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Evaluation of the Electroencephalograms of Schizophrenic Patients.

From a study of 132 schizophrenic patients at the Metropolitan State Hospital and McLean Hospital the author comes to the following conclusions :

The EEG's of schizophrenics fall into three groups :

Group I : Essentially normal.

Group II : Dysrhythmic type, which is indistinguishable from EEG's of individuals known to have convulsive disorders.

Group III : "Choppy" type, which suggests the possibility of a pathological condition in the brain.

Patients in Group II frequently present in their histories the same syndrome as found in epileptics. These patients are either diagnosed as "catatonic schizophrenia" or give a history on the hospital ward of catatonic stupors and excitements. (Author's abstr.)

Electroencephalography in the Psychoses.

The bilateral distribution of the amount of alpha-wave activity (per cent. time alpha) from the cerebrum of 14 schizophrenics, two manic-depressives and one case of traumatic psychosis was determined.

From differences in the distribution of per cent. time alpha over the two cerebral hemispheres, it was found possible to localize cerebral atrophy. The electroencephalographic diagnoses were confirmed pneumoencephalographically in eight of the nine schizophrenics and in both manic-depressive patients. Air injections have not yet been done on the other five schizophrenics.

In two of the schizophrenics with cerebral atrophy delta-wave discharges were occasionally observed. Epileptiform discharges were recorded from the forehead of one of the manic-depressive patients. The patient with traumatic psychosis had no detectable alpha rhythm, so that it was not possible to localize the extensive, marked cerebral atrophy, both deep and superficial, which was subsequently found pneumoencephalographically. However, potential changes typical of normal sleep were obtained while this patient was asleep. (Author's abstr.)

A Five to Ten Year Follow-up Study of 641 Schizophrenic Cases.

1. Of 641 clinically diagnosed cases of schizophrenia, admitted to the Rhode Island State Hospital for Mental Diseases between 1929 and 1934, and followed for five to ten years, 27.5 per cent. were found to be at present in the community, 53.5 per cent. were in mental hospitals, 13.9 per cent. were dead, and for 5.1 per cent. no adequate follow-up information could be obtained.

2. Adequate follow-up data were available for 608 patients ; of these 6.6 per cent. were much improved, 15.3 per cent. improved, 63.5 per cent. unimproved and 14.6 per cent. dead.

3. Classification on the basis of diagnostic subtype showed that 35 per cent. of the simple, 16.4 per cent. of the hebephrenic, 30 per cent. of the catatonic, 16 per cent. of the paranoid and 36.4 per cent. of the "other" group were much improved or improved. Many of the cases in the latter category were of the so-called schizo-affective type.

4. The age of onset of psychotic symptoms had little bearing on the outcome, except that those cases having an onset at the age of 45 or later tended to do less well than those having the onset at a younger age.

5. Of those cases with symptoms of less than six months' duration prior to hospitalization 34.5 per cent. were much improved or improved. For those with symptoms of six to eleven months, 29.4 per cent. were benefited; for those with symptoms of 12 to 23 months 27.8 per cent. benefited; while for those with symptoms of two years or longer only 16 per cent. were benefited.

6. 75.3 per cent. of the patients requiring a hospital stay of six months or less were improved, while only 4.2 per cent. of those remaining in the hospital for five years or longer improved. Patients requiring hospital care for more than two years showed little tendency to improve.

7. Disregarding the dead and untraced cases, 259 or approximately 50 per cent. of 519 patients left the hospital at some time or other for more than one month; of these 129 have continued to remain outside the hospital, while 47 returned temporarily and 83 permanently. The much improved and improved groups show a higher percentage of cases remaining out of the hospital continuously and a smaller percentage of returns than the unimproved group.

8. Pulmonary tuberculosis was the most common cause of death, being responsible for 43 or 48.2 per cent. of 89 deaths. Ten (11.2 per cent.) cases committed suicide.
(Authors' abstr.)

The Effect of Treatment of Depression in the Menopause with Estrogenic Hormone.

In the group of menopausal and post-menopausal depressions studied, the beneficial effect of estrogenic hormone was confined to the relief of vasomotor symptoms with associated improvement in feelings of well-being. There was no evidence that the depressive illness as such was influenced specifically or its course shortened.
(Authors' abstr.)

