EPITOME OF CURRENT JOURNALS

AMERICAN JOURNAL OF PSYCHIATRY
Vol. 97. No. 2. September 1940.

Chronic Rheumatic Brain Disease as a Possible Factor in the Causation of Some Cases of Schizophrenia. W. L. Bruceth. 276.
The Treatment of General Paresis with Malaria Induced by Injecting a Standard Small Number of Parasites. P. Hoch, E. Kusch, and L. T. Coggeshall. 297.
Prognosis Criteria in Hephrenia. B. S. Gottlieb. 332.
Differential Diagnosis of Schizophrenia in the Light of the Concept of Personality-Stratification. O. Kant. 342.


Ideas of Contamination as Defence against Sexuality. G. S. Sprague. 659.
Consequence of Metrazol Shock Therapy. C. F. Read et al. 667.
Involuntary Melancholia. C. C. Ault, E. F. Hecto, and A. A. Werner. 691.
"Abstract" and "Concrete" Behaviour During Hypoglycemia. R. C. Moore. 695.
The Treatment of Morbid Sex Craving with the Aid of Testosterone Propionate. H. S. Rubenstein, H. D. Shapiro, and W. Freeman. 703.

ARCHIVES OF NEUROLOGY AND PSYCHIATRY, CHICAGO
Vol. 43. No. 6. June 1940.

"Bulgarian Treatment" of Parkinson's Disease: Pharynmacologic Aspects and Clinical Effects of Alkaldoids of Belladonna Root. H. Vollmer. 1057.
Personality Changes Accompanying Cerebral Lesions: II. Rorschach Studies of Patients with Focal Epilepsy. M. R. Harrower-Erickson. 1081.
Neurohistopathologic Changes with Metrazol and Insulin Shock Therapy: An Experimental Study on the Cat. N. W. Winkelman and M. T. Moore. 1108.
Histologic Variations with Age in Apparently Normal Peripheral Nerve Trunks. L. Cottrell. 1138.
Cerebral Air Embolism and Vital Staining: Contribution to the Experimental Study of the Blood-Brain Barrier. S. M. Bonton. 1151.
Case Reports:
The Visuospychic Apparatus and the Accommodation Reflex. R. Y. Herren. 1185.
Apparent Dedifferentiation of Nerve Cells of the Human Brain as a Result of Prolonged Starvation. W. Andrew. 1188.
Tumours of the Cervical Portion of the Spinal Cord.


Dural Headache and Interruption of the Dura Mater. W. Penfield and F. McNaughton. 43.


Primary Melanotic Tumours of the Meninges: Resemblance to Meningiomas. Report of Two Cases in which Operation was Performed. B. S. Ray and N. C. Foot. 104.


Case Reports:


**Tumours of Cervical Portion of the Spinal Cord.**—In a study of 91 surgically verified cases of tumour of the cervical region of the spinal cord it has been found that pain in the neck is the outstanding early symptom. Muscular weakness usually begins in the arms but may involve the legs, is progressive and is usually the patient’s chief complaint. Dissociation of a sensory disturbance is a constant accompaniment of all types of lesions of the cervical portion of the cord, but is not in itself diagnostic of any one type of condition. Lumbar puncture with careful manometric studies and complete examination of the cerebrospinal fluid are of great diagnostic value. Abnormal findings in one or both tests are almost constantly associated with neoplasms that involve the cervical portion of the spinal cord. Sphincteric disturbances of variable degrees were present in many cases, but were not of diagnostic or localizing value. Surgical management of tumours of the spinal cord consists of hemilaminectomy on the side of the tumour. This gives adequate exposure without sacrificing the stability of the vertebral column. (R. M. S.)

**Landry’s Paralysis.**—In at least 30 per cent. of cases of acute ascending paralysis there is no clue as to the cause, either in the pathological study of the nervous system and other organs of the body or in the clinical features. In many cases the paralysis appears to follow closely on the heels of an infection and in a small number of cases, in which no pathological lesions may be demonstrated, the cause is accurately known. The best example of this type is “tice” paralysis. Acute ascending paralysis may also be caused by the sting of a weaver fish, vaccine therapy or antitetanus inoculation, or it may be associated with hematoporphyrinuria and with pregnancy. The disease may occur in association with pathological processes elsewhere in the body. Among these are typhoid fever, herpes zoster, lymphogranuloma, malaria, leukæmia, rabies, and antirabic vaccine. The pathological background in cases of acute ascending paralysis has always been elusive and it has been a constant surprise to find cases in which there were profound objective neurological changes and few or no evidences of damage in the nervous system. The great variability in the findings suggest, first, that included under the acute ascending paralysis of Landry are many types of the disease for which there are different causes, and, second, that, as for example in botulism, the primary damage may not necessarily be within the nervous system. (R. M. S.)

**Dural Headache.**—The authors point out that not all headaches are produced by the same structural mechanism or observed by the same nerve pathways. Most headaches appear to be dural in origin, using this term to include the sinuses and veins tributary to the sinuses in their course across the sub-arachnoid space. Other sources of headache which have been suggested are the cerebral arteries and the walls of the third and lateral ventricles of the brain. (R. M. S.)

**Recklinghausen’s Disease.**—A report dealing with a family in which Recklinghausen’s disease, in the form of bilateral acoustic tumours, had been transmitted as a dominant mendelian trait through six generations. (R. M. S.)

**Innervation of Annulus Fibrosus.**—The annulus fibrosus and the posterior longitudinal ligament between the fourth and the fifth lumbar vertebrae are innervated by fine unmyelinated nerve fibres. Their exact origin and course were not determined. The fibres end in naked nerve endings in the annulus fibrosus, and in like manner in the posterior longitudinal ligament with glomerulus-like terminations as well. (R. M. S.)

**Jacksonian Seizures.**—A case is described in which jacksonian seizures could be induced on the right side by various stimuli and movements on the same side. A study has been made of the characteristics of the effective stimuli and movements. Application of cocaine to the conjunctival sac of the right eye diminished the number and intensity of the reflex convulsions. The effect was both immediate and permanent. The spontaneous seizures of the patient were also favourably influenced by this procedure. (R. M. S.)
produced by stimulation of the mesial surface of the cerebral hemisphere, are here reported for the first time. (R. M. S.)

Intracranial Tumours and Epilepsy.—The slowly growing neoplasms have a higher incidence of secondary epilepsy than the rapidly growing tumours, probably because death terminates the history sooner in cases of the latter type. Seizures form a first symptom also more frequently in cases of the slowly growing tumours. Infiltrating and encapsulated tumours, if they are equally slow growing, have an approximately equal incidence of seizures. Operative removal gives complete relief from seizures twice as often in cases of encapsulated tumours as it does in cases of infiltrating tumours. In the Montreal neurological clinic the percentage of "cure" of seizures by operative removal of encapsulated tumours is about the same as that from excision of focal cerebral scars for the relief of epilepsy. Abscesses of the brain are apt to produce seizures at an early stage and again after the formation of a healed scar. Subdural hematomas have a relatively low incidence of seizures, and the attacks even then seem to be due to cerebral injury that may have resulted from trauma rather than to the hematoma itself. (R. M. S.)

