.

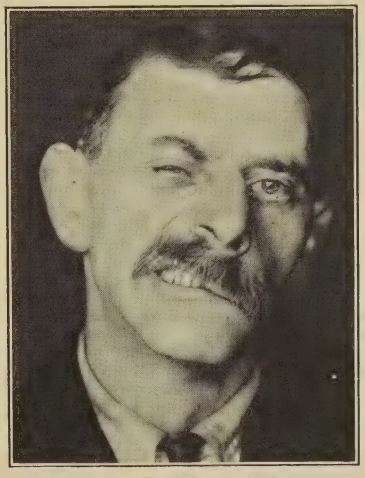

Fig. 193.—Peripheral facial palsy. Showing the teeth.

Chapter II. Vegetative or Visceral Neurology: This chapter contains full discussion of the Autonomic and Sympathetic systems. Fig. 46 will serve as an illustration of the method of analysis followed for all of the viscera. Here the functional pathways of the autonomic system are illustrated. Thus the special pathology of the eye, tear glands, mucus and salivary glands, sympathetic, gastro-intestinal tract, genito-urinary system, respiratory and vascular apparatus, skin, sweat, bone, muscle, fat and blood are all discussed from the standpoint of the neurological integrative processes which make the body a biological unit and permit the metabolism of the body as a whole to functionate.

[Jelliffe & White. Third Edition.]

CHAPTER III discusses the endocrinopathies. Complete and yet concise concepts of the interrelationships and primary activities of the thyroid, parathyroid, pituitary, pineal, adrenal, gonads, thymus and pancreas are outlined. The chief syndromes of disturbances are described and their therapy indicated. This chapter is profusely illustrated.

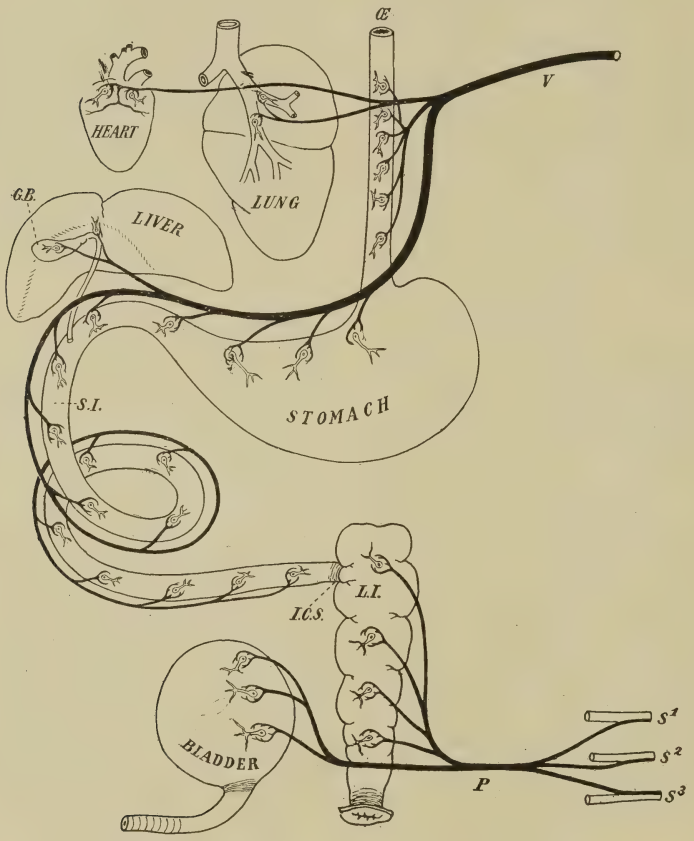

FIG. 46.—The vagus nerve, *V.*, contains connector and effector neurons as far as the ileocolic sphincter. Further effector (sympathetic? and autonomic) neurons lie within the viscera themselves. The pelvic nerve, *P.*, contains connector (and effector) neurons for the sacral outflow, terminal effector neurons lying within the walls of the large intestine and bladder. The vagus thus carries connector neurons to the motor effector cells of the heart, *H.*, which, Gaskell states, have to do with the slow wave-like contractions only (?) found in certain tortoises. The vagus also carries connector fibers to the effectors in the bronchi, *La.*, and also connector fibers to the effectors within the walls of the gall-bladder and bile ducts, *L.I.* (vagotonic icterus), to the walls of the esophagus, *Œ*, the stomach, *St.*, and small intestine, *S.I.* The pelvic nerve, synapses in the sacral root, S^1, S^2, S^3, carries connector fibers to the effectors in the large intestine *L.I.*, and bladder, *B.* (Gaskell.)