Detoxication of Sodium Benzoate in Neuropsychiatric Disorders. The Excretion of Hippuric Acid after the Ingestion of Sodium Benzoate.

The rate of detoxication of benzoic acid was determined in patients with various neuropsychiatric diseases. About one half of the patients with catatonia showed a defect in hippuric acid synthesis. This may be due to the state of muscular rigidity and immobility of these patients. Deteriorated patients with epilepsy showed a defect in the synthesis of hippuric acid, whereas extramural patients with epilepsy showed a normal excretion of the equivalent benzoic acid. This may indicate a defect in glycine synthesis in deteriorated patients with epilepsy. Normal average values were found in post-encephalitic Parkinsonism and multiple sclerosis. A patient with progressive muscular dystrophy was able to synthesize glycine at a normal rate.
(Authors' abstr.)

An Observation on the Treatment of Mental Cases with Sub-shock Doses of Insulin.

1. The authors have observed in the past year and a half, among a mixed population of over 2,400 patients, that a course of sub-shock doses of insulin is effective in controlling most of the problems of management of unco-operative mental patients.

2. The necessity of sedation by drugs can be limited to epileptics and emergency nocturnal disturbances.

3. Difficult feeding cases can be largely corrected by the use of sub-shock doses of insulin.

4. Sub-shock doses of insulin are effective in all types of cases where there are no physical contraindications.
5. No special equipment or personnel is necessary to carry out this form of therapy.
6. Sub-shock insulin therapy is effective in aborting furuncles, carbuncles and acne simplex, as well as in producing more rapid healing in the well-developed lesion.
7. Sub-shock insulin therapy is in no sense considered a curative therapy, although many favourable remissions occur.
8. There is need for further controlled study of this type of therapy.
(Author's abstr.)

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Further Experiences with the Use of Sodium Diphenyl Hydantoinate in the Treatment of Convulsive Disorders.

In 227 of 267 patients previously refractory to other forms of therapy, sodium diphenyl hydantoinate was found to be an effective, non-sedative and relatively non-toxic means of controlling or reducing convulsive seizures over periods varying from two months to two years. A more prolonged study on a larger series of cases is necessary to establish its place in the treatment of patients with convulsive seizures.
(Authors' abstr.)

A Comparative Study of the Effectiveness of Dilantin Sodium and Phenobarbital in a Group of Epileptics.

1. A comparative study of the effectiveness of phenobarbital and dilantin-sodium on a group of chronic epileptics whose average duration of illness has been 15.6 years was undertaken. While phenobarbital has proven beneficial in most cases, the best results were obtained by using dilantin-sodium, as on the latter

drug 40 per cent. showed a complete cessation of seizures for a period of three to six months and 13.3 per cent. showed a marked diminution in the number of convulsive responses, or a total of 53.3 per cent. of improvement.

2. Complications ranging from slight myoclonic tremors to frank psychotic episodes occurred. However, most of them cleared upon withdrawal of the drug or diminution of the dosage.

3. In the treatment of epileptics, the therapy of choice varies with the individual. In our series of cases, dilantin-sodium has been the medication of choice despite its complications and has proven its worth as a valuable adjunct in the treatment of epileptics. (Authors' abstr.)

Dementia Paralytica Accompanied by Manic-depressive and Schizophrenic Psychoses.

In five clinically and serologically typical cases of dementia paralytica, there developed features strongly suggestive of manic-depressive or schizophrenic psychoses.

Long-section studies of the cases pointed to the conclusion that these features were not merely a part of the neurosyphilitic disease, but were manifestations of true manic-depressive and schizophrenic psychoses which pursued their own lines of development independent of the organic disease. Anatomical observations available in one case supported this view.

It is believed that manic-depressive or schizophrenic psychoses accompany dementia paralytica too frequently to be regarded as accidental concomitants of the latter. Apparently they are directly provoked by the organic brain disease. (Author's abstr.)

A Case of Partial Bilateral Frontal Lobectomy.