Experimental Headache and Migraine.—Apparently the threshold for histamine headache is lower in persons subject to chronic recurrent headache than in those not so afflicted and in patients subject to migraine attacks the type of headache produced by histamine is frequently similar to migraine headache. No evidence was discovered that the cranial vascular tree in patients subject to hemicranial migraine headache is unilaterally hypersensitive to histamine. (R. M. S.)

Corpus Striatum.—Stimulation of the caudate nucleus in cats inhibits movements of the skeletal muscles, probably induced by the corticospinal system. The effect is best noted on the ipsilateral side. Stimulation of the caudate nucleus inhibits bladder tone and tends to depress respiration and reduce activity of the sweat glands. Little evidence for somatic localization of these effects within the corpus striatum has been found. (R. M. S.)

E.E.G. Studies of Head Injury.—In addition to emphasizing the need of applying the electroencephalographic method to all varieties of cerebral trauma the authors' studies indicate that the encephalogram provides a sensitive measure of recovery. (R. M. S.)

Dislocations in Metrazol Convulsions.—For the avoidance of fractures and dislocations in the convulsions caused by metrazol shock therapy the author advo-
Vol. 44. No. 3. September 1940.

CURRENT JOURNALS

83
cates a method of manual restraint. At least four assistants are required. (R. M. S.)

Human Behaviour after Removal from Frontal Lobes.—Before operation an injury in the frontal region and the formation of scar tissue had resulted in serious behavioral abnormalities. Further destruction, surgically, instead of aggravating the symptoms, made them disappear. The case appears to establish that bilateral removal in man of the anterior third of the frontal lobes may have no obvious effect on human intelligence or personality. The absence of gross deterioration does not rule out, however, the possibility that in such features as learning in social situations or in initiative and the ability to plan and organize one’s affairs impairment may be found. (R. M. S.)

Vascularization and Vulnerability of the Cornu Ammonis in the Opossum. E. Scharrell. 483.

Constitutional Differences between Deteriorated and Non-deteriorated Patients with Epilepsy. J. W. Hand. 419.


Frontal Lobes.—Before operation an injury in the frontal region and the formation of scar tissue had resulted in serious behavioral abnormalities. Further destruction, surgically, instead of aggravating the symptoms, made them disappear. The case appears to establish that bilateral removal in man of the anterior third of the frontal lobes may have no obvious effect on human intelligence or personality. The absence of gross deterioration does not rule out, however, the possibility that in such features as learning in social situations or in initiative and the ability to plan and organize one’s affairs impairment may be found. (R. M. S.)

*Vascularization and Vulnerability of the Cornu Ammonis in the Opossum. E. Scharrell. 483.


*Stigmatic Pseudocereosis (Disseminated Encephalomyelopathy).—Cortical and Subcortical Degeneration).—Familial and Non-familial Incidence (A Clinico-pathologic Study). C. Davison and A. M. Rubin. 578.

**Myelodilaculiurnus with Cell-Protein Dissociation. D. Daskal, H. A. Teitelbaum, and L. D. Stevenson. 599.

**Vestibular Reactivity in Schizophrenia. A. Angyal and N. Blackman. 611.

Special Articles:


Case Reports:

**Subarachnoid and Intracranial Hemorrhages due to Metrazol. H. N. Roback and C. W. Miller. 627.


Vascularization of Cornu Ammonis in Opossum.—Carbon monoxide poisoning in the opossum affects primarily the cornu ammonis and its vulnerability is explained by a simple hydrodynamic effect of the drop in blood pressure and the dilatation of the blood vessels on the velocity of blood flow under the influence of carbon monoxide. Whereas in blood vessels branching dichotomically the fall in the blood pressure is distributed equally, in the rakerlike pattern of the vascular system of the cornu ammonis the blood pressure can drop locally below a critical level before this condition occurs in the rest of the brain. On account of the sluggish flow of blood, the nerve cells in these areas are exposed to lack of oxygen and to the poisonous effect of carbon monoxide longer and more severely than are those in areas in which the circulation has not yet reached so low a pressure. The suggestion is made that the results obtained in the opossum may lend themselves to a satisfactory explanation of the selective vulnerability of Sommer’s sector of the cornu ammonis in man, which has a rakelike vascular pattern of the type seen in the opossum. (R. M. S.)

**Action Potentials of Muscles in Athetosis. Action potentials of muscles in patients with athetosis and Sydenham’s chorea have been studied. Motor unit discharges are asynchronous and polyrhythmic in simultaneous leads during both involuntary and voluntary movements. In this respect they resemble normal voluntary innervation. Antagonists are in almost constant, simultaneous innervation, which may be steady or irregular in either muscle, during both involuntary and voluntary movements. During periods of rest no indication of basic or “tonic” innervation is noticed in the muscle. During occasional periods of innervation of the protagonist alone no activity in the antagonist is seen. This seems to indicate that in cases of uncomplicated type the “stretch” reflex mechanism is not active, as in spasticity. In cases in which spastic paraplegia is a complication a tendency to synchronous motor discharge is seen, but the simultaneous innervation of antagonists is the same in these cases as in those of pure athetosis. Alternating tremor may be found as a complication of both diseases. This is considered to be caused by involvement of a different pathological mechanism. (R. M. S.)

**Spontaneous Cerebral Ventriculostium.—Two cases are reported in which there was a spontaneous rupture connecting a ventricle with the surface of the brain. In the first case the rupture through the lamina terminalis permitted a remission in the patient’s symptoms for 9 years, and the abnormal ostium was still patent 11 years after the presumed time of its development. This case constitutes the longest clinical demonstration on record of the efficacy of ventriculostomy of the third ventricle for the relief of obstructive hydrocephalus arising from occlusion of the aqueduct of Sylvius or the fourth ventricle. In the second case a rupture through the medial wall of one lateral ventricle did not relieve the patient’s symptoms, since no communication was established with the subarachnoid space. (R. M. S.)

**Metrazol Treatment and Schizophrenia.—Various degrees of improvement took place in 18 per cent. of a group of 100 schizophrenic patients. This is a much lower percentage than that generally reported,
but in 78 per cent. the psychosis had lasted for more than 18 months. None of the treated or the control patients recovered.

(R. M. S.)

**Spastic Pseudosclerosis.**—Four cases of spastic pseudosclerosis are reported, in three of which the disease occurred in members of the same family. Clinically, disease of the pyramidal and extrapyramidal systems and the anterior horn cells and mental symptoms were present in all. In one instance there were also sensory disturbances. The mental symptoms in all of these cases appeared last. Histopathologically, changes were observed in the frontal, temporal, motor, and parietal convolutions, in the pyramidal and extra-

pyramidal systems and in the lower motor neurons. (R. M. S.)

