Part II.—Bibliography and Epitome.*

AM. J. ORTHOPSYCHIAT.

VOL. XIV. JANUARY, 1944.

AM. J. PHYSIOL.

VOL. CXXXVII. 1942.

The Relation between the Physical Properties of Electric Currents and their Electronarcotic Action.

Studying the effects of electric currents applied to the temples of dogs, the authors found two types of electronarcosis: one, a narcotic type resembling chemical narcosis, and the other a kinetic type characterized by hyperkinesis and righting reflexes. The type produced appears to depend on the individual animal and not on the type of current used. The electronarcotic effect of direct current is small as compared with that of either pulse or alternating current.

T. G. ANDREWS (Psychol. Abstr.).

* A number of abstracts in this section are reproduced from *Chemical Abstracts* and *Psychological Abstracts*. To the Editors of these two Journals we extend our grateful thanks.

The Termination of Ascending Trigeminal and Spinal Tracts in the Thalamus of the Cat.

"With oscillographic recording of potentials evoked by peripheral nerve stimulation, the mesencephalic course and thalamic termination of fast-conducting pathways from face and limbs have been studied in the cat. These pathways ascend in and adjacent to the medial lemniscus and terminate in the ventral thalamic nucleus, the limb pathways in its postero-lateral or external division and the trigeminal pathways in its postero-medial or arcuate division."

T. G. ANDREWS (Psychol. Abstr.).

Sexual Behavior in Rats with Lesions in the Anterior Hypothalamus.

"There seemed to be a tendency for damage to the medial half of the anterior hypothalamus to depress sexual activity. . . . Transverse lesions extending from fornix to fornix and lying at various levels from the middle of the optic chiasma to the anterior border of the median eminence are not incompatible with normal sexual behavior. . . . This work, then, neither affirms nor denies the possibility that there may exist in the medial half of the anterior hypothalamus a structure or structures essential for the integration of normal sexual behavior. It does indicate the improbability that such is the case and very definitely limits the course of fibers to and from this hypothetical center."

T. G. ANDREWS (Psychol. Abstr.).

VOL. CXXXVIII. 1943.

Effects on Man of Severe Oxygen Lack.

Schizophrenic patients were subjected to severe anoxia over a period of several minutes either up to or through the point of unconsciousness. The anoxia produced no beneficial effects on these patients nor any lasting harmful effects on the central nervous system. "It should be possible to descend with an opened parachute from 31,000 ft. altitude without oxygen equipment with no ill effects from anoxia."

T. G. ANDREWS (Psychol. Abstr.).

Humoral Intermediation of Nerve Cell Activation in the Central Nervous System.

Central neuro-humoral nerve cell activation was studied on the respiratory act of the dog. Acetylcholine produced hyperactivity of the respiratory center, and the effect varied with the concentration of the substance. "The activity produced was essentially a normal hyperpnea showing the characteristic series of changing and co-ordinated events . . . during a respiratory cycle." It was concluded that neuro-architectural patterns rather than sensory patterns of impinging impulses exercise the dominant role in nervous integration. The authors propose that their conclusions from studies on the respiratory act are applicable to the central nervous system in general.

T. G. ANDREWS (Psychol. Abstr.).

AM. J. PSYCHIAT.

VOL. C. NOVEMBER, 1943.

Immediate and Follow-up Results of Electroshock Therapy.

Results of the follow-up study of 279 patients who received electroshock therapy indicate that this treatment is very effective in the treatment of involutional melancholia and manic-depressive psychosis. The percentage of recoveries reported for this group is slightly less but comparable with that reported one year ago.

Manic patients do not hold their recovery as well as those who have an agitated depression. There is no evidence to indicate that electroshock treatments may prevent future psychotic attacks, nor that it might interfere with spontaneous clinical recovery.

Electroshock therapy is not effective in the treatment of schizophrenia. It is of doubtful value in the treatment of psychoneuroses.

Traumatic skeletal injuries may be decreased by the use of intocostrin (Squibb). Cardiac and pulmonary complications, vasomotor collapse, spasticity, subconjunctival hemorrhages may develop. Memory changes always occur to some degree during the course of treatment. These memory defects do not seem to be permanent. (Authors' abstr.)

EEGs in Post-traumatic Epilepsy.

EEGs of 86 cases of post-traumatic epilepsy were analysed with particular reference to the localization of abnormal electric discharge. Pre-operative and post-operative studies were made on 32 of these patients on whom operation had been carried out for the surgical removal of an epileptogenic lesion.

Definite electrographic evidence for localization of major epileptiform discharge to a relatively restricted area of one hemisphere was obtained in 90 per cent. of the cases. A relatively superficial focus was found in one area without significant complication by abnormality elsewhere in 69 per cent. of the cases. A combination of random slow waves with random spikes or sharp waves was found to be characteristic of superficial cortical epileptogenic lesions of the cerebral cortex. This is interpreted as representing a local condition of metabolic disturbance, a product of which causes neuronal hyperirritability. These two types of electrographic abnormality are also observed in patients with convulsive seizures which follow shortly after acute head injuries. Generalized electrographic disturbances were present without unilateral localization in 10 per cent. of the cases. Three of these patients showed a diffuse multiple spike and sharp wave disorder, with relatively continuous dysrhythmia of a type suggesting a diffuse lesion of the cortex. Prominent equilateral bisynchronous discharge was found in six cases, in three of which there was found the typical wave and spike form of record commonly considered to be characteristic of "*petit mal*" cryptogenic epilepsy. There are two possible explanations of these cases. Either they are cases of essential epilepsy in which head injury is only incidental to the development of seizures, or the accident produced a lesion at the base of the brain which might be serving as a pacemaker for bilaterally synchronous epileptiform discharge of the two hemispheres. Positive evidence for such a lesion is lacking. Pre-operative electrographic study provided a reasonably accurate guide to the border zone of an objective lesion of the brain in 94 per cent. of the cases in which operation was performed. There was evidence of some former brain injury in the region of electrographic localization in all of these cases.

Complete freedom from seizures or very rare minor attacks resulted from surgical excision of epileptogenic lesions in 71 per cent. of those cases with clear uncomplicated pre-operative spike or sharp wave foci. The percentage of success was less than half this amount in patients whose pre-operative EEG showed more than one spike focus, other areas of delta waves or prominent bisynchronous activity.

From the point of view of surgical therapy the EEG provides strong evidence that the technique of excision which has been used in the past few years is satisfactory. The essential feature of this technique is that gyri should be completely, not partially, removed, and the pial covering of remaining gyri be preserved. The white matter thus left exposed does not seem to give rise to abnormal electrographic record. One month after such a removal, spike and sharp wave activity is not present and there is very little delta activity. These cases show the most favourable clinical course.

Persistence of large delta activity or return of large spike or sharp wave activity usually indicates a bad post-operative prognosis. The EEG cannot be depended on however to predict the developmental course of a potentially epileptogenic lesion of the brain, since regressive as well as progressive lesions are encountered. (Authors' abstr.)

The EEG in Late Post-traumatic Cases.

About one-half (48 per cent.) of late post-traumatic cases have abnormal EEGs. The presence of fracture or unconsciousness does not appreciably alter this percentage. Post-traumatic cases with epilepsy have a higher percentage of abnormal EEGs and post-traumatic cases with headache have a lower percentage of abnormal EEGs than the average. Post-traumatic cases with psychosis have a slightly greater percentage of abnormal EEGs than do those without psychosis.

Late post-traumatic cases suffering primarily from headaches have essentially the same

percentage abnormality of EEGs as non-traumatic cases suffering primarily from headaches. Late post-traumatic cases suffering from psychosis (organic reaction type) have essentially the same percentage abnormality as non-traumatic cases suffering from organic psychosis. Late post-traumatic cases suffering primarily from epilepsy have essentially the same percentage abnormality as non-traumatic cases suffering from epilepsy.

In almost all post-traumatic cases having evidence of focal abnormality by EEG, either (1) the focus corresponded to the area of injury, (2) a fracture or skull deformity was found at the site of the focus, or (3) Jacksonian seizures were present involving the side opposite the focus.

(Author's abstr.)

JANUARY, 1944.

Results of Hospital Treatment of Alcoholism.

1. A study has been made of 100 men suffering from alcoholism, admitted to the New York Hospital, Westchester Division, between 1934 and 1940.

2. A review of the family background has shown the common occurrence of excessive drinking in the relatives, the predominance of small families, and an indulgent, pampering type of mother in 59 instances.

3. The drinking usually began at an early age, and continued for an average of 15 years before serious treatment was undertaken.

4. Follow-up studies of these 100 men three to eight years after discharge revealed that 24 were recovered and 19 were managing better, making a total of 43 who had been definitely benefited by treatment. (Authors' abstr.)

Intellectual Impairment in Head Injuries.

1. This investigation is concerned with the frequency and nature of intellectual impairment in head injuries.

2. The methods for evaluation of defects are discussed with special reference to the two criteria used in this study: comparison of performance with estimated intelligence, and improvement on repeated examinations.

3. The following tests measured the impairment best: 100–7 test, pictorial absurdities, hole-in-the-board test, pictorial discrimination, naming of colors, and reading.

4. The mental functions affected are primarily: speed, judgment, and ability to keep up a sustained effort.

5. About one-half of all subjects suffering from head injury show slight intellectual defects. These become less marked with increasing remoteness from the time of the injury. If the impairment is reversible, the duration is usually a matter of less than three months.

6. The impairment seems to be related to the severity of the brain damage. The more serious the intellectual defect the higher is the incidence of abnormal neurological signs.

(Author's abstr.)

AM. J. PSYCHOL.

Changes in the Speech Pattern under Emotiona Tension.

Fifty-two inexperienced subjects were brought before the microphone, thinking they were broadcasting, and oscillographic records were made of their utterances. The amount of fear present was determined from a questionnaire. Controls were later obtained. For comparison 3 trained actors made records simulating fear, and 10 subjects said "ah" into the microphone while experiencing an emotional stimulus. It was found that 46 cases showed a higher, 19 a lower pitch in the fear than in the control situation. The average hypha (physiological syllable) length was increased in 32 and decreased in 23 cases; 32 subjects had pulsation rates (fast vibrato) on the experimental record, while only 7 had it on the control. It is concluded "that a clear picture of the way speech carries emotional components cannot be drawn from a single attribute of speech (such as pitch or time), or from the study of a single 'step' in the scale of speech-specificity (melody, rhythm, accent, vowel, consonant). . . . It can be said, however, . . . that under 'tension' as compared with the 'normal' there are more individuals whose frequency-rate is higher, more whose hypha-time and pause-time are longer, more who show the presence of high-speed pulsations, and a few more who attack and release the hypha in a hard rather than an easy fashion." D. E. JOHANNSEN (Psychol. Abstr.).

Retroactive Inhibition and the Motivation of Learning.

"Evidence has been presented to show that the facts of retention in their relation to motivation may be subsumed under the general theory of forgetting as a function of 'massing' within the trace-field. A hypothesis outlined by Koffka has been restated and generalized as follows: Increased ego-involvement in any learning stiuation has the effect of maintaining for a longer time a high degree of organization in the resulting trace-systems, with the consequence that similar traces have a reduced destructive influence and retro-active inhibition is thereby diminished. Experiments comparing (1) intentional and incidental learning, (2) interrupted and completed tasks, and (3) memorization in hypnotic and waking states have been discussed as support for the hypothesis. A discussion of weaknesses and gaps in the theory and in our knowledge of these effects is appended." D. E. JOHANNSEN (Psychol. Abstr.).

On the Specialization of Carelessness.

Ninety-two subjects were asked to reproduce lines 100–110 mm. in length and to cancel out 50 capital A's, then S's, B's and K's, from a sheet containing 700 printed letters. The average deviation from the correct length had a mode at 2·0–2·4 mm.; the median number of omitted letters was 11. The r between the scores was less than ·30. Aside from the factor of visual discrimination, the individual differences in scores represent carelessness; the relationships found indicate that carelessness has great specificity. D. E. JOHANNSEN (Psychol. Abstr.).

ARCH. INT. MED.

ARCH. NEUROL. PSYCHIAT.

ILLINOIS PSYCHIATRIC SOCIETY.

NEW YORK ACADEMY OF MEDICINE, SECTION OF NEUROLOGY AND PSYCHIATRY AND NEW YORK NEUROLOGICAL SOCIETY.

PHILADELPHIA NEUROLOGICAL SOCIETY AND PHILADELPHIA PSYCHIATRIC SOCIETY.

Acute Arrest of Cerebral Circulation in Man.

A new method, using the KRA apparatus, has been devised to produce complete arrest of the cerebral circulation in man.

Acute arrest of the cerebral circulation in normal young men results in fixation of the eyes, tingling, constriction of the visual fields, loss of consciousness and, immediately after restoration of blood-flow, a brief, mild tonic and clonic seizure.

The average time from arrest of cerebral circulation tol oss of consciousness in normal young men is six and eight-tenths seconds. This coincides with the sudden appearance of the delta wave in the electroencephalogram. One second before loss of consciousness one observes fixation of the eyes in the midline.

The time for recovery of the light-buzzer response depends on personality factors, and does not correlate with sensitivity to acute anoxia. The time of recovery appears to be decreased by pre-engorgement and administration of large doses of the B vitamins.

Arrest of the circulation to the human brain for one hundred seconds may be followed by rapid recovery of consciousness and no objective evidence of injury. The corneal reflex may disappear in less than ten seconds. The abdominal reflex disappears, and the Rossolimo and Hoffmann reflexes often become positive during acute cerebral anoxia, while the Babinski reflex is not obtained.

Considerable individual variation has been noted in sensitivity of normal young men to acute arrest of circulation to the brain. This variation is apparently due to differences in cerebral metabolism in different persons. The resistance to acute anoxia is fairly constant for the same person at different times.

Calculations based on this investigation give figures for oxygen utilization of the human brain of 1·56 c.c. per second, or 4,140 cu. mm. per gm. per hour. This corresponds closely to figures for total brain metabolism reported for the dog and cat. To supply the brain with oxygen, the blood-flow through that organ must average 14,000 c.c. per minute, or about 100 c.c. per 100 gm. of brain weight per minute. At rest the brain receives about one-third of the output of the left ventricle per minute, although it represents only 2 per cent. of the body weight.

(Authors' abstr.)

Changes in the Electroencephalogram Following Metrazol Shock Therapy: A Quantitative Study.

Twenty depressed patients subjected to metrazol shock therapy were studied electroencephalographically. Eleven were studied before and after treatment, nine after treatment only.

The following observations were made:

1. No significant group variation in the alpha index followed metrazol shock therapy, although there were striking individual changes.
2. There was significant variation in slow activity after such therapy.
3. This variation was made manifest as an increase in activity of less than six per second frequency in the motor and frontal areas.
4. There was evidence that the amount of slow activity following therapy was conditioned by the amount of such activity preceding therapy.
5. There was individual susceptibility to change in slow wave activity.

(Authors' abstr.)

Changes in the Electroencephalogram Following Insulin Shock Therapy: A Quantitative Study.

For ten patients with schizophrenia electroencephalographic records were obtained before and after insulin shock therapy. Eight of the ten patients exhibited an increase in the alpha index, which was more prominent in the frontal areas. Averages for the groups showed no striking deviations in slow activity. The increase in alpha activity may be due to slowing of pre-shock faster than alpha activity. (Authors' abstr.)

Cerebral Arteriovenous Oxygen Difference: (1) *Effect of Age and Mental Deficiency.*

The cerebral arteriovenous oxygen differences for undifferentiated mentally defective persons reveal a significant and progressive increase during growth. The values are 4.7 volumes per cent. for the ages of 6 to 9 years, 5·1 volumes per cent. for the ages of 10 to 14 years, 5·9 volumes per cent. for the ages of 15 to 19 years, and 6·6 volumes per cent. for the ages of 20 to 55 years. For the newborn the cerebral arteriovenous oxygen difference averages 8·6 volumes per cent.

The cerebral arteriovenous oxygen differences for undifferentiated mentally defective persons are the same for the corresponding age-groups whether the intelligence quotients of the subjects are from 8 to 49 or 50 to 88.

The average cerebral arteriovenous oxygen difference for 45 undifferentiated mentally defective persons from 20 to 55 years of age is 6·6 volumes per cent., a value not significantly different from that for persons with greater intelligence. Since there is no evidence to indicate that the cerebral blood-flow in these subjects was changed from the normal, it is concluded that the cerebral metabolic rate of undifferentiated mentally defective persons from 20 to 55 years of age is not changed from the normal, and that their mental deficiency is not caused by an impaired cerebral metabolic exchange.

It is suggested that the cerebral arteriovenous oxygen differences for the undifferentiated mentally defective persons of the five age-groups from 6 to 55 years are similar to those for persons with higher intelligence quotients.

The high average cerebral arteriovenous oxygen difference for infants less than two weeks old may be due to a slow cerebral blood-flow, and may occur despite a low cerebral metabolic rate. (Authors' abstr.)

Diffuse Leukoencephalopathy Without Sclerosis: Clinicopathologic Study of a New Form, with Comment on Various Types of So-called Diffuse Sclerosis and Schilder's Disease.

A case of ophthalmoplegia characterized by dissociation of all conjugate movements of the eyes except convergence is presented. In cases of this disorder previously described the dissociated movements were limited to the lateral plane.

The lesion was undoubtedly a congenital weakness of the fibers of the medial longitudinal fasciculus co-ordinating the nuclei of the third, fourth and sixth cranial nerves into the function of binocular vision. The phylogenetically older functions of convergence and the vestibulo-oculomotor connections were not affected. (Authors' abstr.)

DECEMBER.

Chicago Neurological Society.

New York Academy of Medicine, Section of Neurology and Psychiatry, and New York Neurological Society.

Chemotherapy of Intracranial Infections. II: Clinical and Pathologic Effects of Intracranial Introduction of Sulfanilamide, Sulfathiazole and Sulfadiazine in Normal Dogs.