A case is presented in which the anterior-inferior portions of both frontal lobes were removed in 1934. The present (1939) functional activity of the remaining frontal structures is not definitely known, but the nutrition of the tissue seemed not to be grossly impaired at the time of operation. There is no evidence from encephalography of local or general pressure. As nearly as can be determined from the surgeons' maps the ablation involves all of Brodmann's areas 11 and 47, the lower three-quarters of area 10, and the inferior quarters of areas 45 and 46. This patient's present I.Q. is approximately 120. Nevertheless his behaviour is far from normal. He lacks initiative, and tends to become stereotyped in his routine. A careful psychological study was made, using a number of standard and special tests, from which we draw the following conclusions:

1. The Babcock test indicates a loss in his efficiency.
2. Bender's visual-motor gestalt test gave no evidence of deficit.
3. Two of Goldstein's tests, namely, his adaptation of the Kohs-Block test and his adaptation of the Holmgren wool test, uncovered no defect, but the Vigotsky test brought out a rigidity in his categorical attitude and a failure to appreciate the total situation.
4. On the Knox-Cube test his performance approximated the median for children of seven and eight years. On our adaptation of this test, he could reproduce only lines of four taps. Following instruction to group them he reproduced lines of six taps. Interspersing a delay reduced his performance slightly, but not sufficiently to demonstrate that Jacobsen's findings concerning the deficit in temporal integration in monkeys with frontal lobectomies can be extended to this man.
5. With Hunt's arithmetic progressions and narrative containing absurdities, his performance was similar to that of paretics. He failed with the progressions but noted most of the absurdities at the first reading.
6. Increased motivation did not improve his performance with the arithmetic progression, but suggestions concerning procedure led to considerable improvement. His failure with more complicated progressions consisted in an inability to keep more than two series of numbers separated.

7. On the Ishihara test of colour vision he failed to see any figures until told to look for them.

8. These performances led the writers to formulate this patient's deficit into four aspects: Failure to supply spontaneously fresh modes of attack on a problem apparently resulting from an inability to abstract that aspect of the situation causing the difficulty, a rigidity of the "categorical attitude," a sharp limitation in the number of lines of endeavour that he can successfully keep separated simultaneously, and inability to integrate several aspects of a situation. We were inclined to regard the deficit as a defect of abstract behaviour at a relatively high level.

9. The encouraging response of our patient to instruction gives hope of considerable rehabilitation.

10. We wish to emphasize that the frontal lobes cannot be considered as silent areas, and that in psychosurgery it must be remembered that one disease is substituted for another. (Authors' abstr.)

The Control of Normal and "Convulsive" Brain Potentials.

Brain potentials can be used within limits as an index of the action of cerebral neurones. The recorded waves are the envelope of the beats of many single neurones, and their profile depends on the shape of the unit potential and the temporal relation of the many units.

The isolated frog brain, with relatively few and similar neurones which can be subjected to a wide variety of experimental conditions, is especially favourable for studying the control of potentials. Mammalian brain in situ, so far as similar experiments have been made, shows like behaviour.

The olfactory bulb of the isolated brain gives an electrical beat, at six per second, larger and more regular than before removal from the frog. Under varied conditions, the frequency, still regular, may be shifted from one to 50 per second and the single wave from a sine to many highly skewed forms constantly repeated. Such patterns indicate strong unison of the many cells and so reproduce the potential profile of the unit.

The unit beat is controlled by the metabolism of the cell, oxidative or glycolytic energy supplying the driving force. It is also controlled by a trip mechanism, presumably the cell membrane, which determines the frequency of oscillation at constant drive. Amplitude and frequency vary inversely as the trip mechanism is altered, together as metabolism is changed.

Control of cell potentials mainly through metabolism is considered in the cases of oxygen lack, narcosis, cyanide, glucose lack, insulin, B₁ avitaminosis, iodoacetate, and nicotine poisoning. The action and interaction of these and subsequent agents is presented.

Control mainly through the trip mechanism is considered from altered osmotic pressure, sodium, potassium, calcium, magnesium, and hydrogen ions; for neural stimulation and, in more detail, for polarization by constant currents.

Unification of the beats of the many units into synchronous or simultaneous patterns must depend on the propagation of nerve impulses or on electric fields and currents. The mechanism of unification is analysed and tests for its effectiveness are described. The following conditions favour unison: high temperature and calcium, low potassium and sodium, diminution in afferent nerve impulses (in patterns), increased polarization (or injury potentials), the drugs nicotine and caffeine.

Further analysis is made with caffeine, which leads to large repeated waves which may travel along the hemisphere. These are described in detail; and also the control of their size, shape, frequency, speed, and direction of travel by temperature and polarization.