**Subarachnoid Hemorrhage Due to Metrazol.**—A case is described of death due to subarachnoid and intracerebral hemorrhages following the ninth injection of metrazol (5 c.c.). It is believed that the hemorrhages were due to increased permeability of the vessel walls caused by the toxic effects of metrazol and degeneration of the liver. The opinion is expressed that, since therapy with metrazol appears to be less dangerous than was originally believed, its contraindications are few, and psychotic patients with such complications should be given the benefit of metrazol shock therapy. (R. M. S.)

Vol. 44. No. 4. October 1940.


*Faradic Shock in Treatment of Functional Mental Disorders: A Treatment by Excitation Followed by Intravenous Use of Barbitaluates.* N. J. Berkowitz. 760.

*Connections of the Red Nucleus.* J. W. Papez and W. A. Stotler. 776.

**Spinal Dysphasia** (Bifida and Myelodysplasia). B. W. Lichtenstein. 792.


Case Reports:


**Experimental Studies on Headache.**—Of 15 subjects in whom afferent impulses from the superficial tissues of the scalp on one side were blocked by procaine, histamine headache in four and headache due to pneumoencephalographic examination in 11 were the same on the two sides of the head. In 12 subjects obliteration of the cutaneous sensation of the scalp by a blood pressure cuff modified the intensity of the histamine headache. That the reduction in pain was due to raising the pain threshold by introducing a second pain (the tight cuff) is offered as a likely hypothesis. Of five subjects, obliteration of the temporal artery by manual compression reduced the intensity of the histamine headache on that side in two but had no effect in three. Complete subcutaneous infiltration with procaine hydrochloride of half the anterior part of the scalp (frontal, parietal, and temporal areas on one side), including presumably all the vessels of the scalp in that area, did not prevent severe histamine headache in the frontotemporal region, bilaterally, which was of equal intensity on the two sides. Injection of histamine directly into the temporal artery resulted in homolateral temporoparietal headache in two subjects. Ligation of the temporal artery on one side in four subjects and of the middle meningeal artery on one side in seven subjects did not influence the intensity of the headache experienced on the two sides after injection of histamine. In seven subjects who had partial section of the sensory root of the fifth cranial nerve on one side (resulting in unilateral analgesia of the lesser part of the face in six) histamine headache occurred bilaterally. In seven of eight patients who had complete section of the sensory root of the fifth cranial nerve (resulting in unilateral hemianalgesia of the face and anterior half of the scalp), histamine headache was not induced on the denervated area, but did occur elsewhere in the head. In a subject with complete hemianalgesia of the face and head (resulting from a head injury), strictly unilateral hemianesthesia on the normal side of the head was induced by histamine. Histamine headache was absent in the back of the head on one side, but was present elsewhere in the head in two subjects with lesions of the cervical portion of the cord, causing unilateral occipital analgesia. Section of the seventh and the ninth cranial nerve, respectively, in two subjects did not affect the bilateral equality of the headache induced by histamine. Section of both sympathetic trunks in two subjects (cervical portion in one and thoracic portion in the other) had no effect on subsequently induced histamine headache. (R. M. S.)

**Human Pyramidal Tract.**—The Betz cells
can contribute but 2 or 3 per cent. of the fibres found within the pyramidal tract. The size rather than the number of the Betz cells suggests that they may be of importance in pyramidal conduction. (R. M. S.)

Carbon Disulphide Poisoning.—This study includes a survey of the changes in the nervous system in man and in experimental animals following carbon disulphide poisoning. A comparison of the two discloses the fact that in the human nervous system one finds scattered changes in the ganglion cells of the cerebral cortex of varying degree, depending on the severity of the intoxication, disease of the basal ganglia and peripheral nerves and evidence of vascular involvement; in the experimental animal there are more extensive damage to the cerebral cortex and basal ganglia injury of the Purkinje cells, vascular changes, minor damage to the spinal cord and involvement of the peripheral nerves. The changes in the ganglion cells are nonspecific and are merely a manifestation of injury by a noxious agent. The difference in the changes in man and in the experimental animal may be explained, in part at any rate, by the difference in length and degree of exposure to the chemical. (R. M. S.)

Commissural Pathways in Corpus Callosum.—Section of the commissural pathways contained in the corpus callosum may be carried out without any untoward effect on the patient. Such a section may serve to limit the spread of an epileptic wave to the opposite hemisphere. When such limitation occurs, the patients do not seem to lose consciousness or have generalized convulsions. When there are multiple areas from which an epileptic seizure may originate, possibly synchronously, section of commissural pathways between hemispheres may not have any influence on the seizures. (R. M. S.)

**Faradic Shock and Functional Mental Disorders.**—The author claims to have secured good results in various types of mental disorder by the employment of a faradic current as a form of shock therapy. (R. M. S.)

**Connections of Red Nucleus.**—The authors’ studies deal largely with the question of pallidorubral connections through the medium of the prerubral field H or nucleus campi Forel, with the origin and ending of the fasciculus thalamicus, with the segments of the red nucleus and with the origin and destination of descending rubral tracts. Taken together, these stations and pathways appear to form a descending pallidal system, which is part of the extra pyramidal equipment of the brain stem with cortical, pallidal, and cerebellar interconnections. (R. M. S.)

"Spinal Dysraphism."—The author describes three cases illustrating many of the characteristic anomalies of the spinal cord belonging to the spinal bifida, or dysraphic group. (R. M. S.)

**Combined Anoxic and Insulin Shock.**—The common therapeutic factors of the various modern shock and drug therapies for schizophrenia is held to be the general functional readjustment of the central nervous system after the multiple micro-destruction of brain tissue that is unintentionally accomplished by all these methods. (R. M. S.)

**Familial Paroxysmal Choreoathetosis.**—The authors describe what they believe to be a hitherto undescribed clinical syndrome, the essential features of which are the paroxysmal occurrence of attacks of choreoathetosis and the marked familial background. (R. M. S.)

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**BRAIN**

Vol. 63. No. 3. September 1940.


*An Analysis of 1,433 Cases of Paroxysmal Trigeminal Neuralgia (Trigeminal-Tic) and the End Results of Gasserian Alcohol Injection. W. Harris. 209.


Familial Pes Cavus and Absent Tendon-Jerks: Its Relationship with Friedreich’s Disease and Peroneal Muscular Atrophy. J. D. Spillane. 275.

**Trigeminal Tic and Gasserian Ganglion Injection.**—Thirty years’ experience of alcohol injection in trigeminal neuralgia is reviewed. 1,433 cases were treated, of which 457 were followed up. 316 of the 457 had no recurrence of pain for 3 years or more, and 12 for over 20 years. Local infection is thought to be the usual cause of tic doloreux, and other factors, such as heredity and preceding disease are analysed. Some of the complications of injection are discussed. (D. J. W.)