August 3, 1914. August 17, 1914. November 27, 1914.

FIG. 79.—Infantile myxedema. Ten years old. Treated by large doses of thyroid tablets. (A. Josefson.)

FIG. 99.—Exophthalmic goiter, showing marked exophthalmos and enlarged thyroid. (Courtesy of Dr. George W. Crile.)

FIG. 100.—Same patient four months after operation (extirpation.) Greatly diminished exophthalmos and change of facial expression. (Courtesy of Dr. George W. Crile.)

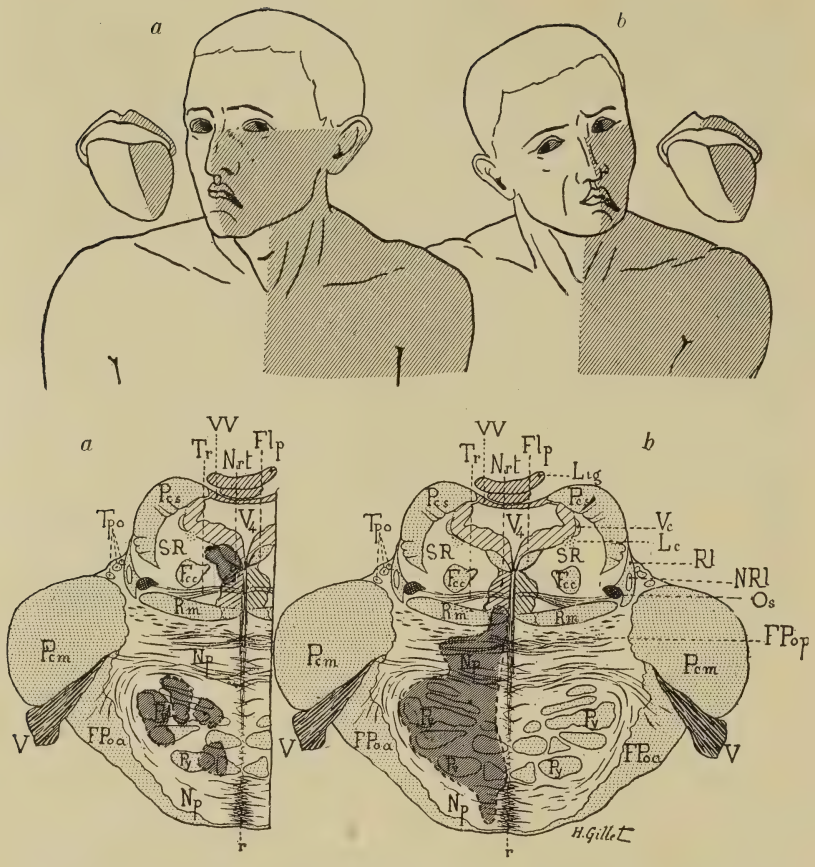

FIG. 168.—Fovilles' syndromes, with anterior and posterior pontine syndromes. Hemiplegia, cerebral type, with (*a*) conjugate deviation of the head and eyes, (*b*) by lesions of the upper portion of the pons, right side, involving the anterior portion of the pons and the region of the tegmentum. On the left side there is a contralateral hemiplegia of the limbs, of the lower part of the face and of the tongue, because of the involvement of the pontine pyramidal fibers *Py* (corticospinal pyramidal fibers, corticonuclear facial and hypoglossal fibers). In *C*, right-hand figure, there is a single lesion which involves the tegmentum at its antero-internal angle and destroys the head-turning (cephalogyric) and eye turning (oculogyric) fibers of the right side which at this level are situated in the pes lemniscus and the internal portion of the median fillet giving rise to conjugate deviation of the head and of the eyes. By reason of the predominant action of the antagonists the head is inclined to the right and the eyes look to the right, the patient looks to the side of the lesion. In *a* there are multiple isolated lesions. Four large foci in the anterior portion destroy the pontine pyramidal fibers with a resulting crossed contralateral hemiplegia of the extremities, the face, and the tongue. Another focus occupies the posterior internal portion of the tegmentum and destroys the internuclear oculogyric fibers of the posterior longitudinal bundle which directly unites the nuclei of the sixth and third nerves and *vice versa*. There results a paralysis of the eyeballs by which they cannot turn sidewise toward the right—right oculorotary paralysis—by reason of the predominance of the antagonists the patient looks to the left. The patient looks away from the lesion toward the paralyzed members. The cortical oculorotary fibers and the pes lemniscus are intact. For details of structure and abbreviations, see chapter on Midbrain Lesions. (Dejerine.)