The spreading caffeine waves are not stopped by nicotine, which blocks synaptic conduction; they cross a complete transection of the hemisphere when the two

halves are in good apposition, and so in electrical mechanism can regulate nerve-cell beats and cause a spreading activation. This may prove of considerable importance in the interpretation of normal activity, electronarcosis, and of the massed "convulsive" action of the cortex in epilepsy.

A theoretical explanation of the mechanism of spread is presented. It demands the existence in brain of maintained polarization gradients in certain directions. These have been found present as predicted. (Authors' abstr.)

Insulin Shock Treatment of Schizophrenia.

The method used and general observations made during insulin shock treatment of schizophrenia are discussed.

From November, 1936, to March, 1939, 76 cases of schizophrenia were treated; 56 of them finished the complete course of therapy; the remaining 20 are either still taking the treatment or the treatment was interrupted for various reasons.

A higher percentage of patients in China compared with those in western countries proved to be unfit for insulin shock treatment. Observations point more to climatic than to racial differences.

From this study, the prospect for remission appears to be dependent on the duration of the disease, the type and course of schizophrenia as well as the form of the onset, cases with an acute onset showing more inclination for remission than those with a gradually progressive course.

The duration of the treatment until remission is not dependent on the duration of the disease.

Remissions in certain cases with protracted treatment or late remissions after shock therapy cannot be positively considered as the result of the shock therapy.

The shock usually decreases during the course of treatment.

In one particular case the shock dose fluctuated in accordance with the mental condition of the patient.

Relapses occurred in 5 of the 20 cases with full remission after the shock therapy. (Author's abstr.)

Clinical Observations in the Insulin Treatment of Schizophrenia.

1. Observations of symptoms of 6,587 insulin treatments recorded on special charts with regard to quality and time of appearance showed that the symptoms succeed each other in a definite and constant order.

2. The progression of symptoms is determined phylogenetically and moves in an order inverse to the phylogenetic age of the layers. At first the activity of the cortex becomes suppressed, releasing the syndromes of the basal ganglia. As time progresses activity of the basal ganglia ceases, giving way to a release of the mid-brain. Finally centres in the medulla oblongata are released.

3. If the signs of release of the medulla oblongata have lasted beyond the time in which pin-point pupils were observed and corneal reflex disappeared, a protracted shock may be expected. Release of medulla oblongata has, therefore, to be considered as the biological border of the therapeutic application of the insulin effect.

4. The time of appearance and disappearance of symptoms depends upon the size of the dose. Increase of the dose speeds up, decrease of the dose slows the rate of progression. Sensitization is another factor affecting the time of appearance of the symptoms. The dose does not influence the sequence of the symptoms.

5. In order to adapt the insulin effect on the brain to the therapeutic purposes, the writer proposed a standard time of five hours.

6. The pharmacological shock has to be managed in this way, that medullary symptoms (tonic extensor spasms, parasympathetic syndrome) are to be expected in the last half of the fifth hour.

7. The shock seems to be therapeutically sufficient if the tonic phase has lasted no less than one hour. (Author's abstr.)

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Two Cases of Brachial Palsy due to Injections of Antitetanic Serum.

Two cases of paralysis accompanying intense serum reaction in the form of oedema and urticaria. One case had had a previous serum injection nine years before; the other case was having his first injection of antitetanic serum. With the appearance of these symptoms the patients noted pain and loss of power in the arm.

The type of paralysis was that of the L'Hermitte syndromes with no disturbance of sensation. Both cases recovered rapidly.

The Value of the Electro-encephalogram Compared with that of Ventriculography in the Localization of Cerebral Hydatids.

It is claimed that the electro-encephalogram permits the differential diagnosis of hydatid cysts from tumours in that the zone of high-frequency waves of high potential surrounding cerebral tumours is absent in the case of hydatids.

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Subdural Chronic Haematoma.

The formation of a subdural haematoma predicates the absolute integrity of the subdural space. This explains the fact that a subdural haematoma can never arise as a sequel of operative interference when the walls of the space must necessarily be breached. In the diagnosis ventriculography is a necessary and decisive step.

Suppurative Epiduritis.

Suppurative epiduritis signifies an acute infection of the fatty tissue of the epidural space and corresponds to the acute perimeningitis of Albers. This paper gives a review of our present knowledge of the symptomatology, pathology and treatment of this condition, together with a complete bibliography.