**Optic Atrophy and Pernicious Anæmia.**—Visual failure was recognized in three early cases of pernicious anæmia. It was associated with primary optic atrophy and small oblong central scotomata spreading to the blind spot. Useful vision slowly returns if the anæmia is adequately treated. (D. J. W.)
Familial Presenile Dementia with Spastic Paralysis.—An unusual case of presenile dementia is described. There was widespread demyelination with peculiar degenerative changes around small blood vessels. The parenchymatous changes were thought to be secondary to the vascular damage, for which no cause could be found. Eleven cases were found in five generations followed in one family. The course of the disease was similar in each and one autopsy was reported. The syndrome has features similar to other recognized forms of presenile dementia but seems to be a separate entity. (D. J. W.)

Relation of Atrophy to Fibrillation in Muscle.—Atrophy following motor denervation of skeletal muscle occurs in the absence of fibrillation. It is therefore not due to the fibrillatory activity. (D. J. W.)

Experimental Lesions in Basal Ganglia.—Lesions in the basal ganglia of 26 cats caused slight hypertonia of the extensor muscles of the contra-lateral limbs. This was associated with a delayed flexor reflex, defective placing reactions, ipsilateral flexor hypertension, and defective closure of the opposite eyelid. The extensor hypertonia was temporarily reduced by deafferentation. (D. J. W.)

Familial Pes Cavus and Absent Tendon Jerks.—Roussy and Lévy's syndrome is an intermediate subgroup of the heredofamilial degenerations of the cord and cerebellum, of which Friedreich's disease and the muscular atrophy of Charcot-Marie-Tooth are examples. (D. J. W.)

CLINICAL SCIENCE

Vol. 4.

No. 3. October 1940.

Somatic Simulating Visceral Pain.—A series of cases illustrates the similarity of pain arising from somatic and visceral disease. Thus somatic disease such as senile kyphotic deformities may give pain simulating angina pectoris, peptic ulcer, renal, or biliary disease. The test of local anaesthesia may clinch the diagnosis of somatic disease. (W. M. H.)

Instrument for Measuring Blood.—The quantity of blood and its degree of oxygenation may be calculated from the amounts of red and infra-red light transmitted, readily measured in the apparatus described. (W. M. H.)

JOURNAL OF ANATOMY

Vol. 74.

No. 2. January 1940.

The Nature of the Soft Palate. F. W. Jones. 147.

An Experimental Study of the Morphogenesis of Intersuavity. S. Zuckerman and J. R. Groome. 171.

*The Projection of the Cerebral Cortex on the Pons and Cerebellum in the Macaque Monkey. S. Sunderland. 201.


*Corticofugal Degeneration Following Thermocoagulation of Areas 4, 6, and 4-s in Macaca Mulatta. W. J. C. Verhaart and M. Kennard. 239.


The Development of Synovial Joints. J. Whillis. 277.


Projection of Cerebral Cortex on Pons and Cerebellum.—(1) The topography of the pontine nucleus is described. (2) The experimental investigations show that (a) cortico-pontine fibres take origin in the frontal, parietal, occipital, and temporal lobes of the brain and terminate in the rostral three-quarters of the ipsilateral pontine nucleus. (b) The fronto-pontine tract receives fibres from area 6, but probably none from areas 8 and 9. These were the only fields of the frontal lobe investigated. The tract occupies the medial segment of the cerebral peduncle and terminates chiefly about the dorsal and medial portion of the nucleus in the rostral half of the pons. (c) The parietal, occipital, and temporal fibres are associated in a common pathway which occupies the lateral segment of the cerebral peduncle and terminates chiefly about the ventral and lateral aspects of the rostral three-quarters of the pontine
nucleus, the parietal fibres terminating more distally than the remainder. The cortical fields giving origin to these fibres and the relative contributions from those fields cited, suggest that the rostral half of the pontine nucleus projects chiefly on to the contralateral lobus medius of the cerebellum. There is no strict projectional localization in the sense that a particular part of the nucleus projects exclusively to any specific cerebellar area. All aspects of the nucleus appear to project diffusely over the surface of the lobus medius. In correlating these findings the author says that it may be assumed that the cerebral cortex projects to the contralateral lobus medius of the cerebellum, which represents the neo-cerebellum, in such a way that the various parts of the lobe have equivalent values anatomically and physiologically, and that any differentiation in the nucleus is more dependent on its cortical relationships than on its cerebellar connections. (G. W.)

Relative Positions of Hippocampus and Corpus Callosum in Placental Mammals.—The relationship between the hippocampal formation or its vestiges and the corpus callosum and psalterium is from transverse serial sections stained by toluidin blue, in a bat and the cat. Similar observations were made in the rat and mouse, using, in addition, sagittal and horizontal sections and the impregnation method as a fibre stain. The investigations lead to the conclusion that the corpus callosum and psalterium of placental mammals lie morphologically ventral to the hippocampus and its vestiges. The relationship is most clearly seen in the bat. In mammals with a larger corpus callosum (e.g. cat) a hippocampal flexure is formed beneath the hinder part of the corpus callosum, as Elliott Smith originally described. In the rat and mouse this flexure is less clearly seen. In general the findings support the theory of Elliott Smith regarding the origin of the corpus callosum and the homologies between the placental and marsupial commissures which he established. No evidence has been found for Abbie’s (1939) view that the corpus callosum has grown through subicular cortex above the hippocampal formation. (G. W.)

Corticofugal Degeneration following Thermocoagulation.—Following identification of areas A6, A4s, and A4 (A=arm region) laminar thermocoagulation within each region will produce Marchi degeneration localized to fibre tracts from each region; these have been traced to their subcortical destinations. All tracts previously well established by other authors for the precentral gyrus as a whole were found in the present investigation for the individual areas and no new connections were established. Fibres from areas A6, A4s, and A4 were found ending chiefly in nasal pontine nuclei, substantia nigra, and thalamus; no fibres could be traced to the red nucleus. The existence of cortico-caudate fibres was not definitely established. With the exception of the corticofugal tract from A4 no tract was found in any one cortical area which did not appear in the other two (6 and 4s) as well. The fibres from each area are arranged in a definite pattern throughout their course in the internal capsule; and they have a similar organization in the pedunculi, and as they project upon the various subcortical nuclei. (G. W.)

Nerve-Endings in Respiratory Muscle.—The muscle fibres and nerve-endings in the intercostal muscles and diaphragm of 12 sheep fetuses are described. The formation of the muscle spindle is found to begin about the 45th day of gestation and to be well advanced by mid-term (80 days). Motor end-plates are not found at 111 days and are present in simple form at 137 days. The findings are correlated with the observations of other workers that sustained movement and inhibition of respiratory muscle are present long before the earliest development of motor end-plates. (G. W.)