Part II

Sensorimotor System. The Neurology of Sensation and Motion.

Comprising Chapters IV–XIV (pp. 285–772) dealing with diseases of the Cranial Nerves, Peripheral Nerves (Neuralgias, Neuritides, Peripheral Palsies), Spinal Cord (Poliomyelitides, Amyotrophic Lateral Sclerosis, Compression, Fracture, Tumors of Cord, Lateral Sclerosis, Combined Scleroses, Multiple Sclerosis, Syringomyelia and allied and varying syndromes), Lesions at level of Medulla, Pons, Brain Stem and Midbrain (profusely illustrated), Paralysis Agitans, Chorea and related Syndromes, Cerebellar Syndromes, Meninges, Diseases of the Brain (Apoplexy, Tumors, Abscess, Encephalitis) and Neurosyphilis.

Part III

Psychical or Symbolic Systems: Neuroses, Psychoneuroses, Psychoses.

Chapters XV–XXIV (pp. 773–988) including the Psychoneuroses and Actual Neuroses, Manic-depressive Psychoses, Paranoid Psychoses, Epileptic Reactions, Schizophrenic (Dementia Precox) Group, Infectious Exhaustion, Toxic Psychoses and Psychoses associated with Somatic Disease, Senile, Presenile and Arteriosclerotic Psychoses, Idiocy, Imbecility, Feeblemindedness and Character Defect Group.

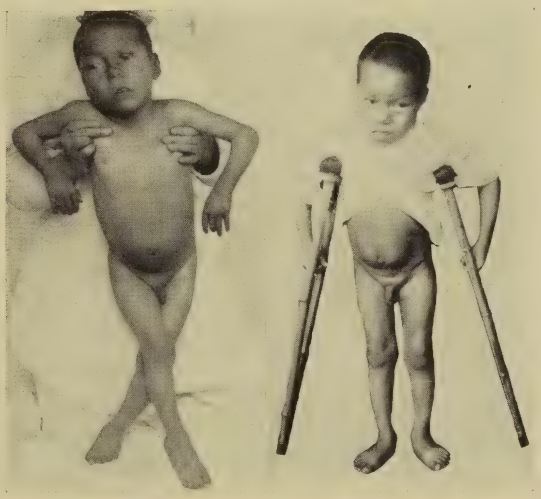

Fig. 348.—Before operation. Fig. 349.—After operation.
Figs. 348 and 349.—Little's disease. Spastic diplegic type from motor area destruction. Posterior root operation. (Kamamura.[1])

Here the entire field of psychiatry is covered, not in the set terms of definitions for diseases, but as interpretative views of processes going on in man in his adjustments to his fellowmen. The functional aspect of behavior is constantly kept in mind and there is to be found here not a cold formal description of dead issues but a view of man's social activities as hampered and modified by altered structural processes as well as by faulty estimates of social values.