In this paper 115 experiments are reported in which sulfanilamide, sulfathiazole or sulfadiazine was implanted intracranially by various methods and in various amounts.

Important clinical results were the production of convulsions by sulfathiazole (when placed on the intact cerebral cortex) and of pleocytosis by all three of the drugs.

Significant pathologic effects were: (1) Immediate acute pachymeningitis and leptomeningitis, with corresponding subacute or chronic inflammation in the later stages; (2) marked fibroplasia in the dura; (3) conspicuous gliosis in the cortex; and (4) varying degrees of neuronal degeneration, proliferation of oligodendrogliocytes and metamorphosis of microglia cells.

All reactions were least extensive when sulfanilamide was employed, and increased with all the drugs when the dose was increased.

These experiments do not indicate that the effects of sulfanilamide and sulfadiazine are sufficiently harmful to contraindicate their critical use in the therapy of intracranial infections. They suggest that sulfathiazole should never be employed in a cranial wound in which there is an opening in the dura. (Authors' abstr.)

Electric Convulsive Therapy, with Emphasis on Importance of Adequate Treatment.

A review of electric convulsive therapy is presented on the basis of experience with 1,500 patients treated in two hospitals with different types of material. The importance of adequate treatment is emphasized, and several technical suggestions are given.

In the manic-depressive psychoses, manic states need more intense treatment than depressive states. Involutional psychosis of the paranoid type shows a less favorable response than does involutional depression.

Stress is placed on the efficacy of electric convulsive therapy in cases of acute schizophrenia when a sufficient number of convulsions is administered; discontinuation of treatment after the usually early clinical improvement leads almost invariably to relapse, and is the most important reason for failure of this method in treatment of schizophrenia.

The results of electric convulsive therapy are less satisfactory for the psycho-neuroses than for the psychoses.

No fatalities occurred in this material. Complications were rare and can largely be prevented.

Electroencephalographic changes and confusional states should not lead to discontinuation of treatment until an adequate number of convulsions have been given. Physical diseases may not be contraindications to therapy if they are aggravated by the mental condition. (Author's abstr.)

Combined Convulsive Therapy and Psychotherapy of the Neuroses.

Twenty neurotic patients in the New Hampshire State Hospital who received a combination of convulsive treatment and active psychotherapy have been studied. This study was undertaken primarily to evolve a practical procedure of treatment rather than to make a statistical comparison of different types of treatment.

The usual procedure of choice was first analytic psychotherapy, followed by four to six electric shock treatments and, finally, by efforts at re-education.

In 50 per cent. of patients the disease was considered to be in remission; in 45 per cent. the condition was much improved or improved, and in 5 per cent. it was questionably improved.

The period of hospitalization for treatment of the neuroses is definitely shortened.

Follow-up studies indicated a satisfactory adjustment and gain in inner resources in the vast majority of our patients. All were able to leave the hospital.

The conception of the healing mechanism is as follows: Shock therapy prepares the ground for psychotherapy by improving the affective tone, fostering active co-operation and tending to overcome the "repetition compulsion." Psychotherapy permits the patient to gain understanding and inner fortitude, as a guard against relapse. (Authors' abstr.)

Perceptual-Motor Patterns Following Bilateral Prefrontal Lobotomy.

The experimental work carried out on perceptual-motor processes seems to indicate that in this particular series of cases bilateral prefrontal lobotomy did not have an appreciable effect on the elementary motor integrative functions. In none of the patients was post-operative disturbance noted when there had been no pre-operative disturbance. This situation held for all of the tests used in the evaluation of motor processes. It is true, of course, that there were instances in which pre-operative disturbance disappeared after the lobotomy. The author attributes this increased motor efficiency to a reflection of increased total adjustment on the segmental, or partial, patterns of behavior. He does not believe that there had been reorganization on a primarily motor level, or that motor integration in the brain had been disturbed as a result of interference with intrafrontal connections or frontothalamopontile connections. While it must be admitted that animal studies have shown a definite relation between the frontal poles and motor function, the work with human material has not demonstrated the extreme motor dysfunction noted in lobectomized animals. This seeming contradiction, he believes, is to be explained in terms of differences in the cytoarchitectonic organization of the human brain and that of the lower animals. The author has found in his work with lobotomized patients that while automatic acts, restlessness, synkinesis, gestalt dysfunction, apraxis and agnosis are sometimes observed both before and after operation, and that while these signs occasionally disappear after the neurosurgical procedure, the essential factor is the destruction of psychotic attitudes rather than altered neurodynamic organization. Thus, while the operative group showed both pre-operative and post-operative motor irregularities, and while the post-operative

irregularities of patients who showed improvement were less pronounced than those displayed in the pre-operative period, the pattern of motor dysfunction approximated that of psychotic patients in general. As clinical improvement became apparent, improved motor integration occurred, although there was no evidence of motor disturbances related specifically to frontal lobotomy. (Author's abstr.)

Use of Insulin as Sedation Therapy: Control of Basic Anxiety in the Psychoses.

Adminstration of insulin in subcoma doses provides an effective method of sedation. Its specific action seems to be in alleviation of anxiety. With relief of anxiety, the psychotic manifestations sometimes rapidly disappear. The method is entirely safe, and is far superior to that achieved by chemical sedation. Combined with active psychotherapy, it has proved of great value in the treatment of a series of difficult patients. (Author's abstr.)

VOL. LI. JANUARY, 1944.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY.

PHILADELPHIA NEUROLOGICAL SOCIETY.

Atrophy of Basal Ganglia in Pick's Disease: A Clinicopathologic Study.

In a clinicopathologic study of a case of Pick's disease extensive bilateral involvement of the caudate nucleus, the substantia nigra, the pallidum and the subthalamic nucleus was observed. (Author's abstr.)

Cerebral Arteriovenous Oxygen Differences. II. Mental Deficiency.

The cerebral arteriovenous oxygen differences are high in patients with amaurotic familial idiocy, and normal for those with microcephaly and hydrocephalus not in the terminal stages.

Above the age of 20 years the cerebral arteriovenous oxygen difference is lower for patients with mongolism, cretinism and phenylpyruvic oligophrenia than for persons with undifferentiated mental deficiency.

In persons with mongolism the cerebral arteriovenous oxygen difference ceases increasing ten years earlier than in those with undifferentiated mental deficiency.

It is suggested that cerebral metabolism is reduced in patients with mongolism, cretinism, phenylpyruvic oligophrenia, advanced hydrocephalus, microcephaly and amaurotic familial idiocy. (Authors' abst.)

Cerebral Cortex of a Man with Senile Dementia Believed to be 107 Years Old.

1. The cytoarchitecture in this very old brain was well preserved and revealed the well-known regional variations.

2. There were definite pyramidization, granularization and spindlization.

3. The gross and histopathologic changes considered as characteristic of the senile brain were present to only a moderate degree.

4. Processes of repair and regeneration were detectable. (Authors' abstr.)

FEBRUARY.

CHICAGO NEUROLOGICAL SOCIETY.

PHILADELPHIA PSYCHIATRIC SOCIETY.

ILLINOIS PSYCHIATRIC SOCIETY.

A Simple Method of Determining Frequency Spectrums in the Electroencephalogram: Observations on Effects of Physiologic Variations in Dextrose, Oxygen, Posture and Acid-base Balance on the Normal Electroencephalogram.

A simple method of determination of the average frequency distribution of the electroencephalogram, which is presented here, yields a spectrum of the average number of waves per second and is highly accurate for regular records, although progressively less accurate with records of decreasing regularity.

After intravenous infusion of dextrose there was a shift toward faster frequencies (up to 12 per second) with rising levels of dextrose in the blood, and a shift toward slower frequencies with falling levels of dextrose. The amount of low voltage fast activity, however, was not influenced by the dextrose level in the blood.

Inhalation of 100 per cent. oxygen for five minutes or longer resulted in a shift toward faster frequencies (up to 12 per second).

Change from the recumbent to the erect posture had no effect on the cortical frequency spectrum unless orthostatic hypotension developed.

The decrease in frequency of the brain-waves during hyperventilation was greatest with low dextrose levels in the blood and least with high dextrose levels in the blood, in spite of comparable alterations in hydrogen ion concentration, carbon dioxide tension, carbon dioxide content and base bicarbonate concentration of the arterial blood.

Hyperventilation produced much greater slowing when the patient was in the erect position than when he was in the recumbent position. Tachycardia and decrease in pulse pressure were also greater when the subject was in the erect position than when he was in the recumbent position during hyperventilation. (Authors' abstr.)

Biopsies of the Brain of Schizophrenic Patients and Experimental Animals.

Histologic examination of biopsy specimens from the prefrontal cortex of patients with chronic schizophrenia revealed degenerative changes of the ganglion cells and progressive and regressive reactions of the glia and blood vessels, such as are commonly seen in cases of chronic intoxications and metabolic disorders. Study of control material obtained from non-schizophrenic human beings and experimental animals proved that the changes were not attributable to the ether narcosis during which the material had been obtained. (Authors' abstr.)

Relation of Narcolepsy to the Epilepsies: A Clinical Electroencephalographic Study.

In a majority, 8 out of 10, of this series of cases of narcolepsy wave forms similar to those most commonly observed with the epilepsies were present.

Because of the unanimous objective electroencephalographic evidence that the primary component of the narcoleptic syndrome is a sleep phenomenon, it appears, despite the antiquity of the term narcolepsy, that the syndrome should be designated by the name of hypnolepsy.

Since the electroencephalographic abnormalities observed during the inter-seizure phase of the hypnoleptic (narcoleptic) syndrome appear qualitatively similar to those associated with the epilepsies, it appears that Wilson's concept that the narcoleptic (hypnoleptic) syndrome is a member of the family of epilepsies is confirmed. A more precise statement of this relationship,

based on electroencephalographic evidence, is that the clinical manifestations both in the epilepsies and in hypnolepsy are often associated with objective evidence of disturbances in the physiology of the brain. (Authors' abstr.)

Acetylcholine Treatment of Schizophrenia.

With 8 of 11 schizophrenic patients treated with convulsant doses of acetylcholine no general therapeutic benefit was obtained. In one patient there was slight, and in another moderate, improvement. One patient's condition underwent a dramatic remission after a therapeutic episode in which he was pulseless for such long periods that he was considered probably dead. On the basis of the available literature it is considered that prolonged cardio-respiratory collapse occurred, as a consequence of which changes in the brain were produced.

The therapeutic results do not justify the continued use of acetylcholine in this manner, particularly since the margin of safety of the drug appears to be extremely slight. (Authors' abstr.)

Effect of Serum on Survival Time of Brain Tissue and Revival of Cerebral Oxidation.

The oxygen uptake of minced brain in plain Krebs-Ringer phosphate solution buffered at a pH of 7.38 was approximately 0·85 c.mm. per mgm. of tissue (wet weight) for the first hour, with a flattening off of the oxidation curve in approximately six hours. In a similar suspension medium of buffered Krebs-Ringer phosphate solution containing 200 mgm. of dextrose per 100 c.c. the oxygen uptake was 1·11 c.mm. per mgm. of tissue for the first hour, with an abrupt flattening of the oxidation curve about eight hours afterward. This abrupt flattening did not occur if a small amount of serum was present in the immersion fluid, but oxidation continued at a practically constant rate for the duration of the experiment.

The cessation of oxidative activity of minced brain tissue was not due to lack of substrate, since determinations of the dextrose content of the immersion fluid revealed a substantial excess of dextrose still present after oxidations had practically ceased.

The addition of dextrose to a dextrose-free suspension medium did not revive oxidation in the brain after a period of six hours.

The cessation of oxidation in these experiments could not be attributed to the production of any inhibiting substance, since oxidation was not revived after the tissues had been washed in isotonic solution of three chlorides (U. S. P.), and placed in a fresh suspension medium.

There was a significant support of flagging oxidation on the addition of serum to a dextrose-free medium at the end of six hours. The effect was not enhanced by the combination with dextrose or by the use of whole blood.

The most likely explanation of the phenomenon appears to be the presence of some essentia of the oxidative enzyme system in the serum or the restoration of normal osmotic relations by the large serum protein molecule. (Author's abstr.)

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Effects of Certain Forms of Emotion on the Normal Electroencephalogram.

In general, the changes in the EEG associated with the forms of emotional excitement utilized in the present investigation appear to be within the limits of normal electrocortical activity. When increases of the slower potentials were observed, only the lowest amplitude slow waves, which are not easily differentiated from flat record, were involved. None of the changes appear to be of such nature as to affect the clinical impression obtained by inspection

of the record and comparison with clinical standards, providing sufficient care is taken to identify and eliminate from consideration a number of physiological potentials which are not electroencephalographic phenomena. Certain extraneous effects which often increase under emotional excitement, such as potentials arising from rapid fluttering of the eyelids and occasionally from a special circulatory change, can create a false impression of abnormality if they are not correctly identified.

In a quantitative analysis of brain potentials, isolated from other physiological potentials, the following results were obtained from the four most strongly reactive members of a group of ten subjects. The delta index did not increase during emotional excitement. A slight reduction of the rhythmic or serial components of the electroencephalogram, attended by an increase in flat record, was commonly observed. A limited amount of simultaneously recorded data from two cortical areas (one subject) suggests that some of the effects of emotion upon the EEG, especially the depression of rhythmic activity and the increase of flat record, may become rather widely generalized, indicating that effective emotional stimulation can influence the function of the greater part of the cortex. But more commonly a specific and more localized effect was observed (from three of the four subjects whose data were quantitatively analysed). The effect consisted of a depression of the fast activity or beta rhythm from the fronto-motor region primarily; and the reduction was sometimes observed in the absence of depression of the occipital alpha rhythm. This result has not been previously reported as an effect of sustained emotional excitement, possibly because of the focusing of attention upon the occipital region in the earlier investigations.

It is felt that the results of the present experiment indicate that the cortical components of certain emotional reactions are reflected in the normal electroencephalogram, and that the specific area of cortical representation of the autonomic nervous system which Fulton, Kennard and Watts have charted (preimotor area) is involved in a specific electroencephalographic response. Suppression of the beta rhythm has previously been reported in association with startle stimuli and with unexpected tactual stimulation. The present data seem consistent with such observations in so far as all of these responses may be related to excitation centers influencing the sympathetic division of the autonomic nervous system.

Suppression of the precentral beta rhythm during excitation involving the autonomic nervous system suggests that it may be possible to extend Jasper's hypothesis of brain rhythms in terms of the level of a "cortical excitatory state" beyond his interpretation of variations of the occipital alpha rhythm to include the precentral fast potentials. For, in the precentral and frontal regions, or in a circumscribed area within these regions, an analogous mechanism may exist; above a critical level of the functional activity of certain cortical cells brain potentials of the faster than alpha frequencies may show less rhythmic characteristics, or may become significantly reduced in their incidence and amplitude. Further research directed towards more exact differentiation of the cortical areas involved in this response and toward a determination of the generality of the response is indicated. (Author's abstr.)

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Afferent Areas in the Cerebellum Connected with the Limbs.

(1) Afferent discharges reaching the cerebellum by the spino- and ponto-cerebellar pathways can be recorded with a wire electrode at a depth of about 1·5 mm. from the surface.

(2) The areas receiving these discharges agree in general with those determined by Dow using a slightly different technique, but with the present method it is possible to make a detailed map of the regions connected with different parts of the limbs and body.

(3) In the cat and monkey spino-cerebellar discharges from the hind-limb arrive in the lobulus centralis on the same side. Discharges from the fore-limb arrive behind them in the culmen, and in some animals discharges from the vibrissae of the snout are found still further back in the lobulus simplex. This arrangement is the reverse of that described by Connor for the efferent connections of the cerebellum as the result of ablation experiments. The afferent areas for the different limb segments are in the order hind-foot, leg, hip, shoulder, fore-arm, fore-foot.

(4) Records of the afferent discharge in single units differ very little from records made from peripheral nerve-fibres. Some discharges come from rapidly adapting tactile receptors, but the commonest are from pressure receptors in the feet and receptors in joints and muscles. Dorsiflexion at wrist or ankle combined with pressure on the palmar or plantar surface is a most

effective stimulus. A single afferent unit in the cerebellum may be connected with receptors as far apart as toe and heel.

(5) Ponto-cerebellar discharges to the lobulus centralis, culmen and lobulus simplex are derived from the hind-limb, fore-limb and face regions of the motor cortex. The receiving areas overlap those for the spino-cerebellar discharges, extending further out laterally. Discharges from the cerebrum can be detected in other parts of the cerebellum (e.g. the ansiform lobules), but their exact origin has not been traced.

(6) The intrinsic activity of the cerebellar cortex is shown by small potential waves of high frequency (150 to 250 per second). These are increased in size and frequency by afferent discharges. The increase is greatest in the region of arrival of the discharge, but there is some spread of the effect, so that a stimulus to the hind-foot may cause a slight increase in the activity of the fore-foot area (culmen), as well as a much larger increase in the lobulus centralis.

(7) In two dogs and one goat the localization of afferent discharges in the cerebellum agreed with that found in the cat and monkey. Thus the difference in the efferent arrangement found by Conner cannot be due merely to a species difference, and further work must be done before conclusions can be drawn as to the neural mechanism of the cerebellar cortex. In general, however, the response of the cerebellar neurones to afferent impulses is not very different, except in time relations, from that of the neurones of the cerebral cortex. (Author's abstr.)

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Rorschach Scores of Parachute Troopers in Training.

A Rorschach group test was given to 65 volunteers accepted for parachute training, and 35 who had failed to complete such training for reasons presumably related to personality factors. The second group differed significantly from the first in having a lower mean number of responses, a greater variation in number of responses per slide, and a greater number of failures to respond. These characteristics are typical of unstable and neurotic subjects. It is necessary to conclude, however, that " the group Rorschach, by itself, cannot provide a criterion for prediction of the remaining paratroopers unlikely to complete their course when these have already been selected by personal interview." F. W. FINGER (Psychol. Abstr.).

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Subdural Hematoma and Effusion as a Result of Blast Injuries.