Innervation of Tongue Musculature.—The innervation of the intrinsic and extrinsic musculature of the tongue was studied histologically by a modified methylene blue technique in a series of 37 normal and 11 operated rats and 1 rabbit in which the hypoglossal and lingual nerves and the cervical sympathetic chain had been resected alone or in various combinations. The staining technique is based upon the injection of measured quantities of dye into tissues of which the circulation is maintained. The method described is applicable to the musculature of the tongue in rats and rabbits and the skin of the ear in the rabbit. No sensory endings were found in the intrinsic muscles of the tongue. No muscle spindles were found in the hypoglossus or genioglossus muscle. Sensory endings of a tension-recording type were found at the origin of the genioglossus muscle. No nerve cells were found along the course of the hypoglossal nerve in the tongue. Sympathetic fibres run in the hypoglossal nerve to reach the blood vessels in the tongue. No accessory nerve endings to muscle fibres or motor end-plates were found. The sympathetic ground plexus, periterminal network and terminal reticulum are considered to be reticular connective tissue. No nerve nets were observed. Dilatation of the pupil on stimulation of the hypoglossal nerve in rats under light ether anaesthesia was found to be due to stimulation of the sympathetic fibres of the hypoglossal nerve. Proprioception, taste, pain, and touch were tested on the tongue, lower gum, and lip in 19 human subjects in which the lingual and inferior alveolar nerves had been unilaterally and
bilaterally infiltrated with novocaine, or in which the mucosa of the tongue, oral pharynx, and palate had been painted with "decicain" or cocaine. In cases in which the lingual nerve was anesthetized by topical infiltration the area of ageusia was limited to the anterior two-thirds of the tongue and there was no overlap in the midline. Pain and touch were found to overlap in the midline in the region of the lower gum. This was confirmed in a case of central root division of the trigeminal nerve. All forms of sensation tested in the anterior two-thirds of the tongue were found to be abolished on complete anesthetization. There was no increase in tongue pressure to bite the tongue after complete anesthetization, although articulation was difficult. The mechanism of proprioception is discussed in the light of the anatomical and clinical findings and recent physiological work. (G. W.)
Neurohistological Basis of Cutaneous Pain.—Pressure, warmth, touch, cold, and pain are represented in the skin in punctate form. The theory of punctate sensibility must be interpreted from a three-dimensional point of view. Multiple spots from which one of the primary modalities of sensation can be aroused occur within the area of skin supplied by a single specific sensory neurone. Cutaneous pain is subserved only by the finer medullated and non-medullated nerve fibres bearing free nerve endings. These fibres are specific and arranged in a plexiform interlocking manner. Non-medullated nerve fibres derived from different neurones often lie within the same neurilemma sheath. There are regional differences in the disposition of, and in the area supplied by, the terminal nerve plexus and endings derived from a single dorsal root ganglion cell subserving pain. Pain can be aroused from the deeper layers of the epidermis and the superficial layers of the dermis. Several varieties of cutaneous pain can be aroused by a single stimulus depending upon the nature of the stimulus and the region of the body stimulated. All varieties of cutaneous pain are subserved by the same nerve apparatus. The "accessory" innervation to encapsulated touch receptors and to nerve endings subserving pressure, cold and proprioception from tendon is morphologically similar to nerve fibres and endings subserving pain. Fine somatic nerve fibres bearing free nerve endings similar to those subserving pain in the skin occur in the adventitia of blood vessels. No nerve apparatus other than that subserving pain is involved in the production of hyperalgesia. "Nocifensor" reactions are mediated by the nerve apparatus subserving pain. There is no anatomical foundation for the usual conception with regard to "axon reflexes." The facts presented establish that cutaneous pain behaves in accordance with the doctrine of specific nervous activity. (G. W.)

Connections of Inferior Colliculus.—The connections of the inferior colliculus and of the dorsal nucleus of the lateral lemniscus were studied in four guinea-pigs and four cats. The method used were those of Marchi and its modification by Swank and Davenport. The majority of lateral fillet fibres arising from the cochlear nuclei end in the contralateral nuclei of the lateral fillet and cerebral nucleus of the inferior colliculus. Some fibres from the cochlear nuclei end in the homolateral nuclei of the lateral fillet and inferior colliculus. A few lateral fillet fibres end in the medial geniculate body. The termination of the lateral fillet fibres in the superior colliculus is problematical. In the guinea-pig the inferior brachium contains fibres derived from the homolateral inferior colliculus and a few lateral fillet fibres. In the cat it also receives fibres from the contralateral inferior colliculus through the inferior intercollicular commissure. The ascending fibres in the inferior brachium end in the caudo-ventral nucleus of the medial geniculate body. In two cats the findings suggest a spatial arrangement of the fibres in the inferior brachium. Tecto-pontine fibres arise, in the guinea-pig, from either the cranial pole of the inferior colliculus, the caudal part of the superior colliculus, the nucleus parabigeminus, or several of these centres. They course among the fibres of the lateral fillet and in the ipsilateral lateral pontine nucleus. Tecto-pontine fibres arise, in the cat, from the caudal region of the superior colliculus. They form a bundle external to the lateral fillet and terminate as in the guinea-pig. Fibres from the ventro-lateral region of the inferior colliculus course medialwards and end in the central grey matter and possibly in the homo-lateral mesencephalic nucleus. A few fibres probably run from the inferior colliculus to the superior colliculus. The commissure of Probst, or dorsal commissure of the lateral fillet, receives fibres from the dorsal nucleus of the lateral lemniscus and collaterals from lateral fillet fibres. The fibres of the commissure end in the contralateral dorsal nucleus of the lateral lemniscus, dorsal nucleus of the brachium conjunctivum, and central nucleus of the inferior colliculus. Other fibres stated in the literature to arise from the inferior colliculus and dorsal nucleus of the lateral fillet have not been found. It is concluded that the midbrain auditory nuclei subserve very few reflex activities, being almost wholly sensory centres. It is suggested that the fibres from the temporal region of the cortex to the medial geniculate body and inferior colliculus control the sensory impulses received by these centres. (G. W.)

Nervous and Vascular Relations of Pineal Gland.—The pineal gland of the rhesus macaque contains a central cone of neurophil in which are embedded numerous large ganglion cells with branching processes. Contributing to this network of nerve fibres are perivascular plexuses accompanying branches of the choroidal arteries which penetrate the pineal gland from its lateral aspect and also a conspicuous fasciculus which can be traced to the apex of the pineal gland where it emerges as the nervus conarii. Fibres from the habenular and posterior commissures enter the substances of the pineal gland through its peduncle, but on tracing these through serial sections many are found to be merely aberrant commissural fibres which enter the peduncle on one side and leave it on the other. It is considered not improbable that all the fibres from the commissures which have been followed into the parenchyma of the pineal gland...
may be of a similar nature. Some of the fibres of the posterior commissure certainly terminate in relation to the ependymal epithelium lining the posterior wall of the pineal recess and have shown regular beading and minute end-bulbs. The central cone of neuropil in the macaque epiphysis is pervaded by a rich capillary plexus. Elsewhere the gland shows no great vascularity. No system of blood vessels is present which links the pineal gland with cell connections in the epithalamus comparable to that which has been described in relation to the hypophysis and the hypothalamus.