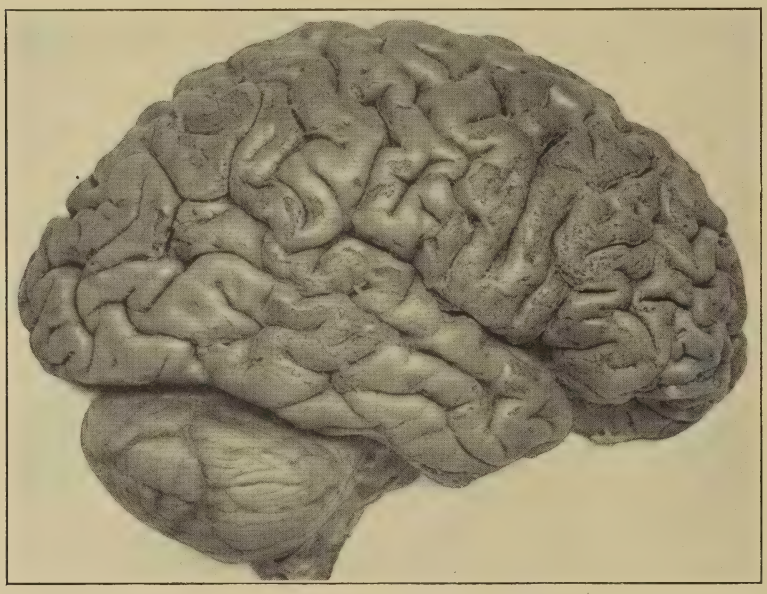

FIG. 391.—Paresis. Cortical changes. Epileptiform convulsions. (Lafora.)

The entire book portrays man as a unit; his viscera, his sensations, his muscles, and his ideas, all working for the satisfaction of his cravings for desirable social ends, and the difficulties within himself as well as in his environment that hinder and impede him in those issues which are collected for practical purposes as diseases of the nervous system.

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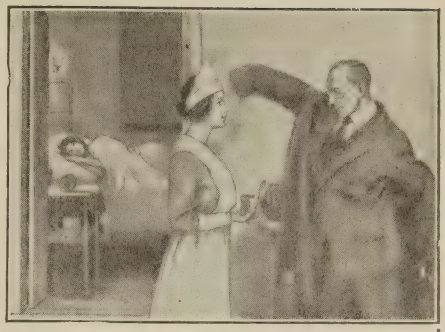

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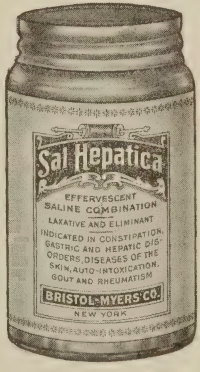

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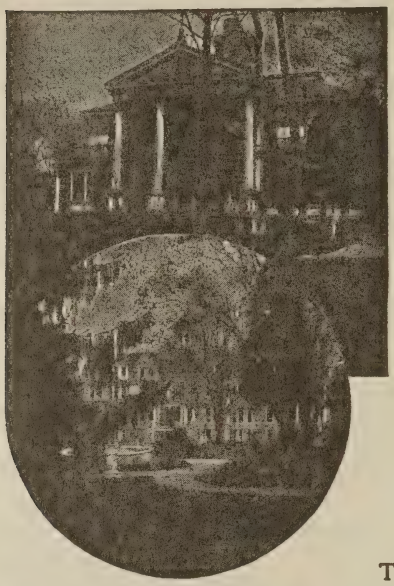

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LIST OF PATRONS TO DIRECTORY

(Continued on Page XXIV)

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DR. J. VAN DYKE, Consulting Physician

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ST. ALBANS SANATORIUM

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A modern Sanatorium for the diagnosis, care and treatment of medical, nervous and mild menta diseases.
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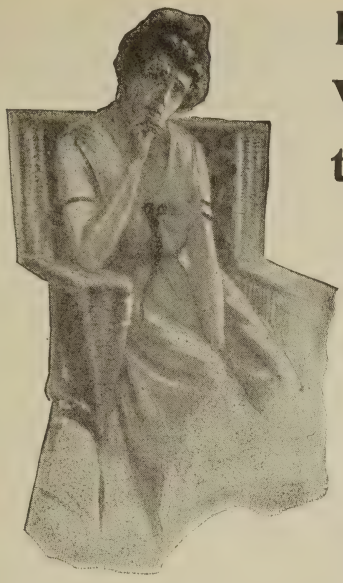

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