In spite of the usually negative neurologic findings, subdural hematoma and effusion can frequently be diagnosed by psychiatric examination and psychological testing. In contrast to

psychoneurotic patients, subdural patients exhibit " dull " facial expressions and lack of " push " even with reference to their complaints. On psychological tests, slow response times, poor concentration, and rage reactions when confronted with failure point to the organic condition. The Rorschach responses show lowered productivity, popular, " easy," whole responses, little attention to detail and no particular color shock. The Shipley-Hartford Retreat Test is recommended as effective in diagnosing subdural hematoma or effusion, particularly when the frontal lobe is involved. D. A. GRANT (Psychol. Abstr.).

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A Multiphasic Personality Schedule (Minnesota). IV: Psychasthenia.

The derivation of a scale is reported for measuring psychasthenia, a condition involving compulsions, obsessions, phobias, vacillation, and excessive worry. 504 scale items were applied to large groups of normal adults and college students and to 20 psychiatric patients selected as cases of psychasthenia. The scale selected was further refined on the basis of correlation of items with total score for 100 normal adults and 100 psychiatric cases. The final scale, composed of 48 items, differentiates well between normal adults and the criterion group of 20 psychasthenic cases, and also between normal adults and 50 psychiatric cases with symptoms of obsessions or compulsions. For normal adults there are small differences in scores between age groups and slightly larger differences between the sexes. Test-retest reliability is ·79; split half reliability is ·91–·94. The scale correlated ·06 and ·28 with the authors' test for hypochondriasis for 100 normal persons and 100 miscellaneous psychiatric cases respectively, and ·44 and ·69 with their test for depression for the same groups. The scale with its scoring key is included in the article. G. R. THORNTON (Psychol. Abstr.).

The Effects of Benzedrine Sulphate and Caffeine Citrate on the Efficiency of College Students.

An early experiment failed to show significant effects of benzedrine sulphate on group means of reading, multiplying, and analogies scores. Subjective reports from both drugged and non-drugged subjects indicated widely varying subjective effects and the influence of suggestion. 129 students were divided into three groups equated for intelligence and sex. At the beginning of a two-hour period one group was given 15 mgm. of benzedrine sulphate, another group 5 gr. of caffeine citrate, and a third a sugar capsule. All were tested during the two hours on three 10-second trials in tapping, a reading test, a vocabulary test, and an analogies test. Among the conclusions reached are the following: "The experimental evidence to date concerning the effect of benzedrine sulphate and caffeine citrate on human efficiency is conflicting." "When college students are unaware of the contents of the pills administered and when they are told that each pill should be stimulating, the non-drugged group seems to improve practically as much as the benzedrine and the caffeine groups." "Reported clearness of thinking and rapidity of work are not substantiated by the group results." G. R. THORNTON (Psychol. Abstr.)

J. COMP. NEUR.

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J. EXP. PSYCHOL.

VOL. XXXIII. NOVEMBER, 1943.

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Problem Solution by Monkeys following Bilateral Removal of the Prefrontal Areas: Responses to Stimuli having Multiple Sign Values.

The scores of the two prefrontal monkeys on the various multiple sign problems described in the paper are consistently inferior to those obtained earlier on four normal rhesus monkeys. These data suggest that the extirpation impaired the ability of the operates to make varying and antagonistic responses to a single stimulus depending upon the particular patterning of the total situation. Since the problem was completed in less than two years after the operation, caution should be exercised in assuming that the operation produced permanent loss. It is entirely possible that two years is too short a time to permit complete post-operative recovery. Even though some deficit appears to exist, the residual abilities of the operated Ss are striking, and represent achievements never previously reported for monkeys following excision of the frontal areas and seldom attained by any subhuman animals. In the combined matching and non-matching tests the monkeys solved third-order generalizations (2) or third-order contingency problems—a creditable performance for any infrahuman organism. The data of this paper indicate that a considerable degree of intellectual sparing followed even the radical operation reported. Similar general results have been described for human patients by Hebb and Penfield and by Nichols and Hunt. In both studies the patients were given over a year to recover from the operations.

The ability of animals, human and subhuman, normal and pathological, on any test, is as dependent upon experimental procedure as it is upon any difficulty intrinsic to the task itself.

The success of the monkeys on the complicated tests of this paper is in large part a result of the nature of the procedure and the long period of adaptation to the test situation. The methods used in this experiment, in their own way, give instructions by the specific cues or signs standing for more abstract generalizations. The use of stepwise procedures may simplify the apparent complexity of the final tasks. To begin with, a single stimulus elicited few differential responses, and additional sign-values were not added until the earlier ones had been thoroughly established.

The importance of method in making possible the solution of complex problems by prefrontal animals is suggested in the report of Nichols and Hunt on the effects of partial bilateral frontal lobectomy on a human patient. Strong evidence was advanced to show that the Ss' performance was markedly better when given specific instructions by the experimenters as to method of approach to problems, or when told to look for new systems of attack upon the problems. The inability of human Ss, following serious brain injury, to shift pre-established sets and to utilize new methods of approach in the solution of tasks has been emphasized by Goldstein.

It is more than possible that the best way to illustrate the difference between normal and pathological animals, both human and subhuman, is by the use of relatively ineffective test techniques (from a pedagogical point of view).

Whenever animals or people are thrust directly into a new situation without adequate preparation, divergence in abilities is exaggerated. Learning to read, learning how to do long division, learning to solve algebraical equations are more difficult tasks than subsequent reading, doing more long division and solving further algebraical equations. The pedagogically good training technique seeks to decrease the difficulty offered by the original learning of a particular skill and thus reduce individual variation in these performances.

It seems certain that serious brain injury reduces general learning ability. The ability to find new and appropriate ways to learn new problems appears to suffer particularly. The answer to this may lie in the fact that learning how to learn is an extremely difficult aspect of the process of acquisition. If this is true, teaching methods become of extreme importance, and analysis of procedures is as important as analysis of problems in the determination of the effects of cortical lesions. (Author's abstr.)

J. GEN. PSYCHOL.

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Pharmacological Shock Therapy as a Psychobiological Problem.

The writers review the literature on insulin and metrazol therapy in mental diseases with emphasis on the relation of the physiological changes to the overlying behavioral picture. They point out that, although the biochemical and physiological mechanisms involved in insulin shock and metrazol convulsions are essentially different, the behavioral modifications are similar; furthermore, theories previously advanced to account for this equivalence of behavior are suggestive but inadequate. They present a tentative Gestalt picture of the psychological changes resulting from shock therapy and suggest that two stages are involved: (1) a disintegration of the "out of step" behavioral field, which is followed by (2) a regrowth of the mind. During the latter stage two opposing sets of forces determine the extent of the cure. The destruction of the behavioral environment is not quite complete and the old behavioral barrier may be reconstructed, and the nearness to complete ego disintegration forces the ego to form stabilizing relations with any developing behavioral object. The psychotherapeutic implication which follows this hypothesis is that the clinician should establish rapport during the early stages of the behavioral rearticulation. H. H. Nowlis (Psychol. abstr.)

J. NEUROL. PSYCHIAT.

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Electro-encephalographic Investigations on the So-called Alpha Waves in the Rabbit.

The potentials from different areas of the cortex of rabbits under light dial anaesthesia were recorded. The curves showed essentially aperiodic, large, and slow potential waves of about 1·5–3 per second. These showed no characteristic details peculiar to the architectonic areas investigated (area praecentralis granularis and area postcentralis). Sufficiently strong stimulation of the animals (e.g. pinching until a reflex twitch resulted) caused the slow waves to disappear for some time and produced characteristic potential curves in the two cortical areas. These potential curves bear suggestive resemblance to the alpha waves of the human electroencephalogram, but one can assert no more than the apparent resemblance until the exact nature of the alpha waves in particular and cortical activity in general is known.

L. H. Beck (Psychol. Abstr.).

J. NEUROPATH. EX. NEUROL.

Pathologic Changes in the Brain after Electric Shock: An Experimental Study on Dogs.

1. Three dogs were subjected to electric shock according to the technique used in human subjects.

2. The shock dosage and the frequency of the convulsions varied with each animal.

3. Pathologic alterations in the brain were minimal: a single perivascular hemorrhage and capillary thrombi in one animal and shrinkage and ischemia of ganglion cells near the site of the electrodes in the remaining two animals.

4. There was no direct correlation between the amount of current used and the changes noted in the brain.

5. It seems that on the basis of the findings here recorded therapeutic electric shock is not contra-indicated in the treatment of psychoses. (Author's abstr.)

J. NEUROPHYSIOL.

Acetylcholine Level of Rat Cerebral Cortex under Conditions of Anoxia and Hypoglycemia.

1. Several methods of extraction and assay of free and total ACh in the cerebral cortex of the normal rat are compared.

2. Subjecting rats to low atmospheric pressure for 1 to 2 hours is shown to decrease the level of free or total ACh in the cortex by approximately one-third to one-half.

3. Administration of prostigmine before low pressure treatment prevents a decrease in free ACh in the cortex.

4. Insulin hypoglycemia results in a greater decrease in free ACh than that produced by the low-pressure treatment.

5. It is suggested that the decline of free ACh may account for the decrease in excitability of the cortex under conditions of anoxia and hypoglycemia. (Author's abstr.)

Accommodation and Autorhythmic Mechanism in Single Sensory Fibres.

The repetitive discharge in response to slowly rising linear stimuli has been recorded with the aid of micro-electrodes from cutaneous and muscular afferents. Single fibres could be isolated by placing the micro-electrode on the dorsal roots. Stimulus form and nerve response are pictured simultaneously with the aid of a double cathode ray oscillograph on the same film.

By this method it is possible to measure the sensory accommodation curves directly, and at the same time correlate them with the properties of the iterative discharge.

There is little, if any, accommodation in *N. saphenous*, representing cutaneous afferents (Hill's constant λ approaching infinity). For different muscular twigs of *n. popliteus* the values for λ range from 150 to 200 m.sec.

The autorhythmic discharge caused by the slowly rising stimuli consists of an initial phase during the time the stimulus rises and a later plateau-phase when the stimulus has reached a certain plateau level of strength. These two phases may be separated by a "silent period."

The plateau discharge is characterized by a frequency which increases with stimulus strength. It is independent of the accommodative resistance of the nerve.

The total adaptation time (from first to last impulse) of the plateau discharge is a function of accommodation and of stimulus strength, and decreases when the accommodative resistance increases or stimulus strength decreases.

Strong stimuli continued on plateau height inhibit the discharge (Schiff-Werigo's cathodal depression), provided that the nerves possess good accommodative resistance. It is suggested that the total adaptation time is largely determined by this factor.

The slowly rising stimulus sometimes causes a rhythmically grouped discharge instead of a continuous flow of impulses. (Authors' abstr.)

The Relation of Area 13 on Orbital Surface of Frontal to Hyperactivity and Hyperphagia in Monkeys.

The posterior portion of the external orbital gyrus (posterior orbital gyrus), which Walker has recently differentiated as a new cytoarchitectural area (area 13), and which Bailey, Bremer and Sweet (1, 2) have demarcated physiologically from adjoining areas, has been ablated in a series of monkeys. This procedure produces in a marked degree many of the symptoms that have been described for prefrontal lobectomy by various workers under the term hyperactivity. The results of area 13 lesions are as follows:

1. Hyperactivity is manifested by long-continued, methodical pacing or running of a regular, stereotyped character.

2. Hyperactivity from area 13 lesions is quantitatively great, is consistently obtained, and is always manifested in some degree within the first or second post-operative day; whereas similar hyperactivity from other prefrontal areas is said to be delayed in onset (as long as 2–3 weeks) and does not invariably occur.

3. Ablation of neighbouring regions by the same operative approach was without effect on activity.

4. Other motor activities are not marked by hyperactivity, but rather suffer reduction. Random, spontaneous activities and posturings are reduced in variety and quantity, as is emotional expressivity. There are also certain ill-defined behavior changes. All of these are most marked in the first post-operative week.

5. Hyperactivity is accompanied by a weight loss and only a slight increase in food intake. (Authors' abstr.)

Responses to Electrical Stimulation of Single Sensory Units of Skin.

Single sensory spots in the skin of human subjects can be conveniently stimulated by high voltage, low current spark discharges, without mechanical deformation of the skin.

The distributions of sensitivity over various regions, for touch and prick, show characteristic patterns. "High" spots of extreme sensitivity to electric stimulation are surrounded by areas of lower sensitivity. An area, varying in size in different regions, from less than 2 mm. to more than 15 mm., appears as a unit in the sense that any stimulus within it is referred to the same locus.

Prick has a much lower threshold than touch, except on the balls of the fingers, where touch threshold is lower.

Tactile endings associated with hair shafts can be differentiated from other tactile endings by the different sensory effects from electrical stimulation of suitable pattern.

Itch without accompanying prick can be elicited by low intensity, high-frequency stimulation of prick endings. Itch also follows as an after-effect of slowly repeated stimuli, each of which causes an initial sharp prick. The same sensory spot can give either touch, prick, itch or sharp pain, all below threshold for ordinary touch endings.

Certain theoretical inferences are offered as to the action of sensory endings, as indicated by the responses obtained by electrical stimulation. (Author's abstr.)

Action Potential and Enzyme Activity in the Electric Organ of Electrophorus electricus. *II: Phosphocreatine as Energy Source of the Action Potential.*

Breakdown of phosphocreatine and formation of lactic acid as a result of the discharge were determined on the electric organ of *Electrophorus electricus*. The energy supplied by these two chemical processes was compared with the electrical energy released. The following results were obtained:

1. The external electrical energy per gm. of tissue and impulse is, on the average, $8{\cdot}2 \times 10^{-6}$ gm. calories. The total electrical energy is at least twice as high. The amount of phosphocreatine split supplies per gm. and impulse on the average $32{\cdot}8 \times 10^{-6}$ gm. calories, that is, four times as much as the external electrical energy.

2. The amounts of acetylcholine and phosphocreatine metabolized as result of the discharge are of the same order of magnitude. This suggests that the energy of phosphate bonds is used for the resynthesis of acetylcholine.

3. The discharge leads also to lactic acid formation supplying an energy of $16{\cdot}8 \times 10^{-6}$ gm. calories per gm. and impulse. The chain of reactions supplying the energy required to restore the resting condition of the electric organ thus appears to be fundamentally identical with those which are the source of energy in muscle contraction. (Authors' abstr.)

The Formation of Acetylcholine. A New Enzyme: "Choline Acetylase."

An enzyme has been extracted from brain and nervous tissue (electric organ) which forms acetylcholine. The formation occurs only in presence of adenosinetriphosphate (ATP). The enzyme is called choline acetylase.

The formation of ACh is greatly enhanced by fluoride which, according to Ochoa, inhibits adenosinetriphosphatase, but not the transfer of phosphate to a phosphate acceptor.

K^+ at a concentration between 2 and 6×10^{-2} M and NH_4^+ at a concentration between 2 and 8×10^{-2} M do not affect the enzyme. Cu, iodoacetic acid and iodine have a strongly inhibitory effect. The implications of these observations for the mechanism of nerve activity are discussed. (Authors' abstr.)

Effects on EEG of Chronic Lesions of Basal Ganglia, Thalamus and Hypothalamus of Monkeys.

1. In monkeys chronic lesions of the subcortical nuclei have been found to produce changes in the EEG, although lesions restricted to cortical tissue cause no such change.

2. Lesions of the basal ganglia, if large enough, or of basal ganglia and cerebral cortex, cause permanent alteration in the EEG.

3. Epilepsy, either clinical or subclinical and detectable by EEG, was a frequent finding following lesions to basal ganglia.

4. The changes of EEG following lesions of basal ganglia can be directly correlated with the functional changes in the monkey, and are similar to those seen in human children with chorea.

5. Lesions of the thalamus caused marked slowing of rate, irregularity of pattern and the appearance of high, slow, rounded waves at frequent intervals.

6. Lesions of the hypothalamus caused great slowing of the rate and diminution of amplitude. With large destruction practically no pattern of potentials remained.

7. This is in direct contrast to the effects of sleep, which are to increase amplitude and intensify the normal pattern.

8. It is suggested that the post-traumatic changes which appear in both man and monkey may be directly related to changes within the basal ganglia. (Authors' abstr.)

Hand and Foot Patterns of Low Electrical Skin Resistance: Their Anatomical and Neurological Significance.

1. Under normal conditions, that is, at ordinary room temperature, etc., the hands and feet, like the face, show sharply defined areas of low electrical skin resistance. On the hands these patterns usually include the entire palmar surface up to the line which divides the dorsal and ventral parts of the hand. The skin of this area shows a resistance about one-fourth that of the skin of surrounding areas. On the feet the areas of low electrical skin resistance usually include the entire plantar surface and a small band along the side of the foot and over the toes.

2. These areas become constricted in cold temperatures and during sleep, and become enlarged in warm temperatures and with exercise or excitement. When the patterns contract the tips of the fingers and the toes are the last to show a low resistance. When they expand the patterns first envelop all of the dorsal surface of the hands and feet, and then move up the arms and legs, showing regular sock and glove patterns.

3. The possible relationship of these areas to the distribution of sweat glands, blood vessels and hair was considered.

4. It was shown that the patterns do not conform to the distribution of any of the peripheral nerves or the sensory dermatomes. It was suggested that they might represent cortical or subcortical patterns of the distribution of sympathetic nerves to the extremities.

(Authors' abstr.)

Nature of Paresis Following Lateral Cortico-spinal Section in Monkeys.

Interruption of the lateral cortico-spinal tract in the spinal cord of the monkey results in a

paresis that is more prominent in the lower than in the upper extremity, and that is more pronounced in the distal than in the proximal muscle groups.

This paresis is characterized by hypotonicity, hypoactive reflexes, and absence of clonus, indicating that no descending inhibitory pathway whose interruption results in spasticity is present in the lateral cortico-spinal tract of the monkey. (Authors' abstr.)