In the monkey a choroidal vessel extends up into the wall of the straight sinus where it ramifies in a subependymal position. From this vessel recurrent twigs descend to enter the pineal gland at its apex. The nervous conarii in the monkey has been traced from the central cone of neuropil in the pineal gland into the wall of the straight sinus. Here it ramifies in a plexiform manner in a subendothelial position, its fasciculi usually having a close topographical relation to branches of the choroidal artery which are also found here. Some sections show a globular skein of nerve fibres in the pial tissue, between the pineal gland and the straight sinus resembling a sensory nerve ending. In the human pineal gland the nervous conarii has been recognized. It emerges from the tip of the gland and runs an uninterrupted and apparently unbranched course to reach the dura mater of the tentorium cerebelli. Here it runs back in the floor of the straight sinus occupying a subependymal position. The nerve has been followed in serial sections for a distance of 20 mm. Its destination (in a peripheral direction) has not been determined. A formation of the arachnoid has been described in relation to the floor of the straight sinus where the great vein of Galen opens into it. This structure somewhat resembles a large arachnoid granulation of the usual type, but its stroma consists of dense pial tissue containing a sinusoidal plexus of blood vessels and several large blood sinuses. It has been termed the suprapineal arachnoid body. From its structure and disposition it is suggested that the suprapineal body may provide a ball valve mechanism whereby the venous return from the great vein of Galen is regulated and controlled. On its way to the dural floor of the straight sinus the nervous conarii in the human brain was found in two specimens to pass through the suprapineal body and traverse one of the blood sinuses therein. No evidence was found either in macaque or human material for the existence of the "ganglion conarii" as described by Pastori. (G. W.)

Thalamic Degeneration Induced by Temporal Lesions.—The location of the auditory area in the central cortex of the cat was determined by comparing the positions of eight surgical lesions of the temporal cortex with the distribution of the resulting cellular degeneration in the medial geniculate bodies. Six cats were used, two having lesions on both sides. The auditory radiation from the thalamus ends in a cortical area including the middle cetsylvian gyrus and the dorsal parts of the sylvian and anterior echo sylvian gyri, extending ventrally to the upper tip of the sylvian sulcus. The rostral tip of the medial geniculate body is connected to the rostral part of the auditory area in the upper end of the anterior echo sylvian gyrus. The fibres from the central and ventromedial part of the geniculate body including the large cell portion of the nucleus end in the lower part of the acoustic area in the sylvian gyr.

(G. W.)

JOURNAL OF CLINICAL INVESTIGATION


The Mechanism of the Excretion of Vitamin C by the Human Kidney at Low and Normal Plasma Levels of Ascorbic Acid. G. J. Friedman, S. Sherry, and E. P. Rall, 685.

A Photoelectric Method for the Quantitative Determination of Erythrocyte Fragility. F. T. Hunter. 691.

On the Inactivation of Thrombin by Plasma Protein. J. D. Stewart and G. M. Rourke. 695.


Bronchial Calibre Changes in Bronchiectasis. J. Greenfield. 723.


Antibody Formation in Cases of Lobar Pneumonia with Sulfathiazole. Y. Kneeiand and B. Mulliken. 735.
Neuromuscular Transmission in Humans.

The method, which is described, has been used in normal subjects and in patients with myasthenia gravis. The abnormal responses found in this disease are corrected after prostigmin administration.


—The principle of the venous occlusion plethysmograph is utilized for the measurements, and results of hyperventilation and temporary increased intracranial pressure are similar to those previously recorded. Cerebral blood flow is diminished in paresis and cortical atrophy, while nicotinic acid causes an increase.

Intravenous Histamine and Ménière's Syndrome.—Intravenous histamine caused an improvement with no untoward effects. Various metabolic studies were also made.

Experimental Pernicious Anemia.—Major
crocytic anæmia with ataxia and degeneration of the sensory neurone occurred in a few animals deprived of yeast but which received a fixed diet of casein, sucrose, lard, cod-liver oil, salt, thiamin, riboflavine, and nicotinic acid.

Destruction of Thiamin by Unacidified Bile.—The patient with achlorhydria is shown to develop a thiamin deficiency unless more than the usual quantity is taken in. This deficiency is suggested as the explanation of cord changes in pernicious anæmia.

Migraine.—From experimental procedures it is inferred that migraineous headache does not arise primarily from the cerebral arteries, but chiefly from dilatation and stretch of external carotid artery branches. Further, that pre-headache phenomena result from cerebral vasconstriction. (J. N. C.)

Vol. 19.


Carbohydrate Metabolism in Addison's Disease.

Vol. 92.

*Extrapyramidal Function. F. A. Mettler. 141.

Left-Sided Weakness, Blood Pressure Difference between the Two Arms and Left Optic Atrophy. A. New Clinical Syndrome? F. E. Weatherby and N. H. Wiley. 151.


Extrapyramidal Function.—In cats hypertonicity is induced when the lower connections of the cadata nuclei are cut and it is increased by elimination of the red nuclei. Contralateral spasticity is further increased when the entire brain anterior to the red nucleus is removed. On the whole, the effect of the corpus striatum must then be inhibitory, for while the pallidum is shown on stimulation to produce plastic tonus it cannot produce spastic states, striatal disorders are accordingly interpreted. Thus in Wilson's disease with the gross changes in the striatum rhombencephalitis rigidity is no longer inhibited and tremor is accentuated by volitional activity, while for paralysis agitans it disappears since the striatal link is not impassable.

In Huntington's chorea the pallidal structures are released from the inhibitory mechanism of the striatum, but since they are relatively intact movements appear synergic. In animals athetoid movements are produced by stimulation in the region of the rubrospinal tract, ascending limb of brachium conjunctiva and the reticulo-spinal tract. The rubrospinal tract has nothing to do with athetosis. It may be modified by ablation of cortical area 6 or section of the reticulospinal tract. The authors consider athetosis may come from abnormal activity in tracts leading to the substantia nigra, inferior olive nucleus ansa peduncularis, and from area 6 to the globus pallidus. The tentative nature of explanations based on present experimental results is emphasized. (W. M. H.)

Sclerosis and Fever Therapy.—From a study of 51 cases followed for an average of 31 months it is concluded that fever therapy is of value only in early cases of short duration and slight severity. It is not recommended in intermediate or advanced cases. (W. M. H.)

Metrazol Remission in Severe Obsession-Compulsion Neurosis of Five Years' Duration. M. Zeltier. 290.

Two Cases Showing Tonic Neck Reflexes and Tonic Fits Following Vascular Lesions in the Brain Stem. A. B. King. 302.

*Observations and Results Obtained in the Hypoglycemic Treatment of Schizophrenia. A. R. Coyne. 309.

*The Threat of Mental Disease. I. S. Wile. 323.

Adipositas Cerebralis and Emaicatio Cerebrales. A. Gordon. 342.

Meningeal Permeability and Metrazol Therapy. B. Skorodin. 348.