Removal of Acetylcholine by Cholinesterase Injections and the Effect Thereof on Nerve Impulse Transmission.

Purified cholinesterase preparations, injected intravenously, are capable of acting within the animal body, thereby preventing the chromodacryorrhetic effect ordinarily obtained from injected acetylcholine.

It has been possible to prove, through the injection of these enzyme preparations, that acetylcholine plays an essential role in the transmission of nerve impulses to the sphincter pupillae. By measuring pupil diameters under constant experimental conditions, it has been demonstrated that the direct light reflex is partially or totally abolished by the injection of cholinesterase preparations, indicating that the integrity of the reflex depends on the presence of acetylcholine at some point or points in the pathway of the nerve impulse. (Authors' abstr.)

The Basis for Repetitive Activity in Phrenic Motoneurons.

A single shock, applied to the inspiratory center in the medulla oblongata of the cat, leads to the discharge of impulses over spinal respiratory pathways for periods of 30 m.sec. or more. If the stimulus is weak and applied during expiration, it will cause few phrenic neurons to respond, but will facilitate those neurons to subsequent shocks if they follow the first at intervals of less than 30 m.sec. On the other hand, a strong stimulus produces this same facilitation, but since it causes large numbers of phrenic neurons to respond, it initiates subnormality in those neurons. For an initial period of 20 m.sec., the more short-lived facilitation outweighs subnormality, but the latter dominates the picture during the succeeding 100 m.sec.

Facilitation largely results from the continued delivery of impulses from center to motoneuron as a result of delay pathways or re-entry circuits within the center. Spinal interneuron repetitive activity plays a much less prominent role. Subnormality on the other hand is mainly resident within the phrenic motoneurons.

The repetitive discharge of phrenic neurons which characterizes normal inspiratory activity may be explained in terms of a balance between the degree of excitation of those neurons and their rates of recovery of excitability. (Author's abstr.)

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An Oscillographic Study of Olfactory System of Cats.

Following single shock stimulation of the olfactory bulb in the cat, potentials were recorded on and in the prepyriform cortex, the anterior olfactory lobe, the olfactory tubercle and the pyriform lobe. No responses were obtained in the septum, the diagonal band, the amygdaloid nuclei and the hippocampus.

The initial responses were surface negative on the prepyriform cortex covered by the macroscopically visible olfactory tract, on the olfactory tubercle and on the pyriform lobe. Laterally on the prepyriform cortex the initial responses were positive, and on the anterior olfactory lobe they were sometimes negative and sometimes positive. These findings were considered of interest, since other sensory cortices exhibit an initially positive potential following peripheral stimulation. The different sign of response on the olfactory cortex was attributed to the different orientation of discharging elements in this cortex resulting from the surface position and linear distribution of its afferent fibers.

Deeper in the prepyriform cortex and in the cephalic portion of the pyriform cortex the potentials were inverted and the initial response was positive. Caudally in the pyriform cortex the deeper intracortical records did not show this reversal in sign. Here the first wave was absent and only a later negative phase was present.

In the immediate vicinity of the lateral olfactory tract on the prepyriform cortex a fast negative spike or notch preceded the first negative wave. This spike or notch was conducted

unattenuated after a conditioning stimulus and was relatively resistant to anoxia. Indications are that it was due to impulses in olfactory tract axones.

Usually the records from the prepyriform cortex had a single negative potential, whereas the records from the olfactory tubercle and the pyriform lobe had two negative potentials. In all these regions the first negative potential could be enhanced and the second negative potential eliminated by a second stimulus.

The presence of transcortical connections through the prepyriform cortex to the pyriform cortex were indicated by a later negative wave, which persisted after rostral section of the olfactory tract and was dependent on stronger stimulation of the olfactory bulb.

In a few instances positive potentials along the external and internal capsules and in the putamen, the globus pallidus and the entopeduncular nucleus were recorded. The significance of these responses is not known. They may represent a pathway from the olfactory system, possibly to the striatum. (Authors' abstr.)

The Effect of Calcium on the Neuromuscular Junction.

The effect of calcium lack and excess on the neuromuscular junction has been investigated in frog's sartorius and isolated nerve-muscle fibre preparations of the M. adductor longus.

1. Reduction of ionized calcium in the surrounding fluid affects the endplate region prior to the nerve-endings and muscle fibres.

(*a*) Spontaneous activity resulting after immersion into citrate or calcium-free saline solutions originates primarily at the endplates.

(*b*) Reduction of calcium to one-third to one-fifth of normal first increases the excitability of the endplates as judged by repetitive response to a single nerve impulse. Also the sensitivity of the endplates to applied acetylcholine is 100-1,000 times increased. Subsequently neuromuscular block results, while the nerve-endings still conduct impulses and the muscle action potential set up by direct electric stimulation is not appreciably altered. It is suggested that the block is due either to (i) diminished production of the "transmitter," or (ii) diminished electric excitability of the endplate region.

2. The part of the sartorius immersed into calcium-free or calcium-deficient saline becomes negative relative to the rest of the muscle.

3. Excess of ionized calcium gradually blocks nerve-muscle transmission presumably by lowering the electric excitability of the muscle fibre adjacent to the endplate.

(Author's abstr.)

Effects of Dorsal Root Section on Choline Esterase Concentration in Spinal Cord of Cats.

1. The concentration of choline esterase in the gray matter of the sixth lumbar segment of the spinal cord in cats has been determined, and the effects of unilateral and bilateral deafferentiation on the enzyme activity have been studied.

2. In normal cats the QChE values were, on the average, 13·7 and 13·9 in the left and right dorsal quadrant wedges respectively. In the left and right ventral quadrant wedges the values obtained were 17·6 and 18·6 respectively.

3. After unilateral deafferentiation, a decrease of about 10 to 20 per cent. was observed in all four quadrant wedges. After bilateral deafferentiation the percentage decrease was approximately twice as great, i.e. about 30 per cent. in all four quadrant wedges.

4. These results are compared with the effects of nervous degeneration on choline esterase activity in muscle and ganglia and the implications are discussed. (Authors' abstr.)

Functional Organization of Frontal Pole in Monkey and Chimpanzee.

Neither the older histological studies of the cortex nor those more recent stimulations which indicated that the eye field extended above the sulcus arcuatus had suggested the extent of the eye field disclosed in these experiments. The type of stimulation used was designed to evoke responses with a minimum spread of current, and the eye field thus disclosed had a sharp margin. Its continuation on the orbital surface was extremely narrow. Nevertheless, one might have thought that this lower extension depended upon spread of current to some underlying tract, had it not been for the fact that strychnine caused a suppression of electrical activity exactly as it did elsewhere in area 8, and that strychnine is known to act only upon cell bodies.

Strychninization of the frontal pole rostral to area 8 has revealed much greater differentiation and more complex interrelation of dissimilar areas than had been anticipated. The picture invites comparison with Brodman's cytoarchitectonic map, not of the monkey but of man, for the areas disclosed here functionally in the chimpanzee are as numerous as the areas distinguished anatomically by him in man. Unfortunately, they are so different in shape and arrangement as to make it impossible to homologize them. Far greater correspondence exists between these areas in the chimpanzee and those distinguished by von Economô in man—a correspondence which is enhanced by omission of those of his final subscripts which indicate a finer shade of cytoarchitectonic differentiation than can be confirmed with assurance.

The outstanding conclusion of the experiment is that with its relative increase in bulk the frontal pole of the chimpanzee, instead of resembling the ill differentiated frontal pole of the monkey, has come to resemble the highly differentiated and complex frontal pole of man.

(Authors' abstr.)

The Distribution of Acetylcholine in Brains of Rats of Different Ages.

Estimations of the free ACh of brain tissues of infant, young and adult rats were made; also of the spinal cord and spinal nerves of adults. In rats less than one day old the medulla was found to be highest in ACh (0·6γ/gm.) and the pallium lowest (0·16γ/gm.). In adult rat brains the cerebellum was lowest (0·1γ/gm.) and the brainstem highest (0·58γ/gm.). In the adult rat the spinal cord was found to contain more ACh than any part of the brain and the spinal nerves more than the spinal cord. Taking the value of free ACh in the adult cerebellum as one, the other relative values are: Pallium = 2, medulla = 4, brain-stem = 6, spinal cord = 10, spinal nerves = 34.

When whole brains of infant, young and adult rats were extracted and assayed the free ACh of the infant brain was 0·1 γ/gm.; that of young rats was 0·2 γ/gm.; while adults yielded 0·4 γ/gm.

An attempt has been made to relate the regional distribution of ACh in the mammalian nervous system to other known properties and functions of the parts of this system. Except for the pallium, the changes in ACh level of the parts of the brain, with age, are fairly closely paralleled by changes in respiration, glucose utilization and glycogen storage. A close correlation has been shown between distribution of ACh and that of cholinesterase. It is pointed out that the order of increasing resistance of the parts of the nervous system to anoxia and hypoglycemia is essentially the same as the order of parts arranged to show increasing amounts of ACh per unit weight. That is, those parts which are least resistant to anoxia and hypoglycemia (cerebellum and cortex) are lowest in ACh; while those parts which are most resistant, at least to anoxia, are highest in ACh (spinal nerves, autonomic ganglia). (Authors' abstr.)

Functional Organization of the Medial Aspect of the Primate Cortex.

By physiological neuronography the following areas on or near the gyrus cinguli of the macaque and chimpanzee were identified. Area 24 in the anterior part of the gyrus is a suppressor area. Area 23, in the posterior and superior part, sends impulses to the preoccipital and parastriate areas and projects to the anterior nucleus of the thalamus in the macaque. Area 29, close to the splenium of the corpus callosum, was not found to have other cortical connections, but also projects to the anterior nucleus of the thalamus in the macaque. Along the sulcus cinguli there is a " cingular belt " homologous with areas 32 and 31, which receives connections from all known suppressor areas of the cortex (24s, 8s, 4s, 2s, and 19s), but does *not* project to them. Area 32 has commissural connections, but none has been demonstrated for area 31.

Areas on the medial surface of the frontal lobe of the chimpanzee, which may correspond to Brodmann's areas 10, 11 and 12, have been identified and their firing characteristics determined. These were not identified in the macaque. (Authors' abstr.)

Optic Nerve Regeneration with Return of Vision in Anurans.

1. In larval and adult anurans of six different species regeneration of the optic nerve resulted in a return of visual perception which was well organized, not an intermingled confusion. Distinct and consistent responses to position and direction of movement of objects in the visual field were recovered.

2. The orientation of visuomotor responses after recovery, however, was dependent upon the orientation of the retina. It was normal in animals whose retinas had been left in normal position, but reversed about the optic axis in animals whose retinas had been rotated through 180 degrees prior to nerve section.

3. The location of scotomas produced by localized lesions in the optic tectum after optic nerve regeneration indicated that optic fibers from different retinal loci had re-established functional connections in the same areas of the optic lobe to which they had originally projected (Author's abstr.)

The Peripheral Unit for Pain.

1. A unit of a sort for pricking pain can be isolated in the skin by anaesthesia of a nerve branch, after locating by electrical stimulation all points of maximal sensitivity in the nerve's distribution. Taking advantage of the scattering overlap between adjacent nerve branches, the smallest area remaining unanaesthetized after block of one branch, but completely bounded by anaesthetized areas, consists of one highly sensitive point surrounded by an area decrementing in sensitivity toward its periphery. The smallest area anaesthetized but bounded by sensitive areas is a similar unit.

2. These units overlap slightly, but the marginal region of overlap is the region of minimal sensitivity. Certain units appear to be innervated by each of two nerve branches, and more are probably multiply innervated by axons from the same branch.

3. If two such units are stimulated coincidentally or by alternate bursts, two-point discrimination between them then depends on degree of stimulation; the greater the stimulation, in terms of either strength or frequency, the closer together are two points recognizable as discrete. Two points discriminated as such do not summate in painful sensation, and vice versa. Some adjacent points mask each other, i.e. they neither summate in intensity of sensation nor are they recognized as separate spots.

4. Itch, non-painful prick and pain, elicited by appropriate patterns of stimulation from the same point, differ in quality as well as quantitatively.

5. This qualitative shift, with quantity of stimulation, and the shift from summation to two-point discrimination similarly induced, point to a central qualitative interpretation of sensory impulses depending only on quantitative factors involving identical peripheral mechanisms within the single modality of pricking pain. (Author's abstr.)

J. PARAPSYCHOL.

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Synthesis of Acetylcholine in Sympathetic Ganglia and in Cholinergic Nerves.

Feldberg investigated the superior cervical ganglion, the cervical sympathetic, vagus, and phrenic nerves, and motor roots in the cat. He concludes that synthesis of acetylcholine in sympathetic ganglia is a property of the preganglionic nerve-endings and a necessary preliminary for sustained synaptic transmission. The property appears to depend on intactness of some structural part of the tissue, probably the axone, since it is lost when mechanical destruction is carried too far (grinding with silica). Synthesis occurs apparently only to replace acetylcholine expended. When the cervical sympathetic trunk is cut, the distal portion and the ganglion lose their synthesizing power simultaneously with the loss of synaptic transmission, but while nerve conduction is still intact. This loss is among the first functional changes in degenerating cholinergic nerves. They apparently synthesize acetylcholine throughout their course in the same manner as in sympathetic ganglia. No synthesis was observed in sensory roots. M. E. Morse (Psychol. Abstr.).

Synaptic Potentials and Transmission in Sympathetic Ganglion.

When synaptic transmission through the cat's superior cervical ganglion is blocked by curare, a preganglionic volley sets up a local negative potential of the ganglion cells relative to their axones—the synaptic potential—which spreads decrementally along the post-ganglionic fibers. In these respects it resembles a catelectrotonic potential and is thus analogous to the end-plate potential of curarized musele. Summation of the synaptic potential set up by two preganglionic volleys occurs, and if the summed potential is sufficiently high, the ganglion cells discharge impulses. Synaptic potentials set up by single or repetitive stimulation were analysed on the basis of Hill's local exponential theory. The processes involved in synaptic transmission and facilitation are discussed, particularly the so-called detonator facilitation, and it is concluded that most and possibly all evidence for such action may be attributed to the brief transmitter action. M. E. Morse (Psychol. Abstr.).

Recovery of Fiber Numbers and Diameters in the Regeneration of Peripheral Nerves.

Counts and measurements of the myelinated fibers in the rabbit's peroneal nerve were made at standard levels in the normal nerve, after crushing, after severance and suture, and after nerve grafts. Only after crushing was the nerve fully reconstituted as to number, size, and pattern of fibers. After suture and grafting the fibers in the peripheral stump were fewer and on the average smaller than those in the central stump. The bearing of these results on functional recovery is discussed. In crushing, the fibers are interrupted but remain opposite their own Schwann tubes. After suture, a particular fiber can enter one of many tubes and thus may be functionally "lost" through misdirection. Anatomical restoration remains incomplete long after the simpler functions have recovered, but different functions probably require different degrees of reconstitution. This is of considerable importance in man in restoration of delicate functions. The factors determining selection of fibers for maturation are unknown. Shunting is important in reducing the number of end-organs reached and in preventing maturation of large fibers in small tubes. M. E. Morse (Psychol. Abstr.).

J. PSYCHOL.

VOL. XV. 1943.

Slow Waves of Circulatory Origin in the Elęctroencephalogram.

During an investigation of the effects of emotional excitement on the normal EEG, very slow waves of 1–2 cycles per second were observed. As a slow brain rhythm has often been considered abnormal, further investigation was made, using two types of EEG's. The same type of slow waves was observed in the records of five schizophrenic and three normal subjects with no ascertainable organic abnormalities. These waves coincided exactly in frequency with simultaneously recorded pulse rate and showed no fast component. It is considered probable "that these slow potentials represent an electroarteriogram arising chiefly from the more richly supplied vascular areas of the cerebral cortex and the pia mater."

R. B. Ammons (Psychol. Abstr.).

J. SOC. PSYCHOL.

VOL. XVII. 1943.

MENT. HYG., N.Y.

VOL. XXVII. 1943.

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MSCHR. PSYCHIAT. NEUROL.

NERV. CHILD.

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VOL. XVIII. JANUARY, 1944.

Use of Metrazol in Barbiturate Poisoning.

1. The successful use and analeptic action of 36 c.c. of metrazol in a case of poisoning with 102 gr. of sodium amytal is reported.

2. A brief review of the literature on the pharmacology, animal experimentation and clinical use of analeptics in barbiturate poisoning is presented.

3. A comparative study of metrazol, picrotoxin and other analeptics as physiological antidotes in barbiturate poisoning is made.

4. The rationale for the use of metrazol in the case presented is fully discussed and indications for its use are given. (Author's abstr.)

The Prevention of Post-convulsive Asphyxia in Electric Shock Therapy.

1. A simple procedure, hyperventilation just prior to the shock, is suggested as a manoeuvre to prevent certain asphyxial episodes in the post-convulsive period of electric shock therapy.

2. Previously described methods of combating this complication are reviewed.

(Author's abstr)

The Rorschach Analysis of Psychotics Subjected to Neuro-Surgical Interruption of the Thalamo-Cortical Projections.

The Rorschach form-perception test was used pre-operatively and post-operatively, whenever conditions permitted, in a series of 20 psychotic patients subjected to therapeutic bilateral prefrontal lobotomy. A continuing clinical follow-up was made on each patient for periods ranging up to one year. Because of the severe psychotic subjects dealt with and other factors tending to reduce the number of cases available for reliable comparative studies, it was not possible to compute quantitative relationships on the basis of age, sex, or diagnosis. Qualitatively, the study revealed that the changes from pre-operative records to post-operative records are not very large in most cases, and that atypical signs present in the post-operative records are frequently anticipated in the pre-operative records. In the post-lobotomy course, Rorschach improvement may, or may not, run parallel with clinical improvement. An analysis of the post-operative scoring signs revealed the presence of several of Piotrowski's criteria of intracranial damage, but since they frequently appeared in the pre-operative picture, it was felt that they were more a function of the psychotic processes than of the lobotomy. In general, it appears that the neurosurgical transection of the frontal association areas plays a less important role in the reorganization of the Rorschach patterns than does the prepsychotic and pre-operative personality structure. (Author's abstr.)

Fluctuations in the Mental Level of Schizophrenic Patients.

Thirty schizophrenics whose average age was 28·1 years were examined and re-examined by means of the Wechsler-Bellevue scales. The results were compared with those obtained from 30 non-schizophrenic State hospital patients with a mean age of 38 years who were also tested, then re-tested after some time. The intervals between test and re-test for both groups ranged from 1 to 35 months, with a mean of slightly more than 13 months for both groups.

The results tabulated and discussed justify the following conclusions:

1. The large majority of the schizophrenic patients show a rise in mental level, indicating a higher degree of mental efficiency. This rise is probably due to two major factors: (*a*) The improved clinical picture of the patients; (*b*) the practice effect involved in the employment of the same scale. The greatest number of mental level decreases may be found in the catatonic group. Because of the small numbers involved, these results cannot be considered conclusive.

2. The verbal scale of the Wechsler shows comparative stability, and is probably a close approximation of the patient's potential level. Considerable changes may be noted in the performance scale. The speed factor is of prime importance in the performance scale. The changes in it are most likely due to better initiative, "mental energy," co-operativeness, and increased alertness on the part of the patients.

3. The outstandingly poor coefficient of correlation on the comprehension test shows considerable fluctuation in the schizophrenic's practical judgment—more so than any other function measured by Wechsler's scales. It seems to offer to the patient the greatest opportunity of demonstrating schizophrenic thought disturbance.

4. The intrascale deviations from the mean show larger variations in the schizophrenics as well as in other hospital patients than in non-psychotics.

5. The total distribution of the schizophrenic group and its individual subtests, both on test and re-test, does not show any significant differences when compared with the measures of variability for the non-schizophrenic as well as non-psychotic distribution.

(Author's abstr.)

PSYCHOANAL. QUART.

VOL. XII. 1943.

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VOL. XL. DECEMBER, 1943.

VOL. XLI. JANUARY, 1944.

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PSYCHOL. REV.

VOL. LI. JANUARY, 1944.

PSYCHOMETRIKA.

VOL. VIII. 1943.

PSYCHOSOM. MED.

VOL. VI. 1944.

Parallelism in Changes of Sensory Function and Electroencephalogram in Anoxia and the Effect of Hypercapnia under these Conditions.

Experiments are reported in which the electroencephalogram (EEG), the critical visual fusion frequency (CFF) and the pulse-rate were recorded in five subjects under anoxia and under control conditions, in order to determine whether any correlation exists between the subjective sensory changes observed in anoxia and the activity of the brain as recorded by the EEG.

It is shown that conditions of anoxia leading to a decline in CFF are accompanied by typical anoxic changes in the brain as demonstrated by the EEG. Degrees of anoxia which do not alter the CFF significantly have no effect on the EEG. The experiments suggest that the subjective changes in visual functions observed in anoxia are not due to ill-defined psychic factors, such as lack of attention or lack of co-operation, but are due to an actual impairment of the neurons of the retino-geniculatestriate system.

Addition of 3 per cent. carbon dioxide to oxygen-nitrogen mixtures greatly alleviates or completely offsets the effects of anoxia. This holds true not only for the general symptoms (dizziness, perspiration, general discomfort, etc.), but also for the effects of anoxia on the CFF and EEG. Under the conditions of these experiments there is likewise a parallelism between subjective (sensory) and objective (EEG) changes. The mechanism involved is discussed and the fact is emphasized that the pulse-rate rises more when oxygen-nitrogen mixtures are inhaled than when similar oxygen-nitrogen mixtures are used to which 3 per cent. carbon dioxide had been added. (Authors' abstr.)

Electroencephalographic Studies in Asthma with some Personality Correlates.

Fifty-four male cases of bronchial asthma have been studied from the point of view of electroencephalographic and personality data.

The electroencephalographic data indicate a definite relationship between bronchial asthma and a dominant alpha record, i.e., about three times as many dominant alpha records were found in the asthmatic group as in a normal group.

Dominant alpha records have been correlated with passive, receptive types of individuals. This has been determined by previous studies.

The author's personality data would seem to indicate that in general we are dealing with a single, fairly definite personality constellation. Their patients appear to be a fundamentally passive dependent group who are the children of an over-protective, dominating mother. They have not cared for, striven for, or gained any marked degree of independence in life, and continue to seek care and protection from the environment.

Their results would indicate, therefore, a close relationship between bronchial asthma and a fundamental passive dependent personality structure, by the criterion of high dominant alpha index correlation with established passive personality.

These findings would seem to show the value of this type of study for the better understanding and evaluation of the underlying personality structure and psychic factors in patients with this disease and in psychosomatic problems generally. Some further implications of this study are pointed out and discussed. (Authors' abstr.)

QUART. J. STUD. ALCOHOL.

VOL. III. 1943.

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REV. MEX. NEUROL. PSIQUIAT.

VOL. IX. 1943.

REV. NEURO-PSIQUIAT., LIMA.

VOL. V. 1942.

VOL. VI.

Phenomenology of Mescaline Intoxication and Functional Analysis of Thought During its Course.

In three cases of intoxication from ingestion of mescaline sulphate the principal introspective results showed close analogies with the course of the schizophrenic consciousness as presented by Zucker. A basic perceptual disorder was the inability to form adequate gestalten; on the expressive side this corresponded to distortion of "intentionality." Visual and auditory thresholds were lowered, while other senses were restricted. Complete introspective protocols for the course of intoxication in the subjects (medical students) are given, together with an extensive bibliography covering various phases of the topic.

H. D. SPOERL (Psychol. Abstr.).

REV. PSIQUIAT. CRIM., B. AIRES.

VOL. VI. 1941.

Fertility of Psychopaths.

This is an examination, derived from German statistics, of the necessity for and the results to be expected from the German sterilization laws. The statistics showed that none of the categories affected had a fertility above that of the general population, and among schizophrenics and epileptics there was evidence of biological autoelimination. Little is known of the etiology of psychopathies, and especially it is unknown whether pathogenic genes may also carry favorable factors and what regenerative powers may accompany degenerative factors. Dominant inheritance is not usual in the psychopathies, and the extent of recessive inheritance is unknown. These laws are not only inefficacious, but their spirit is opposed to the medical, legal, and moral principles of civilized peoples. In Germany they have caused, as deplored by their leading advocate, Rudin, a decline of interest in psychiatry. The facts here presented should lead to a powerful counter-movement of prevention through mental hygiene and advances in psychiatry.

M. E. MORSE (Psychol. Abstr.).

Rorschach's Test and Bernreuter's Personality Inventory in Homicides.

Serebrinsky made a comparative statistical analysis of the Rorschach test and Bernreuter inventory on 131 homicides. By both methods the great majority of the subjects showed emotional instability. The most interesting finding was the relation between color and movement responses and certain aspects of the inventory. Neurotic tendency (introversion, emotional instability) was connected with color responses. Their predominance was, in fact, a measure

of neuroticism according to the inventory. Movement answers were apparently allied to self-sufficiency and domination. The tendency to dominate was low, but higher among the introverts than the extraverts. Although these results express only an orientation and may be affected by the conditions of prison life, they are pertinent because few attempts have been made to corroborate the results of the Rorschach test by other psychological measures.

M. E. MORSE (Psychol. Abstr.).

VOL. VII. 1942.

REV. PSIQUIAT. DISC. CONEX.

VOL. VI. 1941.

REV. PSIQUIAT., URUGUAY.

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RORSCHACH RES. EXCH.

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SCHWEIZ. ARCH. NEUROL. PSYCHIAT.

VOL. L. 1942.

Nail Biting: Contribution to the Study of the Pathology of the Person.

This study of 436 nail biters illustrates over-determination of a symptom. Both phylogenetically and ontogenetically nail biting represents primarily autoaggression and destruction

(" tooth and nail "). The anxiety factor is masked by various others, all characterized by forced suspension of activity, e.g. masochistic pleasure of exasperation. As to choice of discharge, jaw movements in general as outlets for tension are more important than usually recognized. Nail biting gives a maximum subjective effect by inconspicuous, socially inoffensive means. It is rarely the resort of very abnormal children. Another root of nail biting is probably in the collective unconscious (magic significance of the nail). Although the children are of the " nervous " type, analytic study often yields little concrete material because the habit creates little conflict. It has slight intrinsic significance, but if attacked directly it may become secondarily neuroticized. M. E. MORSE (Psychol. Abstr.).

The " Unloading Function " of the Convulsion. Psychodynamics of Electric Shock Therapy.

Flescher believes that the benefits of convulsive therapy are due primarily to the individually and socially harmless discharge of great amounts of aggressive energy which would otherwise be turned against self or others. The resultant increased libido, turned toward the physician, permits an analytic approach. The feeling of helplessness is unimportant therapeutically, and the anxiety effect is limited to the amnesia factor. This theory would explain why the best results of convulsive treatment are attained in melancholia, and the inadequacy of *petit mal* reactions. A new field lies in the obsessive neuroses in which the aggressive drive is strong. The meaning of the motor sphere for aggressiveness and its role in idiopathic epilepsy and manic attacks are discussed. M. E. MORSE (Psychol. Abstr.).

Vegetative Nervous System. Questions of Organization, Concepts and Nomenclature.

In view of misunderstandings and differences of opinion, Hess restates and clarifies his conception of the vegetative nervous system. He divides it into the ergotropic and histotropic portions, which correspond in general, but not wholly, to the sympathetic and parasympathetic divisions. His conception, and therefore his nomenclature, are based on the functional plan of the vegetative system, rather than the topography of the roots. The co-ordinated effect on the total organism, not on isolated organ-systems, is the guiding principle.

M. E. MORSE (Psychol. Abstr.).

The Prepsychotic Personality of Shock-resistant Schizophrenics.

This study is based on 90 shock-resistant patients, the majority 30–40 years old. The duration of the disease averaged 6½ years, and hospital residence was less than one year. The results show that the shock-resistant group contained many more abnormal personalities, especially schizoid psychopaths, than the shock-susceptible group. There was no difference in intelligence between the two groups. The total schizophrenic group contained a third division, the constitution of which has not yet been investigated. These are neither resistant nor apparently curable, but are improved socially by shock therapy, although still showing schizophrenic defect. Constitution determines both the spontaneous course of the disease and the results of treatment. Under the right indications, however, shock therapy is very valuable.

M. E. MORSE (Psychol. Abstr.).

Studies on the Clinical Course and Family Picture of Shock-resistant Schizophrenics.

This investigation was made on 90 shock-resistant patients, the majority 30–40 years old. The periods of observation after treatment ranged from six months to five years. The most important finding is that the clinical course of the disease, both in the patient and affected members of the family, was characterized by a constitutionally determined malignancy. This constitutional element is not affected by treatment; 80–90 per cent. of the shock-resistant cases pursued an uninterrupted downward course, as contrasted with less than 10 per cent. of the shock-susceptible. This study emphasizes the overwhelming significance of constitutional influences for the prognosis of shock therapy in schizophrenics.

M. E. MORSE (Psychol. Abstr.).

STUD. PSYCHOL. PSYCHIAT., CATHOL. UNIV. AM.

VOL. VI. 1943.

The Construction of a Test for Measuring Character Traits. *Hsü, E. H.* . . . No. 1.

Z. GES. NEUROL. PSYCHIAT.

VOL. CLXXI: 1941.

The Rorschach Test as Aid in the Differential Diagnosis of True and Tetanic Epilepsy. *Weissenfeld, F.* 1

1. Physiology, Pathology, Biochemistry, etc.

The Significance of Spinal-fluid Cholesterol in Differential Diagnosis. Kujath, G. [*Allegm. Z. Psychiat.*, **121**, 249–62 (1943).]

Cholesterol (I) was determined in the spinal fluids (II) of a large number of children with various chronic and acute diseases of the central nervous system as follows: Dry 1 or 2 ml. of (II) in a desiccator, extract with $CHCl_3$–C_2H_5OH (1 : 1), dry, extract the residue with $CHCl_3$, apply the Liebermann-Burchard reaction, and read in a photoelectric colorimeter. Fairly good agreement between analyses on 1- and 20-ml. portions of the same (II) was obtained in 9 comparisons. In " normal " children (some with retarded development) the concentration of (I) in (II) ranged from 0·16 to 0·36 mgm. per 100 ml.; 0·4 mgm. is taken as the upper limit of normal. The (I) concentration was above normal in 26 of 43 cases with clinical evidence of stationary brain atrophy; in 5 of 8 cases of idiocy with neurologic symptoms; in 15 of 25 cases of idiocy with abnormal and in 2 of 3 cases with normal encephalograms; in 8 of 9 cases of idiocy with symptomatic seizures; in 4 cases of hydrocephalus; in 3 of 5 cases of congenital lues; in 3 of 13 cases of congenital feeblemindedness; and in 1 case each of tuberous sclerosis and epilepsy during and after a seizure. WARREN M. SPERRY (Chem. Abstr.).

A Glutamine-like Substance in Blood and Spinal Fluid, including a Method for its Determination. Harris, Meyer M., Roth, Roslyn T., and Harris, Ruth S. [*J. Clin. Investigation*, **22**, 569–76 (1943).]

A glutamine-like substance appears to occur in blood and spinal fluid, as supported by the following facts: (1) Certain tissues of the body contain glutaminase which can synthesize glutamine; (2) glutamine has been isolated from horse meat; (3) the parallel behavior under various conditions of hydrolysis of glutamine and the glutamine-like substance; (4) the probable formation of pyrrolidone-carboxylic acid by the glutamine-like substance in blood plasma.

J. B. BROWN (Chem. Abstr.).

The Tryptophan Test in General Paresis. Madonick, M. J., and Lissman, J. [*J. Lab. Clin. Med.*, **28**, 338–43 (1942).]

The tryptophan test was performed on the spinal fluid of 133 paretic persons. A positive response was obtained in 82 per cent. of the cases. It was positive in 3 cases of taboparesis and negative in 4 cases of tabes. Five of 13 cases of psychosis with meningovascular or cerebral syphilis gave a positive response. In a control group of 102 patients without syphilis, only 2 cases, one of cerebral arteriosclerosis and the other of rheumatic fever, gave a positive reaction. The test is most often positive in cases of syphilis with a paretic gold curve, but does not occur in other diseases as multiple sclerosis where a paretic gold curve is present without syphilis. The test is not dependent upon a quantitative increase in the total protein of the spinal fluid. Previous work in the literature is discussed and results tabulated. In the performance of the test it is essential that the fluid be clear. HOWARD W. ROBINSON (Chem. Abstr.).

The Shellac Reaction on 1,400 Spinal Fluid Samples. Kutscher. [*Deut. med. Wochschr.*, **67**, 1201–4 (1941).]

The spinal fluid is mixed with an equal volume of a commercially available shellac solution. Normal fluids remain clear, whereas pathological specimens become cloudy. The reaction is more sensitive than either the gold sol or mastic reactions as commonly used, and avoids the false positive results sometimes obtained with the Pandy reaction.

ARTHUR GROLLMAN (Chem. Abstr.).

The Glucose Content of Cerebrospinal Fluid in Meningitis. Schuster, G. [*J. pharm. chim.*, **2**, 170–2 (1942); *Chem. Zentr.*, **11**, 678 (1942).]

The glucose content of cerebrospinal fluid was studied in 42 patients during a meningitis epidemic. In 37 cases there was a marked rise in glucose. As the meningitis symptoms disappeared the glucose concentration returned to the normal level.

S. MORGULIS (Chem. Abstr.).

The Colloid Chemistry of the Hydrochloric Acid-collargol Reaction. Duensing. [*Arch. Psychiat. Nervenkrankh.*, **115**, 157–73 (1942).]

The reaction, devised by Riebeling (*C.A.*, **32**, 5488[8]), measures in a series of increasing dilutions the protective action of spinal fluid (I) against the coagulation of collargol (II) by 0·002 N HCl. In dilutions up to 1 : 10 or 1 : 15 the absence of coagulation is explained by the buffering action of normal (I). The ultrafiltrate of normal (I) protects as well as (I) itself. The protective action of pathology (I) in higher dilutions is ascribed to the increased quantity and to the quallty of the protein (III); ultrafiltrates of such fluids give no greater protection than normal (I), and on the average fluids with the highest (III) concentration give the greatest protection. But there is no direct proportion between (III) concentration and degree of protection; small concentrations of (III) frequently exercise a disproportionately large protective action. This is explained as follows: With increased concentrations of HCl, up to 0·01 N, the zone of

protection against coagulation of (II) is unexpectedly increased up to higher dilutions of normal (I), because the more positively charged (III) formed through action of the HCl has a greater protective action; for the same reason small increments of (III) in pathology (I) have a large effect and the high sensitivity of the reaction is thus explained. Serum (III), precipitated by dialysis, was dissolved in physiological NaCl solution, in (I) ultrafiltrates, and in a solution of salts, buffered with phosphate to simulate the ultrafiltrate. Typical pathological curves of (II) coagulation were obtained with the last two, but not with the first preparation; it is not necessary to assume the presence of unknown bodies to explain the findings in pathological (I). The frequent finding in pathological (I) of a zone of precipitation followed by a zone of protection as the dilution is increased is related to differences in the isoelectric point of the (III) present in different diseases. In the region of the isoelectric point the (III) does not protect, but on the acid side, reached in larger dilutions where the buffering effect of (I) is less, (III) protects again against coagulation of (II). No difference in buffer capacity between normal and pathological (I) was observed. WARREN M. SPERRY (Chem. Abstr.).

A Study with Radioactive Isotopes of the Permeability of the Blood-cerebrospinal Fluid Barrier to Ions. Greenberg, David M., Aird, Robert B., Boelter, Muriel D. D., Campbell, W. Wesley, Cohn, Waldo E., and Murayama, Makio M. [*Am. J. Physiol.*, **140**, 47–64 (1943).]