Hypoglycemic Treatment of Schizophrenia.—An analysis of results of insulin therapy in 55 schizophrenic patients followed for periods of 6 to 12 months. In 75 per cent. of the cases the duration of the psychosis was less than 2 years and this group included all those who recovered (19 per cent.). 17 per cent. were improved, 63 per cent. unimproved. No patient ill more than 5 years showed improvement. Favourable response to treatment was generally evident in the 3rd-4th week, while no permanent improvement was seen in those who showed no response by the 6th week. (W. M. H.)

Threat of Mental Disease.—This review addsuce interesting statistics on the incidence of mental disease, emphasizing the cues for prevention found in the high proportion among first admissions of psychoses accompanying cerebral arteriosclerosis, the rôle of psychoses in increasing mortality, the socio-economic factors in the genesis of mental disease. (W. M. H.)

Vol. 92.

No. 3.

September 1940.

Bilateral Cortical Thromboses. D. M. Palmer. 429.

Hypoglycemic Epilepsy. L. J. Robinson. 442.


Vigilance and the Vitalistic Hypothesis. S. E. Roffe. 471.

*Cerebellar Agenesis. H. S. Rubinstein and W. Freeman. 489.

Basal Ganglia Degeneration.—Degeneration of the basal ganglia proceeding to cyst formation was found in a subject who had shown for 22 years the symptoms of lenticular degeneration. The liver was not involved. Olivo-ponto-cerebellar atrophy, disclosed microscopically, had no clinical counterpart. A single disease process, involving basal ganglia, brain stem and spinal cord is suggested. Two siblings were similarly affected. (W. M. H.)

Cerebellar Agenesis.—Signs of cerebellar defect appeared only 2 years before death (at 71) in a case of marked cerebellar agenesis. The brain showed arteromatous infarcts over the cortex, a right-sided defect in the brain stem, and a cerebellum represented by a small flocculo-nodular lobe. The authors discuss compensation for cerebellar deficiencies and conclude that it was not needed in a subject of such constitutional inferiority as the one described. (W. M. H.)

Vol. 3.

No. 4.

October 1940.

J. G. Dusser de Barenne 1885-1940. 283.

*Hypothalamic Lesions and Pneumonia in Cats. E. W. Haertig and J. H. Masserman. 293.

*Progression Movements Elicited by Subthalamic Stimulation of Patients. M. H. Walker. 300.


Integration of Locomotor Behaviour Patterns of the Hagfish. B. Campbell. 323.


Ocular Movements from the Occipital Lobe in the Monkey. A. E. Walker and T. A. Weaver. 353.


Hypothalamic Lesions and Pneumonia.—After lesions in the mid-hypothalamic area between the chiasm and mammillary bodies cats show unusual motor behaviour when held upright by the nape of the neck, attempting to leap high and clawing wildly until set upon all fours. A large proportion succumb to bronchopneumonia. They respond to injection with fever, but hyperthermia is not maintained in fluctuating environmental temperatures. (W. M. H.)

Progression Movements and Subthalamic Stimulation.—A C stimulation of the subthalamus in the region dorsal to the mammillary bodies causes in cats under nembutal walking and running movements. The locomotor point appears to be in Forel's field at the level of the subthalamic decussation. (W. M. H.)

Optic Nerve Stimuli and Electrical Activity.—The electrical activity in the region of the external geniculate the radiation and cortex following electrical excitation of the optic nerve was studied oscillographically in the cat. The geniculate and cortex are activated by the first group of the
fastest waves in the fibres of the optic nerve. Paired shocks show facilitation of the second responses at intervals of 2–15 m./sec. Facilitation is likewise found at the cortical level. Slow potentials suggesting after potentials are found in the cell layers of the geniculate. The cortical activity shows a depression followed by facilitation in phasic relationship to the alpha rhythm after a single volley. Further elucidation of the cortical response must therefore be in terms of the patterns of the fibre response and of the cortical receptivity. Fibres from the optic tract spread over much of the area bounded by the medial and lateral geniculate, the pretectal area and the superior colliculus. In general the larger fibres synapse in the anterior, the smaller in the posterior regions. (W. M. H.)

Hypothalamus and Diathermy.—Local hypotalamic heating was produced in normal dogs without anesthesia by means of diathermy. Small gold electrodes had been placed on the anterior or posterior hypothalami with leads to the skin surface and at least a month allowed for recovery. Following local heating at the anterior area shivering was almost instantly suppressed and peripheral vasodilatation occurred; after like heating of the posterior hypothalamus there was only slight reduction of shivering and no peripheral vasodilatation. Panting was not induced by local hypothalamic heating. (W. M. H.)

Neocortex and Postural Reactions.—While the postural responses of hopping and placing are slower and less exact in the opossum than in the phylogenetically higher forms, they are shown by extirpation experiments to be dependent in part on electrically excitable areas of the neocortex. (W. M. H.)

Chemical Constitution and Anaesthetic Potency in Cortical Potentials.—The frequency of cortical waves in the anaesthetized cat’s brain is related to the anaesthetic potency, diminishing with increase of the molecular weight of the alcohols and substitution of secondary and tertiary for the primary forms. (W. M. H.)

Forelimb Muscle Contractions in Rat Fetuses.—Effective neuromuscular transmission (effe rent) is shown in 16-day rat fetuses although nerve endings are primitive in form. It is suggested that extra muscular factors, such as those due to the poor differentiation of the limb structures, may account for the high threshold, long time factor, and long duration of the earliest visible muscular contractions. The theory of a “myogenic” developmental phase is rejected. (W. M. H.)

Vol. 3. No. 5. September 1940.

Activity in the Simplest Spinal Reflex Pathways. B. Renshaw. 373.


*Central Course of “Recurrent Sensory Discharges.” D. H. Barron. 403.


*Function of Mesencephalic Root of Fifth Cranial Nerve. B. Corbin and F. Harrison. 423.


Spinal Reflex Pathways.—In decerebrated cats the central reflex time for a homolateral ventral discharge following stimulation of a lumbar dorsal root varies between 0.65 and 1.0 m./sec. Ventral root discharges from direct stimulation of the central gray show that the synaptic delay at the motoneurons is similar. Large groups of motoneurons are typically discharged at particular central reflex times. (W. M. H.)

Sensory Systems and Cerebral Cortex.—Under nembutal anaesthesia the spontaneous activity of the cortex is dependent upon the integrity of the sensory pathways, disappearing when the brain stem is cut at the colliculi, the optic thalamus destroyed, or its cortical radiations severed. Discharges like the spontaneous bursts of activity appear throughout the cortex when sensory nerves, the thalamus or thalamo-cortical fibres are stimulated at rates 6-20 per min. Faster rates set up an after-discharge lasting several minutes. (W. M. H.)

Choline Esterase in Brain and Spinal Cord.—At an early stage in gestation (60-80th day) choline esterase is in high concentration in the spinal cord of sheep fetuses while the amount in brain is low, rising rapidly during the final few weeks. This finding is correlated with the mainly local reflex character of the early movements in mammalian embryos. The enzyme is found concentrated at the nerve endings before end plates appear. (W. M. H.)