The permeation of ions from the blood-stream into the cerebrospinal fluid is generally a slow process. Many hours are required for the labelled ions the normal ratios found by chemical analysis. The results favor the secretion theory of formation of the cerebrospinal fluid.
E. D. WALTER (Chem. Abstr.).

Relation of Cholinesterase to Acetylcholine and Blood-Pressure Variations. Reichert, Willi, and Frisch, Wolfgang. [*Arch. exptl. Path. Pharmakol.*, **200**, 235–43 (1942).]

In narcotized cats the prolonged slow injection of acetylcholine or acetyl-β-methylcholine produced a marked decrease in the cholinesterase activity of the blood. Drugs which increase blood pressure do not increase blood cholinesterase activity. The latter is independent of the blood pressure and the circulatory regulating mechanism. L. E. GILSON (Chem. Abstr.).

Acetylcholine and the Physiology of the Nervous System. Fulton, J. F., and Nachmansohn, D. [*Science*, **97**, 569 (1943).]

It has been difficult to reconcile the extremely rapid events taking place in neural activity with what was presumably a process requiring considerable time, namely, acetylcholine release. Recent experimental work shows: (1) that choline esterase is localized at the neuronal surface (this allows for rapid hydrolization of acetylcholine), and (2) a parallelism is found between the amount of choline esterase present and the E.M.F. produced by the electric organs of *Electrophorus electricus* and *Torpedo*. The electric organs of these specimens have present an amount of choline esterase to hydrolyse in 60 minutes, several kilograms of acetylcholine, i.e. several milligrams in one millisecond. "This high rate of metabolism makes possible the assumption that acetylcholine is closely connected with the discharge." Such evidence indicates that acetylcholine is an essential link in the generation of the electrical changes recorded during both axon and synaptic activity. F. A. MOLE, jun. (Psychol. Abstr.).

Effect of Glutamic Acid on the Formation of Acetylcholine. Nachmansohn, D., John, H. M., and Waelsch, Heinrich. [*J. Biol. Chem.*, **150**, 485–6 (1943).]

The addition of l(+)-glutamic acid to dialyzed extracts of rat brain in concentration of 2×10^{-2} M increased the rate of formation of acetylcholine (I) about 4–5 times. d(−)-Glutamic acid had a small effect. l(+)-Aspartic acid, dl-serine, l-malic and α-ketoglutaric acids had no effect. dl-Alanine and dl-methionine and glutamine increased the rate of formation of (I) about twice at a concentration of 2×10^{-2} M. Succinic acid increased the rate about twice and citric acid about 4–6 times. Are these active substances coenzymes of choline acetylase?
RACHEL BROWN (Chem. Abstr.).

The Nicotinic Acid Content of Cereals and Pellagra. Ayroyd, W. R., and Swaminthan, M. [*Bull. mens. office intern. hyg. publ.*, **33**, 507 (1941); *Chem. Zentr.*, **11**, 679 (1942); *cf. C.A.*, **34**, 7364⁹.]

Wheat contains 5 mgm. per cent. nicotinic acid, barley 3 mgm. per cent., rice 2–4 mgm. per cent., corn and rice meal 1·5–2·0 mgm. per cent. Feeding experiments on Rumanian families suffering from pellagra showed that rice contains less nicotinic acid than corn. Hence, the low nicotinic acid content of corn is obviously not an etiological factor in pellagra.
E. O. WHITTIER (Chem. Abstr.).

Studies of Urinary Pigments in Pellagra and other Pathological States. (1) *Clinical Observations. Watson, Cecil J., and Layne, John A.* [*Ann. Internal Med.*, **19**, 183–99 (1943).]

The chromogen (probably indoleacetic acid) which gives the urorosein reaction is a normal constituent of the urine of many individuals who have no evidence of nicotinic acid deficiency. Some urines contain an unknown oxidizing agent which yields a spontaneous reaction for urorosein. There is no relation between the administration of nicotinic acid and the presence

of either the chromogen or the oxidizing agent. The spontaneous reaction occurs only in diseased and is much more frequent in deficiency states.

(2) *The Excretion of Porphyrin and the Urorosein Reaction in Dogs with Experimental Black Tongue.* [*Ibid.*, 200–5.]

The spontaneous urorosein reaction was absent in urine from four dogs with experimental black tongue. The appearance of red color in the toluene preservative of dog urines was not correlated with nicotinic acid deficiency. There was no significant increase in coproporphyrin in dogs with black tongue.

(3) *Certain Toluene Soluble Pigments of Human and Canine Urine. Schwartz, Samuel, Marvin, James, Layne, John A., and Watson, C. J.* [*Ibid.*, 206–12.]

The red pigment extracted by toluene from certain human and canine urines was shown by chromatographic analysis to be composed of several pigments. Two of them each obtained from human urine were similar to but not identical with indirubin.

JOHN T. MYERS (Chem. Abstr.).

Pellagra and Nicotinic Acid. Ferrero, S. [*Arch. ital. med. sper.*, **4**, 1033–48 (1939); *cf. C.A.*, **33**, 3846[6], [8], 8707[6]; **34**, 2427[4]; **35**, 161[5]; **36**, 165[9], 6205[7].]

R. P. E. HOPF (Chem. Abstr.).

Action of Vitamins on Nervous Centers. Chauchard, P. [*Compt. rend.*, **214**, 130–3 (1942); *cf. C.A.*, **36**, 2594[5], 3533[4]; **37**, 4437[1].]

After intraperitoneal injection of vitamins, measurements of chronaxie in adequately fed rats, rabbits and guinea-pigs show that correct functioning of various nervous centers directly depends on the provision of appropriate amounts (equal to those required to prevent deficiency) of vitamins, and that excess or deficiency of these produces characteristic changes (stimulation and (or) depression) in nervous excitability. In some cases antagonism or synergism among vitamins is observed. The extent and duration of the changes usually depend on the dose of vitamin.

B. C. P. A. (Chem. Abstr.).

Vitamin B_1 Deficiency and Attempts to Produce Poliomyelitis in White Rats. Toomey, John A., Frohring, Wm. O., and Tahacs, Wm. S. [*Proc. Soc. Exptl. Biol. Med.*, **54**, 153–4 (1943).]

The experiments gave no evidence that vitamin B_1 deficiency will in any way make white rats more susceptible to Flexner's M. V. poliomyelitis cotton rat-adapted strain.

L. E. GILSON (Chem. Abstr.).

The Liberation of Aneurine by Stimulating Nerves. Muralt, A. v., and Zemp, J. [*Arch. ges. Physiol.* (*Pflüger's*), **246**, 746–8 (1943).]

Resting and stimulated sciatic nerves of frogs were analyzed for their content of thiamine by noting the growth-promoting effect of extracts of these nerves on a culture of Phycomyces. The stimulated nerves contained 2γ of thiamine per gm. of tissue more than the resting ones.

ARTHUR GROLLMAN (Chem. Abstr.).

Chemical Factors in Nerve Growth Studied in Tissue Culture: Vitamin B_1 and the Growth of Spinal Ganglia. Burt, Agnes S. [*J. Cellular Comp. Physiol.*, **21**, 145–59 (1943).]

Between the normal physiological range and limits of toxicity, vitamin B_1 has no effect on axon growth in tissue culture.

A. D. HASLER (Chem. Abstr.).

Effect of Iodoacetate on Respiration and Glycolysis in Excised Rat Brain. Fuhrman, Frederick A., and Field, John, 2nd. [*J. Cellular Comp. Physiol.*, **21**, 307–17 (1943).]

All concentrations of iodoacetate tested which inhibited anaerobic glycolysis also ultimately inhibited O consumption. Fermentation and O uptake in excised rat cerebral cortex are not separable by treatment with iodoacetate.

A. D. HASLER (Chem. Abstr.).

Active Substances in Nerve Stimulation. Muralt, A. v. [*Arch. ges Physiol.* (*Pfluger's*), **245**, 604–31 (1942); *Chem. Zentr.*, **11**, 1592 (1942)].

MAURICE M. RATH (Chem. Abstr.).

Electroencephalographic Study of the Action of Latrodectus mactans *Spider Bite. Odoriz, J. B., and Sampayo, R.* [*Rev. soc. argentina biol.*, **19**, 27–36 (1943).]

Changes produced in the electroencephalograms of dogs, cats and guinea-pigs indicate that *Latrodectus mactans* venom is a neurotoxin having a diffuse action on the entire central nervous system. Administration of antiserum returns the encephalographic tracings to normal rhythm.

L. E. GILSON (Chem. Abstr.).

The Action of Sympathomimetic Amines on the Respiration of Tissues in vitro. de Meio, R. H. [*Anales asoc. quim. argentina*, **31**, 80 (1943); *cf. C.A.*, **37**, 5145[2].]

There was studied the action of β-phenyl-β-hydroxyethylamine (I), ephedrine (II), and benzedrine (III) on the respiration of the retractor penis (dog), uterus and liver (rabbit), and diaphragm and intestine (rat); the Warburg technique was used. In their effect on the dia-

phragm, liver and uterus, the three resemble adrenaline (studied by others). The intestine shows inhibition. Respiration of the retractor penis is distinctly stimulated by the three amines. The concentration limits at which increase was observed were with (I), 2×10^{-8} M, with (II) and (III) 10^{-7} M. The first is more active than adrenaline (concentration $0{\cdot}55 \times 10^{-7}$ M), and none of them shows the inhibition clearly observed in the case of adrenaline at concentrations below $0{\cdot}55 \times 10^{-9}$ M. E. M. SYMMES (Chem. Abstr.).

Hypertension and Loss of Pressor Response to Angiotonin as the Result of Trauma to the Central Nervous System and Severe Hemorrhage. Page, Irvine H. [*J. Exptl. Med.*, **78**, 41–58 (1943).]

Angiotonin refractoriness and hypotension follow upon injury to the central nervous system in dogs and cats. The syndrome develops in the absence of the kidneys and the suprarenal glands. Glycine, methylisothiourea (I) and rest are the only agents studied which tend to restore responsiveness, and the first two of these have only an irregular and temporary effect. There is a marked degree of specificity in the syndrome, because undiminished pressor responses to adrenaline, tyramine and (I) are observed during complete angiotonin refractoriness. Despite the prolonged hypotension, changes in the amount of plasma proteins and in the hematocrit readings are not striking. C. J. WEST (Chem. Abstr.).

A Study of Serum Protein in Epileptics. Klimes, K., and Láng, A. [*Arch. Psychiat. Nervenkrankh.*, **114**, 691–8 (1942).]

The total protein and colloid-osmotic pressure are normal, but the albumin : globulin ratio is decreased in epileptics. WARREN M. SPERRY (Chem. Abstr.).

Acetone Bodies and Creatine in Schizophrenia. Löfdendahl, Hillevi. [*Nord. Med.*, **13**, 896–7 (1942); *Chem. Zentr.*, **11**, 802 (1942).]

In 50 cases of schizophrenia examined the Me_2CO and creatine contents of the urine were normal; β-hydroxybutyric acid was above normal in 16 cases.

L. E. GILSON (Chem. Abstr.).

The Lactoflavin Content of the Central Nervous System and Its Significance. Leemann, H., and Pichler, E. [*Arch. Psychiat. Nervenkrankh.*, **114**, 265–89 (1941); *cf. C.A.*, **36**, 6603[5].]

The lacotoflavin (I) content of normal, human spinal cord was 2·30–2·85 γ/gm.; there was little difference among the cervical and upper and lower lumbar portions. No (I) was found in spinal fluid. The respiration of sliced guinea-pig brain was about the same in 0·9 per cent. NaCl alone; NaCl + 0·01 M phosphate (II) buffer, pH 7·6; NaCl + glucose (III); and NaCl + (II) and (III). The rest respiration (after addition of KCN) was very small in the absence of (III) and ceased after 30 minutes; with (III) it was much higher and it continued for over one hour. It is concluded that the yellow enzyme, which carries on the rest respiration after the heme system is immobilized, oxidizes only carbohydrate. In accordance with this hypothesis the striopallidum, which is rich in (I), gave a high and long-continued rest respiration in the presence of diluting (0·005 per cent.) (III), while the (I)-poor medulla oblongata showed a very low rest respiration. The feeding of a vitamin B_2-free diet to guinea-pigs for 2 months had no effect on the (I) content of 4 portions of the brain as compared with normal animals. Depleted guinea-pigs injected with 1 mgm. lactoflavin phosphate per day for three days preceding death showed a little lower (I) concentration. Sublethal doses of KCN, given for several days, did not affect the (I) concentration of the guinea-pig brain. The (I) content of several structures of infants' brains was about the same as the corresponding values found in adults, and (I) occurs in the brains of rodents at about the same level as in the adult human; but there is little or no Fe in the brains of rodents and human infants. From these facts it is concluded that the flavin respiration system is older phylogenetically and ontogenetically than the Fe system. The (I) and Fe concentrations and the total and rest (KCN) respirations are closely parallel in different structures of the adult human brain. The (I) concentration of several structures of the brain was determined in nine patients with diseases affecting the brain. Deviations from normal (decreases) were found only in one patient with myasthenia and one with a carcinoma of the bronchus with metastases in the cerebellum. An attempt to determine (I) in brain tissue with the fluorescent microscope was unsuccessful. WARREN M. SPERRY (Chem. Abstr.).

Carbohydrate Metabolism in the Central Nervous System. Huszák, I. [*Biochem. Z.*, **312**, 315–29 (1942).]

Ganglion cells and neurites show differences not only in the O_2-activating systems but also in the carbohydrate metabolism. The mechanism of carbohydrate metabolism in the white matter is in some respects like the muscle mechanism, the decomposition starting with glycogen and proceding through phosphorylated stages. In the gray matter the significant path of carbohydrate metabolism begins with glucose which, after phosphorylation, probably follows the same course as in the white substance, and resembles that of red blood cells and other tissues which can utilise glucose. The white matter, thus oxidizes glycogen and phosphorylated hexoses but does not attack glucose or other non-phosphorylated sugars. The gray matter, however,

uses glucose as its main nutrient, but this is oxidized only after phosphorylation. The phosphorylation of the glucose is initiated by adenosine triphosphate. In both white and gray matter the glycogen undergoes phosphorolysis. S. MORGULIS (Chem. Abstr.).

Gonadotropin Excretion in Normal Men and Women and Cases of Hysterectomy, Menopause, Migraine, Epilepsy and Eunuchoidism. Main, R., Cox, W., O'Neal, R., and Stoeckel, J. [*J. Clin. Endocrinol.*, **3**, 331–4 (1943).] KATHRYN KNOWLTON (Chem. Abstr.).

The Gonadotropic Activity of the Tuber Cinereum in Rats; Study of the Endocrine Activity of the Brain (Neuro-secretory Study). Weisschedel, E., and Spatz, H. [*Deut. med. Wochschr.*, **68**, 1221–3 (1942).]

The implantation of tissue derived from the vicinity of the tuber cinereum in the midbrain into infantile rats and mice induced a gonadotropic activity. The activity of the tissue was comparable to that obtained by hypophyseal tissue, and indicates a neurosecretory activity of the midbrain. ARTHUR GROLLMAN (Chem. Abstr.).

Heredity as an Etiologic Factor in Chronic Alcoholism. Lemere, F., et al. [*Northw. Med., Seattle*, **42**, 110 (1943).]

The explanation of alcoholism as a neurotic symptom is insufficient because most patients become normal when they stop drinking. The authors' studies of the family histories of 500 alcoholics indicate specific inherited susceptibility to alcohol, consisting in abnormal attraction to its effects. Alcoholism is four times more frequent in the families of excessive drinkers than in the families of normal drinkers. The relationship between inheritance of psychopathy and alcoholism is non-specific. Total abstinence is often an equivalent of alcoholism in that the abstainer avoids a substance to which he realizes his susceptibility. Inheritance is usually through the father or the mother's male relatives, probably due to the restraining effect of social disapproval of alcoholism in women rather than to sex-linked inheritance. The logical treatment is to deprive the alcoholic, through the conditioned reflex method, of his ability to escape reality and obtain abnormal pleasure from alcohol. M. E. MORSE (Psychol. Abstr.).

The Hyperventilation Syndrome and Its Importance in Aviation. Hinshaw, H. C., Rushmer, R. F., and Boothby, W. M. [*J. Aviat. Med.*, **14**, 100 (1943).]

Hyperventilation (voluntary, deep and rapid breathing) produces blurring of vision, numbness of the extremities, and in later stages muscular cramps, serious vasomotor collapse and unconsciousness. These symptoms are produced by the reduction of CO_2 in the blood, and may also result from spontaneous, unrecognized hyperventilation occurring under conditions of emotional strain, excitement and anxiety. This syndrome, which is now recognized as the physiological basis for some symptoms noted among persons of unstable nervous temperament, may also occur in normal individuals under conditions of emotional stress. Although the effects of extreme hyperventilation are well known, it has not been adequately emphasized that similar results are produced by mild hyperventilation continued over a long period of time. A few instances of probable spontaneous hyperventilation among flyers are discussed.

C. PFAFFMAN (Psychol. Abstr.).

Effects of Exposure to Oxygen at High Barometric Pressure on Higher Functions of the Central Nervous System. Bean, John W., and Wapner, Seymour. [*Proc. Soc. Exptl. Biol. Med.*, **54**, 134–5 (1943).]

Repeated exposure to pure O at 65 lb. gauge pressure had no effect on the ability of rats to learn a maze habit, but retention and memory of a maze previously mastered was adversely affected to a striking degree. L. E. GILSON (Chem. Abstr.).

The Importance of Electrolyte Equilibrium for the Reactivity of the Vegetative Nervous System. Jesserer, Hans. [*Deut. med. Wochschr.*, **68**, 857–62 (1942).]

The K+ and Ca ++ of the blood are controlled by the regulatory centers of the brain and play an important role in determining the reactivity of the vegetative nervous system. Normally the ratio of K : Ca is 2. In vagotonia the ratio is increased.

ARTHUR GROLLMAN (Chem. Abstr.).