Recurrent Sensory Discharges.—Conduction of recurrent sensory discharges by collateral fibres of the type hitherto postulated would seem unlikely from experiments in rats. Rootlets carrying these discharges were identified and cut. The peripheral portions were found to show no evidence of degenerating fibres and action potentials could not be recorded from the central portion 3 days after section. (W. M. H.)

Intercortical Connections of Corpus Callosum.—In cats and monkeys single electrical shocks applied to one hemisphere give rise to potentials in the other hemi-
sphere generally most readily detected at the symmetrical point. In the monkey an exception is the ocreulum of the ocipital lobe. Localized stimulation in certain areas may evoke potentials over a considerable portion of the corresponding contralateral area. These impulses are mediated by direct callosal fibres. (W. M. H.)

Cortical Potentials Mediated by Corpus Callosum.—The potential wave caused by stimulation of the contralateral hemisphere is diphasic, being surface positive for 15 m./sec. and negative for 75 m./sec. Nembutal obliterates the negative phase. Results from micro-electrodes inserted to various depths suggest that ascending fibres of the callosum ramify in the upper layers and end in the first layer where they synapse with descending interneurones which lead to deeper cortical layers. The ascending fibres contributed the surface positive component, the descending the negative. (W. M. H.)

Mesencephalic Root of Fifth Cranial Nerve.—Electrical potentials from the mesencephalic root of the Vth, localized with the Horsley-Clarke instrument, are elicited by pressure stimulation of the teeth and palate, and by stretching of the masticator muscles. Impulses in the alveolar and palatine nerves passing to the motor nucleus are probably inhibitory. No potentials from the IIIrd, IVth, or Vth nerves result from the stretch of the extrinsic ocular muscles. (W. M. H.)

JOURNAL OF PHYSIOLOGY


The Pituitary and the Insulin Content of Pancreas. R. E. Hast. 419.


The Relation of Heart Rate to Intracranial Pressure. O. G. Edholm. 442.


The Anaerobic Recovery Heat Production of Frog's Muscle at 0° C. D. K. Hill. 460.


The Absorption of Water from the Colon of the Rat under Urethane Anaesthesia. B. L. Andrew, J. N. Davidson, and R. C. Garry. 487.


Blue-Green Region of Spectrum.—The position of the "blue-green" region of the spectrum was found for 100 normal subjects and shown to be less uniform than that of the "yellow" region. (W. M. H.)

Action of Pituitary Extracts on Urine.—A non-pressor but anti-diuretic extract of posterior pituitary lobe, prepared by heating at 99° C. and pH 10-0, was found to have no diuretic action on the anesthetized animal. The diuretic effect of posterior pituitary extracts with both principles is therefore due to the pressor activity. From the effects of anaesthesia and operative procedures on urinary osmotic pressure and urine flow it was shown that the anti-diuretic action failed when the urine was hypertonic (freezing value below 0-800). (W. M. H.)

Amines Related to Adrenaline.—These further studies on amines related to adrenaline show the effect of a double bond in the side chain. Phenylbutenylamine resembles benzodrine in toxicity, action on blood pressure, and effects on smooth muscle. It fails to produce the same restlessness in animals, but a coarse intention tremor becomes marked. Phenyllylamine closely resembles β-phenylethylamine in toxicity and actions. In these compounds the introduction of two unsaturated carbon atoms has therefore little effect on physiological activity. The substitution of a phenyl group in dβ diphenyl ethylamine produces a different action—depressant both on C.N.S. and on smooth muscle. (W. M. H.)

Heart Rate and Intracranial Pressure.—The cardiac slowing which occurs when the intracranial pressure rises above systolic pressure was shown in cats to be independent of the rise in blood pressure continuing when such rise was prevented by a mercury valve. (W. M. H.)

Osmotic Pressure of Endolymph.—A method of collecting small quantities of endolymph is described. Measurements of total osmotic pressure show increasing values for blood, c-s-f, perilymph and endolymph in this order. The findings are considered to support the view of a secretory origin of both c-s-f and labyrinthine fluids. It is suggested that endolymph is transferred to the perisaccular connective tissue by excretory activity of the pars intermedia. In the "dilution phase" this connective tissue is distended and the osmotic pressure reduced so that absorption into the blood stream is possible. The wide variations in its bulk and consistency give some support to this theory. (W. M. H.)

Action of Adrenaline on Uterus, and
Modification by Eserine.—Adrenaline applied to guinea-pig uterine muscle which has been soaked for 4-5 hours in Ringer-Locke solution with eserine, causes relaxation followed by contraction. Atropin and ergotoxin do not alter this modification of the normal adrenaline action of inhibition and relaxation. A tentative suggestion is that the production of K in adrenaline inhibition liberates a minute amount of ACh, destruction of which is delayed by the eserine. (W. M. H.)

**PHYSIOLOGICAL REVIEWS**

Vol. 20. No. 4. October 1940.


**PSYCHIATRIC QUARTERLY**


Psychosomatics and Somatopsychics. A. Myerson. 665

Types and Analyses of the Clinical Picture of Recovered Schizophrenics. O. Kant. 676.

Homesickness and the Mother's Breast. E. Sterba. 701.


Electric Convulsion Therapy in Mental Disorders. L. Kalinovsky and S. E. Barrera. 719.

The Mechanisms of Wit and Humour in Normal and Psychopathic States. A. A. Brill. 731.

Thirty Years of Alcoholic Mental Disease in New York State. H. M. Pollock. 750.

Some Implications of Psychotic States. G. S. Sprague. 770.


The Psychology of Sudden and Premature Graying of Hair. H. S. Barahal. 786.

The Role of Allergy in Neuropsychiatry. T. W. Clarke. 800.

Habitus and Personality in Mental Disease Associated with Organic Disease. E. Davidoff, G. L. Goodstone, and E. C. Reifenstein. 809.

Amyotrophic Lateral Sclerosis with Psychosis. S. Androp. 818.

Rorschach Interpretation of the Personality Structure of Schizophrenics Who Benefit from Insulin Therapy. F. Halpern. 826.


**SCHWEIZER ARCHIV FÜR NEUROLOGIE UND PSYCHIATRIE**

Vol. 15. No. 2. 1940.

Zur Problem von Konstitution und Prozess in der Schizophrenie auf Grund des Rorschach-Versuches. (Problems of constitution in schizophrenia based on the Rorschach test.) G. Boszorményi and F. Merei. 278.

Psychogene und Hysterie. (Psychogenesis and hysteria.) R. Flinker. 296.


Zur Lehre von der erschwerten Wortfindung und ihrer Rückwirkung auf das Denken des Aphasischen (Dritter Beitrag). (Thought processes of aphasics in connection with word teaching.) F. Lotmar. 341.


Das künstlerische Schaffen Geisteskranker und seine Beziehungen zum Verlauf der Krankheit. (The artistic activities of the mentally ill and their relation to the course of the illness.) P. Mohr. 427.