Effect of Hormones on Contraction of Striated Muscle and on Cholinesterase Activity. Torda, Clara. [*Proc. Soc. Exptl. Biol. Med.*, **53**, 121–5 (1943).]

Dilute suspensions or solutions of various commercial preparations of anterior pituitary sex hormone, estrone, estradiol, progesterol, testosterone propionate and pituitary vasopressin increased the sensitivity of frog rectus abdominis muscle to acetylcholine and to K ion, and somewhat decreased the cholinesterase activity of brain tissue *in vitro*. Oxytocin had no such actions. Sensitivity of the muscle to K was also increased by desoxycorticosterone. A correlation between the threshold of excitability of the effect on cells and the presence of the above substances is suggested. L. E. GILSON (Chem. Abstr.).

Neuropathology Following Inadequate Nutrition. Peraita, M. [*Arch. Psychiat. Nervenkrankh.*, **114**, 611–48 (1942).]

A discussion of the nutritional situation in Madrid during and after the civil war.

W. M. SPERRY (Chem. Abstr.).

Dephosphorylation of Potato Starch by Brain Phosphatase. Samec, Max. [*Atti accad. Italia, Rend. classe sci. fis., mat. nat.*, **3**, 128–31 (1941); *Chem. Zentr.*, **11**, 668 (1942).]

A phosphatase preparation from dog brain was shown to be free from amylase and from maltase. It was allowed to act for eight days at 40° on a 3 per cent. solution of soluble starch in borate buffer at pH 9·2. It was dialyzed till free of B, electro-dialyzed to constant condition. It contained 0·012 per cent. P_2O_5, or only 7 per cent of that in the original starch. The P-free starch was a white, hygroscopic powder, not entirely soluble in hot water. Its molecular weight by osmosis was about 19,500. During dephosphorylation it lost viscosity, but gained only a little in reducing power.

J. J. WILLAMAN (Chem. Abstr.).

Control of Conditions in the Hydrolysis of Cerebrosides for Their Volumetric Determination. Lanfranchi, Franco. [*Atti accad. Italia, Rend. classe sci. fis., mat. nat.*, **2**, 202–7 (1940); *Chem. Zentr.*, **11**, 816 (1942).]

Pure cerebron was isolated from bovine brain and tested by placing it in an alcohol solution (0·5 mgm. cerebron per c.c.) according to the method of Fawaz, Lieb and Zacherl (*C.A.*, **32**, 607[3]). These authors carried out the hydrolysis by taking 0·5–2 mgm. of substance in 4 c.c. of 11 per cent. HCl and holding at 110° for 20 minutes. Estimation of galactose according to the method of Kimmelstiel (*C.A.*, **24**, 3524) was in good agreement with the calculated value.

R. J. ALLGEIER (Chem. Abstr.).

Clinical Experiments on the Vegetative Nervous System with So-called Potential Substances. Wegemer, Ernest. [*Arch. exptl. Path. Pharmakol.*, **200**, 428–54 (1942).]

Some known effects of acetylcholine, acetyl-β-methylcholine, synephrine and insulin are discussed.

L. E. GILSON (Chem. Abstr.).

Nucleinate-like Action upon the White Blood Cells of the Ether-insoluble Fraction of Lipoids from Beef Brains. Tompkins, Edna H. [*Bull. Johns Hopkins Hosp.*, **72**, 347–70 (1943); *cf. following abstract.*]

Intravenous injections of rabbits with ether-insoluble fraction of brain lipoids had the same effect on white blood cells and bone marrow as intravenous injections of sodium nucleinate. Individual injections were followed by neutropenia within a half-hour; neutrocytosis began 1–4 hours after injection, reached a peak 2–12 hours after injection and returned to normal in 8–24 hours. Decrease of lymphocytes began slightly later but continued for 11–12 hours. Monocytes tended to parallel the changes in lymphocytes. Fragmentation of neutrophils and erythrocytes was observed, as well as the appearance of young neutrophils and increased numbers of nucleated red cells from the third to the eighth hour after injection. Repeated injections of the brain lipoids caused sustained leucocytoses, increase of polymorphonuclears and lymphocytes, and myeloid hyperplasia of the marrow.

ZELMA BAKER MILLER (Chem. Abstr.).

Metabolism of the Perfused Dog Brain. Handley, Carroll A., Sweeney, H. Morrow, Scherman, Quinten, and Severance, Robert. [*Am. J. Physiol.*, **140**, 190–6 (1943).]

A method of isolating the circulation to the dog brain and a perfusion technique are described. Approximately 50 per cent. of the O supplied to the head region is used by the brain. The brain accounts for about 8 per cent. of the total O consumption of the body at rest.

E. D. WALTER (Chem. Abstr.).

Study of 100 *Abnormal Electroencephalograms. Vasconcelos, R.* [*Rev. med. Hosp. Gen., Mex.*, **3**, 580–97 (1941).]

The author found that the tracings of epileptics, focal and idiopathic, could be divided into three classes: those corresponding to mild epilepsy, Jasper's paroxysmal dysrhythmia; curves showing the anomalies described by Lennox and Gibbs; and total or almost total disorganization of severe epilepsy. Of nine cerebral tumours six were localized exactly by the EEG, as proved by operation or autopsy.

M. E. MORSE (Psychol. Abstr.).

The Encephalophone: A New Method for Investigating Electroencephalographic Potentials. Beevers, C. A., and Furth, R. [*Nature, Lond.*, **151**, 110–11 (1943).]

A method is described by which EEG changes are converted to changes of pitch of a musical tone by producing a change in beat frequency of two independent high-frequency oscillators. Alpha and beta rhythms give characteristic trills, while the slow waves frequently found in pathological conditions give correspondingly slow sweeps of tone. This audio method is recommended for clinical use, as distinct from research where permanent recording is essential.

C. G. MUELLER (Psychol. Abstr.).

Clinical and Encephalographic Observations in Severe Epilepsy under Treatment. Goldman, D. [*Amer. J. med. Sci.*, **205**, 388–99 (1943).]

This is a report on 16 cases of epilepsy, the majority severe and long-standing, treated over a period of three years with dilantin and phenobarbital. They were classified 1–5 according to severity. Every case was definitely modified, and most were markedly improved. Class 1 patients had no symptoms for considerable periods, and their performance gave evidence of recovery. The changes in their EEG's were greater than would be expected from reports based on shorter periods of observation, the EEG's becoming eventually indistinguishable from normal. Tracings from Classes 3 and 4 showed marked improvement. It seems reasonable to hope that adequate and sustained treatment of convulsive disorder in the early stages, under EEG control, may result in complete relief and prevention of progressive deterioration.

M. E. Morse (Psychol. Abstr.).

Neural Mechanisms of the Electrical Rhythms of the Cerebral Cortex. Obrador Alcalde, S. [*Ciencia, Méx.*, **8**, 193–201 (1942).]

Accumulating research on brain waves has emphasized the synchronous character of the currents. Cortical rhythms are elaborated upon this synchronization of neural units, which is essentially an unknown process. In the central nervous system there is a close connection between the cortex and subcortical centers, especially the thalamus and hypothalamus. It is upon these subcortical centers that the electrical phenomena of the cortex depend. An experiment with cats is reported, giving evidence of the shunting out of cortical responses when certain cerebral sections are made.

H. D. Spoerl (Psychol. Abstr.).

The Effect of Muscular Exercise on the Serum Cholinesterase Level in Normal Adults and in Patients with Myasthenia Gravis. Stoner, H. B., and Wilson, A. [*J. Physiol.*, **102**, 1–4 (1943); *cf. Richter and Croft, C.A.*, **37**, 1492[5].]

The concentration of cholinesterase (I) was determined in the serum from 6 normal subjects and from 11 patients with myasthenia gravis, 9 of whom were under treatment with prostigmine. Samples of blood were taken from the antecubital vein before and after occlusion for four minutes, with and without exercise of the fingers and wrist. In none of the cases was there a significant change in the concentration of (I) as the result of exercise.

B. J. Jandorf (Chem. Abstr.).

The Physiological Effects of CO_2 on the Activity of the Central Nervous System in Man. Brazier, Mary A. B. [*Medicine*, **22**, 205–21 (1943).]

Special consideration is given to high-altitude flying. The influence of CO_2 on the central nervous system of man and on anoxia, as well as the mechanisms by which anoxia is combated by CO_2, is considered.

F. B. Seibert (Chem. Abstr.).

Correlation Between Sex and Chemical Constitution of the Human Brain. Wei, Arthur, and Liebert, Erich. [*Quart. Bull. Northwestern Med. School*, **17**, 117–20 (1943).]

The cephalin fraction of human brain tends to increase with age at the expense of other lipide fractions in both gray and white matter. Adult female brain contains more cephalin than male brain, while the male brain is relatively richer in lecithins, galactolipides and sphingomyelins. The lecithin and cephalin fractions of female brain are richer in P than the phospholipides of the male brain.

Dorothy A. Meyer (Chem. Abstr.).

The in vitro Oxidation of Pyruvic and α-Ketobutyric Acids by Ground Preparations of Pigeon Brain. The Effect of Inorganic Phosphate and Adenine Nucleotide. Long, C. [*Biochem. J.*, **37**, 215–25 (1943).]

For the anaerobic oxidation of pyruvate and α-ketobutyrate by ground pigeon brain preparations, with methylene blue as H-acceptor, either inorganic PO_4^{---} or arsenate is required. But whereas inorganic PO_4^{---} stimulates the O_2 consumption and the utilization of pyruvate or α-ketobutyrate by respiring brain preparations, arsenate has a slight inhibiting effect. Under comparable conditions, α-ketobutyrate is utilized equally well by minced or ground pigeon brain, but pyruvate is utilized more rapidly by ground than by minced tissue. This difference in behaviour is attributed to the adenine nucleotide traces in the preparations. Adenine nucleotide markedly increases the net O_2 uptake and pyruvate utilization by pigeon brain suspensions in the presence of PO_4^{---}; the oxidation of α-ketobutyrate is stimulated only occasionally. Normally the O_2/α-ketobutyrate ratio and the respiratory quotient for α-ketobutyrate oxidation is the same, whether brain suspensions or minced brain preparations are used. It is concluded that dialyzed brain suspensions, respiring in a phosphate-buffered inorganic medium, utilize pyruvic acid by oxidative decarboxylation and anaerobic dismutation, but in the presence of adenine nucleotide it undergoes an entirely different type of oxidation. For the part of pyruvate oxidation, which is catalyzed specifically by adenine nucleotide, the following data were obtained: O_2/pyruvate, 1·20; respiratory quotient, 1·50; gaseous CO_2/bicarbonate CO_2, 2·0. The second value (1·50) indicates that in the oxidation of 1 mole of pyruvic acid 1·8 moles of CO_2 are produced, or that 60 per cent. of pyruvic C is converted to CO_2. The last value (2·0) indicates that 2 moles fixed acid must also be produced, but the nature of the fixed acid is still unknown.

S. Morgulis (Chem. Abstr.).

Gangliosides, A New Group of Sugar-containing Brain Lipoids. Klenk, E. [*Z. physiol. Chem.*, **273**, 76–86 (1942); *cf. C.A.*, **28**, 6156[5]; **36**, 3204[3].]

Since lipoids containing neuraminic acid (I) are located mainly in the central nervous tissue, or, perhaps, exclusively in the ganglia, and are of a glucosidic nature, the name "gangliosides" (II) is proposed for them. The (II), along with cerebrosides and sphingomyelins, are components of the protagon fraction of brain tissue (*cf.* Blix, *C.A.*, **33**, 713[1]). (II) are water-soluble, non-dialyzable colloids, consisting of fatty acids (mainly stearic) 20, sphingosine or a similar base 13, (I) 21, and sugar (mainly galactose) 40–43 per cent.; small amounts of glucose were found. (II) are freed from alkali salts by solution in 15 volumes of basic Pb acetate, precipitation with 70 volumes of MeOH, suspending the precipitate in 25 volumes of MeOH and benzene (1 : 1), and decomposing the Pb salt with H_2S; yield, 85–90 per cent. of the original product. The main portion of cerebrosides is removed by extraction with hot EtOAc or by 95 per cent. alcohol. The phosphatides are removed by adsorption on Al_2O_3 from a hot pyridine solution (1 : 6). The filtrate is evaporated *in vacuo* and precipitated with a large amount of acetone; yield, 8·8 gm. P-free substance, from 12 gm. of extract. For further purification the P-free material is dissolved in 15 volumes of glacial AcOH with heating, allowed to stand overnight and decanted. The precipitate is a mixture of cerebrosides and (II), constituting 30 per cent. of the P-free product; yield, 8·3 per cent. (I). The supernatant fluid contains (II), which are precipitated by acetone. The substance is dissolved in a minimum amount of $CHCl_3$ and alcohol, and, on dilution with hot alcohol, the $CHCl_3$ is removed by distillation. At 0° the pale yellow substance separates almost completely; yield is 60–70 per cent. of the P-free product. (II) is dried at 70° *in vacuo*; analysis corresponds to $C_{64}H_{118}N_2O_{26}$. (II) is practically insoluble in ether, acetone and AcOEt, difficultly soluble in EtOH, more readily soluble in MeOH, easily soluble in mixtures of benzene + alcohol, $CHCl_3$ + alcohol, pyridine and AcOH. Crystallized from hot alcohol it yields small spherolytic crystals, showing in polarized light a well-formed girder cross. It decomposes at 205° without melting. The aqueous solution reacts acid to litmus. With phenolphthalein it behaves as a monobasic acid, but the color change is very diffuse. The acid reaction indicates the presence of a free carboxyl group of (I). Fehling solution is not reduced by it. It does not contain free NH_2 groups. In pyridine solution the sp. rotation is $(\alpha^{20})D = -2{\cdot}79°$. Identification of the cleavage products (fat acids, sphingosine, galactose and glucose) is described in detail (*cf. C. A.*, **37**, 5743[7]). T. Laanes (Chem. Abstr.).

Distribution of Phosphatase in the Spinal Cord of Chick Embryos of One to Eight Days' Incubation. Moog, Florence. [*Proc. Natl. Acad. Sci. U.S.*, **29**, 176–83 (1943).]

Alkali phosphatase (I) and acid phosphatase (II) were determined in spinal cord sections by methods modified from those of Gomori (*C.A.*, **35**, 2915[2], 8053[3]). Both were found in fairly large amounts as early as the end of the first day of incubation. (I) usually reacted more strongly than (II). The histological distribution of (I) and (II) (determined at daily intervals) is given in detail. All nucleoli and nuclear membranes contain (I), but (II) is not found in nuclei. Both enzymes appear to be phosphomonoesterases of classes AI and AII of the Folley and Kay (*C.A.*, **30**, 5242[8]) classification. W. C. Tobie (Chem. Abstr.).

The Type of Cholinesterase Present in Brain Tissue. Mendel, Bruno, and Rudney, Harry. [*Science*, **98**, 201–2 (1943); *cf. C.A.*, **37**, 5427[6].]

Brain tissue of all vertebrates contains only true cholinesterase. No general statement on the type of cholinesterase in any other organ can be made. E. D. Walter (Chem. Abstr.).

Nerve Conduction as an Interaction in the Albumin Chain. Schmidt, Otto. [*Physik Z.*, **44**, 139–50 (1943).]

In an extension of previous work (*C.A.*, **37**, 2258[5]) on the "freedom" and interaction of B-electrons, Schmidt concludes that nerve conduction, which is a resonance of enol groups of the same kind, is directional. The exciting energy is conducted over long distances without significant diminution of intensity. Stimulation of both ends of a nerve leads to barriers. The temporary coefficient is that of a chemical reaction (enolization). Nerves can be blocked by "hydrogen binding." J. B. Austin (Chem. Abstr.).

The Significance of Adrenal-cortical Hormones in Psychiatry and Neurology. Klimmer, Rudolf. [*Allgem. Z. Psychiat.*, **121**, 324–34 (1943).]

A review. W. M. Sperry (Chem. Abstr.).

Biological Changes in Theiler's Virus of Spontaneous Mouse Encephalomyelitis. Jungeblut, Claus W. [*Am. J. Pub. Health*, **33**, 1227–43 (1943).]

In two of four experiments in which Theiler's virus of mouse encephalomyelitis was transmitted to cotton rats—with subsequent serial subpassage in the latter animals—the virus became fixed in the new host and acquired new biological properties. These properties were reflected (*a*) by a marked increase in peripheral invasiveness for albino mice and cotton rats, and (*b*) by the ability to induce various types of central nervous system involvement in guinea-pigs. Evidence is adduced to show that the cotton rat variant was serologically identical with the parent virus. J. A. Kennedy (Chem. Abstr.).

Probable Mechanism by which Somatic Changes in Certain Emotional States are Mediated. Milhorat, A. T., et al. [*Proc. Soc. exp. Biol. N.Y.*, **53**, 23–5 (1943).]

A loop of intestine from adult rabbit was suspended in physiological solution, attached to a recording lever so that its contractions could be recorded. Blood from agitated psychiatric patients was added to the solution. Blood from normal individuals served as control. The blood from the patients altered the rhythmic contractions of muscle and reduced the amplitude of contractions because of incomplete relaxation. These were not the simple effects from using adrenalin, and the nature of the substance producing the result is unknown.

H. PEAK (Psychol. Abstr.).

The Bi-sexuality of Man. Myerson, A., and Neustadt, R. [*J. Mt. Sinai Hosp. N.Y.*, **9**, 668–78 (1942).]

Through the presentation of case-material the authors discuss five types of homosexual conduct: (1) The polymorphous group, where the individual becomes a homosexual when excluded from heterosexual conduct, e.g. in jail; (2) the passively homosexual group (adynamic sexuality), those sought out by active homosexuals and finding social pleasure and possibly profit in the relationship; (3) heterosexuality followed by exclusive homosexuality, shift in sexual personality rather than a transitory experimental phase; (4) true male homosexuals, homosexual in drive, conduct and fantasy; and (5) the paradoxical group, essentially impotent or without drive, but without true male homosexuality. The authors describe a method whereby the ratio of androgens and estrogens is analyzed in ratio between male and female hormones. For each case presented the hormone findings are given. Although the chemical tests are crude, there nevertheless remain important clinical correlations between the sexual constitution of a male and the hormonal values established by the examination of his urine for androgens and estrogens.

A. WEIDER (Psychol. Abstr.).

Age and Reorganization of Central Nervous System. Kennard, M. A., and Fulton, J. F. [*J. Mt. Sinai Hosp. N.Y.*, **9**, 594–606 (1942).]

A comparison of motor performance, made before and after ablations from the central nervous system in both adult and infant monkeys and chimpanzees for the past six years, yielded the following results: " (1) In monkeys and chimpanzees the factor of age affects directly the amount of recovery of motor functions which follows ablations of the motor areas of the cortex; (2) other areas of cortex reorganize to some degree to integrate motor function in the absence of the motor areas, at any age; (3) there is little restitution of function if operations are made after the second year of life, and only during the first six months of life is it sufficient to produce function adequate for the existence of the animal; (4) the basal ganglia function at birth and continue to show similar functions throughout life; (5) after removal of the frontal association areas, 9–12, and the occipital areas, the remaining cortex shows no such capacity for reorganization of motor function; (6) the sensory motor cortex may be considered therefore as a unit within which there is much less specificity of function in the infant than in the adult; (7) the capacity for reorganization in the absence of specificity may be considered at the present time as due either to functional or anatomical changes."

A. WEIDER (Psychol Abstr.).

A Physiological Theory of Colour Perception. Granit, R. [*Nature, Lond.*, **151**, 11–14 (1943).]

Using the micro-electrode technique of measuring single fiber discharge, two types of individual spectral sensitivity curves for receptors were found: (1) " Broad absorption bands, here called *dominators*; and (2) narrow bands, here called *modulators*." The theory proposes that the dominant type, which is the more frequent, is responsible for the sensation of brightness. The narrow modulator bands, which are found in three preferential regions around 580–600 mμ., 520–540 mμ., and 450–470 mμ., modulate the dominant impression of brightness to color. The theory is evaluated in terms of other experimental data.

C. G. MUELLER (Psychol. Abstr.).

Intellectual Symptoms in Temporal Lobe Lesions Including "Déjà pensée." Brickner, R. M., and Stein, A. [*J. Mt. Sinai Hosp. N.Y.*, **9**, 344–8 (1942).]

" Two cases are described in which ' forced thought ' was a manifestation of a temporal lobe lesion. In one of the cases there was a feeling of familiarity for the forced thoughts (déjà pensée)." The " dreamy state " is broken down into (1) the déjà phenomenon and the feeling of strangeness, (2) panoramic memory or fragments of it. A theory of their genesis is presented which suggests a hitherto unreported neurophysiological function of the temporal cortex.

A. WEIDER (Psychol. Abstr.).

Course and Prognosis in the Psychoneuroses. Malamud, W., and Gottlieb, J. S. [*J. Mt. Sinai Hosp. N.Y.*, **9**, 630–9, (1942).]

341 cases of psychoneurosis, admitted to the Iowa State Psychopathic Hospital during the years 1929–1937 inclusive, were subjected to a follow-up study during the year 1939. The studies made of these patients during their stay in the hospital were reviewed in terms of the clinical picture they presented, their life-history and their treatment and course in the hospital. It was found that in the two largest groups (hysterias and mixed neuroses) certain factors stood out as useful prognostic criteria. I.Qs. above 90 on the Binet and duration of the disease of one

year or less before admission to the hospital were found more frequently in the cases that recovered than in those who showed no improvement. The authors describe a treatment (deep exploration) which resulted in the most frequent recoveries. In the hysterias, asthenic physical build and gradual onset were most often found in the unimproved cases. The mixed neuroses showed higher age-levels and a shorter stay in the hospital among the unimproved patients.

A. WEIDER (Psychol. Abstr.).

2. Pharmacology and Treatment.

Influence of Various Drugs on the Threshold for Electrical Convulsions. Tainter, M. L., Tainter, E. G., Lawrence, W. S., Neuru, E. N., Lackey, R. W., Luduena, F. P., Kirtland, H. B., jun., and Gonzales, R. I. [*J. Pharmacol.*, **79**, 42–54 (1943).]

An electrical device is described for measuring the convulsive threshold of unanesthetized rabbits, with a high resistance stimulator and 60-cycle current. Barbital compounds, dilantin, 3-methyl-5,5-phenylethylhydantoin and propazone, raised the convulsive thresholds generally proportional to the dose. The different barbitals showed little difference in potency for equivalent doses. Marked depression of excitability was produced by bromides, chloral, EtOH, propylene glycol, paraldehyde and tribromoethanol. Morphine, 10–15 mgm. per kgm., did not change the threshold. Acetylsalicylic acid caused no change; large doses of acetophenetidine and acetanilide raised the threshold. The analeptic drugs strychnine, metrazole, coramine and caffeine were irregular in their effects; this indicates a lack of specificity for this phase of cerebral function. Picrotoxin lowered the threshold. Cocaine, mescaline and the sympathomimetic amines raised the threshold to a moderate degree. Thyroxine lowered the threshold to epileptiform convulsions more than any other agent tested. This effect suggests a possible physiological basis for the impaired neuro-muscular control and poor poise of clinical hyperthyroidism.

L. E. GILSON (Chem. Abstr.).

Changes in Blood Pigment Produced by Narcotics. Jung, Fritz. [*Arch. exptl. Path. Pharmakol.*, **201**, 210–12 (1943).]

Contrary to Ellinger and Rost (*C.A.*, **17**, 2009) no methemoglobin is produced in the blood of cats by prolonged anesthesia with Et_2O or $CHCl_3$.

L. E. GILSON (Chem. Abstr.).

The Influence of Amphetamine (Benzedrine) Sulfate, d-Desoxyephedrine Hydrochloride (Pervitin) and Caffeine upon Work Output and Recovery when Rapidly Exhausting Work is Done by Trained Subjects. Foltz, E. E., Ivy, A. C., and Barborka, C. J. [*J. Lab. clin. Med.*, **28**, 603–6 (1943).]

Four students, trained on the bicycle ergometer, were given one of the above drugs or a placebo intravenously before a double work period. Amphetamine did not affect the output, but pervitin and caffeine increased it in the unfatigued subject. Neither amphetamine nor pervitin enhanced the rate of recovery in the fatigued subject, but caffeine did so. In some instances the drugs definitely improved feeling-tone. Stimulants should be chosen according to whether the purpose is to increase the output of unfatigued persons or to enhance recovery of the fatigues. The foregoing findings pertain only to rapidly exhausting work.

M. E. MORSE (Psychol. Abstr.).

The Influence of Benzedrine on Work-decrement and Patellar Reflex. Alles, G. A., and Feigen, G. A. [*Amer. J. Physiol.*, **136**, 392–400 (1942).]

Doses of 10, 20 or 40 mgm. of benzedrine sulphate inhibit voluntary muscular fatigue and may abolish complete muscular fatigue maintained by repeated work trials. The effect is related in degree and time with the effects of benzedrine on the patellar reflex, and it is probably indicative of action directly on the central nervous system. The effect is more marked than that observed with ten times as much caffeine.

R. L. SOLOMON (Psychol. Abstr.).

The Influence of Amphetamine (Benzedrine) Sulfate and Caffeine on the Performance of Rapidly Exhausting Work by Untrained Subjects. Foltz, E. E., Schiffrin, M. J., and Ivy, A. C. [*J. Lab. clin. Med.*, **28**, 601–3 (1943).]

Twenty-three male subjects were given a capsule of benzedrine, caffeine, or a placebo one hour before a test consisting of stepping up and down while carrying a knapsack loaded to one-third of the body-weight. The drugs produced no evident effect except a euphoria, making the subject feel that he "was doing a lot of work." This type of test, however, is inadequate to determine the effect of the drugs on work output, since the influence of training overshadowed a possible pharmacological effect.

M. E. MORSE (Psychol. Abstr.).

Effect of Amphetamine (Benzedrine) Sulfate upon Higher Nervous Activity. Alpern, E. Bryce, Finkelstein, Nathaniel, and Grantt, W. Horsley. [*Bull. Johns Hopkins Hosp.*, **73**, 287–99 (1943).]

Oral administration of amphetamine sulfate to four dogs (1 mgm./kgm.) caused marked loss of differentiation in the conditioned reflexes—secretory, motor and autonomic. There was an increase in the conditioned secretion to food, the latent period of conditioned secretory responses was shortened, while that of conditioned motor defense reflexes was unaltered or lengthened.

The unconditioned secretion to food and sexual reflexes were decreased. The effects are observed after a half-hour, reach a maximum in 1–2 hours, and can still be detected six hours after administration of the drug. ZELMA BAKER MILLER (Chem. Abstr.).

Modern Stimulants of the Nervous System (Benzedrine). Ginetsinskii, A. G., Barbashova, Z. I., and Shamarina, N. M. [*Advances in Modern Biol.* (*U.S.S.R.*), **16**, 113–26 (1943).]

A review of benzedrine covering the relation between chemical structure and physiological effects of related amines, pharmacodynamics, toxicology and clinical applications.
G. M. KOSOLAPOFF (Chem. Abstr.).

Severe Injury to the Kidneys and Brain following Sulfathiazole Administration: Levels and Persistent Cerebral Damage. Luetscher, John A., jun., and Blackman, Sam. S., jun. [*Ann. Internal Med.*, **18**, 741–56 (1943).]

Five cases of sulfathiazole reaction (three severe and two probable) were studied. All developed an unusual increase in serum Na and chlorides. In two fatal cases there were symptoms of cerebral injury, and areas of edema and gliosis were found in the cerebrum at autospy.
JOHN T. MEYERS (Chem. Abstr.).

Peripheral Nervous Symptoms in Treatment with Sulfonamides and Related Drugs. Nyman, Ebbe. [*Nord. Med.*, **18**, 861–2 (1942); *Chem. Zentr.*, **11**, 807 (1942).]

The Me groups of various sulfonamides, especially sulfamethylthiazole, are discussed with regard to their possible neurotropic action, and analogies with the curare alkaloids and the quarternary ammonium bases are pointed out. L. E. GILSON (Chem. Abstr.).

Sedormid (Allylisopropylacetylcarbamide) Intoxication. Funk, Erich. [*Z. psych. Hyg.*, **15**, 43–66 (1942).]

Several cases of chronic intoxication with severe psychotic manifestations, due to the excessive use of sedormid, are described. WARREN M. SPERRY (Chem. Abstr.).

The Diagnostic Value of the Rapid Detection of Barbiturates in the Urine in Cases of Poisoning. Denis, X., and Lambrechts, A. [*Rev. belge sci. méd.*, **12**, 247–53 (1940); *Chem. Zentr.*, **1**, 2693 (1941).]

A method is described by which it is possible to detect the presence of 0·2 mgm. of barbituric acid in 20 c.c. of urine. The method depends on the ether extraction of the urine absorbed in a mass of Na_2SO_4 and the subsequent detection of the barbituric acid colorimetrically by treatment of the ether extract with $CO(NO_3)_2$ and Et_2NH. M. G. MOORE (Chem. Abstr.).

Effect on the Fetus of Pentobarbital-sodium and Pentothal-sodium. Dreisbach, Robert, and Snyder, Franklin F. [*J. Pharmacol.*, **78**, 250–8 (1943).]

The drugs were injected into the maternal ear vein and the respiratory movements of the full-term rabbit fetuses observed through the uterus wall, exposed by laparotomy under the surface of a saline bath. Pentobarbital-Na, 5–10 mgm./kgm., decreased the respiratory rate of the fetuses for less than 15 minutes; 20 mgm./kgm. decreased it to about one-third normal for 30 minutes without producing any marked analgesia in the maternal animal; and 30 mgm./kgm. deeply depressed or abolished fetal respiration for the duration of the experiment. Pentothal-Na, 10 mgm./kgm., had no marked analgesic effect on the maternal animal, and decreased fetal respiration to one-third normal for about 5 minutes. Repeated doses, totalling 30–35 mgm./kgm., had relatively little cumulative effect on the fetuses. Fetal apnea after injection of pentothal-Na was caused by the drug and was not due to anoxemia, since analysis of the fetal blood showed that oxygenation and the CO_2 content remained normal.
L. E. GILSON (Chem. Abstr.).

A Possible Method for the Determination of Prolonged Action of Barbiturates. Cole, Versa V. [*J. Pharmacol.*, **78**, 170–3 (1943).]

Rats were given Na pentobarbital. Several hours after all signs of narcosis had disappeared the rats were still protected by the barbiturate against death from strychnine or picrotoxin. In another experiment Na phenobarbital was found to be more effective against death from strychnine when given 22 hours before the strychnine than when given only 20 minutes before the latter. Na phenobarbital was equally effective against death from picrotoxin whether given 20 minutes or 22 hours before the picrotoxin. L. E. GILSON (Chem. Abstr.).

Different Effects of Coramine and Metrazole on the Body Temperature of the Rabbit. Hahn, Fritz. [*Klin. Wochenschr.*, **21**, 460–1 (1942).]

The body temperature of the rabbit is lowered by metrazole and raised by coramine. In order to demonstrate these effects distinctly, half of the subcutaneous convulsive dose is required (18 mgm. metrazole/kgm. or 150 mgm. coramine/kgm.). Regular changes of 1–20 (and more in exceptional cases) are obtained only with 60–80 per cent. of the convulsive dose. When coramine is given in doses which raise the temperature, distinct muscle tremors occur; these doubtless

liberate large amounts of heat in the body. They do not occur with metrazole. There is nothing to indicate opposite effects of these two substances on the sympathetic nervous system.
RUTH BERGGREN (Chem. Abstr.).

The Bases and Results of Electric Shock Therapy; The Pathogenesis of the Psychoses. Ewald, G., and Haddenbrock, S. [*Z. ges. Neurol. Psychiat.*, **174**, 635–69 (1942).]
The blood sugar (I) concentration increases by 30–40 mgm. per cent. after electric shock convulsions, reaching the maximum at about 10 minutes and returning slowly to normal at about one hour. A larger rise (55 mgm. per cent.) in (I) follows metrazole convulsions and the hyperglycemia is maintained for a longer time. The increase in (I) is not due to a mobilization of muscle glycogen, because a rise of 20 mgm. per cent. occurred in cases of abortive electric shock therapy in which no convulsive muscular contractions occurred.
WARREN M. SPERRY (Chem. Abstr.).

The Conditioned Reflex Treatment of Alcoholism. Lake, C. B. [*Welf. Bull. Ill. St. Dep. Publ. Welf.*, **34**, 2 (1943).]
Although not a radical method, the conditioned reflex treatment is the most effective way of laying a foundation in the form of a temporary aversion to intoxicants and of starting the alcoholic on a rational program of sobriety and self-sufficiency. The treatment, which requires a 3-day hospitalization, consists of injections of an emetic followed by sedation. During convalescence massive doses of vitamin B are given and office consultations are continued for some time. The treatment succeeds only when the patient genuinely wants to recover.
M. E. MORSE (Psychol. Abstr.).

The Effect of Vitamin E Therapy on the Central Nervous System in Amyotrophic Lateral Sclerosis. Davison, Charles. [*Bull. N.Y. Acad. Med.*, **19**, 386–416 (1943).]
Ten cases of amyotrophic lateral sclerosis were treated with α-tocopherol and vitamin E. The clinical response was *nil*, but in six cases destruction of the myelin sheaths and axis cylinders was less intense than that observed in untreated cases. G. H. W. LUCAS (Chem. Abstr.).

Action of Ephedrine in Myasthenia Gravis. Burn, J. H. [*Schweiz. med. Wochschr.*, **71**, 1196–7 (1941); *Chem. Zentr.*, **11**, 67 (1942).]
The therapeutic benefit of ephedrine in myasthenia gravis as determined by experimental studies is based (1) on improvement of inhibited neuromuscular synapses, and (2) upon augmentation of the like action of the circulating adrenaline and of the sympathetic impulse.
MAURICE M. RATH (Chem. Abstr.).

The Course of the Serologic Tests during Therapeutic Malaria in Patients with Syphilis. Kaplan, Bernard I., and Brightman, I. Jay. [*Am. J. Pub. Health*, **33**, 1073–82 (1943).]
Changes in quantitative serologic tests in syphilitic individuals during the course of therapeutic malaria depend upon the type of test employed and the species of parasite used. During infection induced by inoculation with *Plasmodium malariae* there was a uniform fall in the New York State complement-fixation titer and a preliminary rise and subsequent fall in the Kahn and New York State titers. During infection induced by inoculation with *Plasmodium vivax* the serologic changes were most often similar but were not so constant. Fever alone did not seem to be a major factor in the production of the serologic changes. No conclusions are warranted regarding any relationship between the changes in serologic titers and potential therapeutic results. J. A. KENNEDY (Chem. Abstr.).

he Treatment of Post-encephalitis Parkonsonism with Belladonna Root (Bulgarian Cure). Lehoczky, T. v. [*Deut. Z. Nervenheilk.*, **154**, 242–71 (1943).]
Various preparations of belladonna root (I) were used in the treatment of 160 patients, of whom 84 were definitely, 43 somewhat, and 26 a little improved; 5 were unchanged and 2 died. (I) is a valuable therapeutic agent in Parkinson's disease.
WARREN M. SPERRY (Chem. Abstr.).

The Action of Benzol on Certain Central Nervous Regulating Mechanisms. Guerra Perez-Carral, F. [*J. Pharmacol.*, **77**, 336–42 (1943).]
The effects of inhalation of benzol on certain sympathetic reactions and temperature regulation, together with the characteristic shivering and panting, were studied in rabbits and dogs. The findings indicate that benzol has a specific central action on a zone of integration for these reflexes, influenced through the hypothalamus. M. E. MORSE (Psychol. Abstr.).