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Spread of the Epileptic Discharge: An Experimental Study of the After-discharge Induced by Electrical Stimulation of the Cerebral Cortex.

The spread of the epileptic after-discharge induced in monkeys by electrical stimulation of the cerebral cortex was studied, using several indexes of epileptic activity. These indexes are, first, the spread of clonic movements; second, the local changes of blood flow in the cerebral cortex during epileptic activity. These changes, which in themselves cast light on the nature of the epileptic discharge, cast additional light on the nature of the epileptic discharge by helping to reveal the manner in which the epileptic discharge spreads. Two types of procedures altering the spread of this discharge have been carried out, namely, section of the corpus callosum and transcortical section at right angles to the central sulcus of Rolando.

This study has concerned mainly the motor regions, so as to correlate the motor manifestations of the fit with the other concomitant phenomena of the epileptic discharge. Some observations have been made on other areas of the cerebral cortex. The following conclusions have been reached :

1. The after-discharge induced by electrical stimulation of the cortex is a faithful experimental counterpart of clinical types of epilepsy. Various motor variants have been observed which appear to be identical in their characteristics with those seen in certain clinical forms of epilepsy. The changes in blood flow in these animals during fits are the same as those seen in man during epileptic fits. The changes in electrical potential during and after epileptiform fits are the same in monkeys as they are in man during epileptic seizures.
2. A constant type of fit is easily reproducible in monkeys by electrical stimulation of the cortex. A study of the various factors which influence it renders the mechanism of these epileptiform fits accessible to experimental analysis.
3. The corpus callosum plays a definite role in the spread of the epileptic discharge from one hemisphere to the other, and this is demonstrable by all the indexes of epileptic discharge, although it is best recorded and illustrated graphically by the electrical activity.
4. Epileptic discharge from one hemisphere, if widespread over that cortex and prevented from spreading to the other hemisphere by section of the corpus callosum, gives rise to contralateral clonic movements and ipsilateral slow tonic movements, the latter being due, at least in part, to epileptic discharge from an area in the pre-motor region governing ipsilateral movements.
5. Epileptic discharge of the neurons of the ipsilateral areas of the cerebral cortex gives rise to a large part of the tonic element of the convulsion.
6. Transcortical section at right angles to the central sulcus, if it is of sufficient extent in a sagittal direction and of sufficient depth, alters the pathway for the spread of the epileptic discharge. This appears to be due to interruption of certain corticocortical association pathways. A significant characteristic circuitous pathway involving the corpus callosum and contralateral motor cortex is then evident in the spread of the epileptic discharge.
7. With the cerebral cortex intact, subcortical centres play a secondary role in the spread of the epileptic discharge.
8. The spread of the epileptic discharge takes place by neuronal pathways.

(Author's abstr.)

Heat-regulatory Mechanisms in Normal and in Schizophrenic Subjects; Under Basal Conditions and after the Administration of Dinitrophenol.

A study was made of the skin and rectal temperature, the oxygen consumption rate and the rate of evaporation of insensible perspiration under controlled environmental conditions of 30° C. and 20 per cent. relative humidity in 20 normal controls and 20 otherwise healthy schizophrenic patients in a chronic stage of the psychosis. The investigation was carried on under identical conditions on two days, on the first of which no medicament was given, and on the second of which 300 mgm. of dinitrophenol was administered by mouth to each subject.

Under basal conditions the normal subjects showed a distinct elevation of skin temperature, a rise in the rate of oxygen consumption and a slight fall in the rate of evaporation. The patients showed little increase in temperature, no change in the rate of oxygen consumption and a more rapid fall in the rate of evaporation.

After the administration of dinitrophenol, the normal subjects showed an increase in skin temperature up to 2.2° C. (3.96° F.), an elevation in the oxygen consumption rate of 31 per cent. and an augmentation in the evaporation rate of 51 per cent. The patients showed less reactivity to the drug, the corresponding changes being 1.3° C. (2.34° F.), 25 per cent. and 28 per cent. respectively.

In the chronic stage of the psychosis, schizophrenic patients show less reactivity to metabolic stimulation than do normal subjects. (Author's abstr.)

Mineral Content of the Brain: Changes in Experimental Animals Following Injection of Insulin and Metrazol.

Microincinerated sections of the brains of rabbits treated with either insulin or metrazol or a combination of the two, by a technique similar to that employed in the treatment of patients with psychoses, showed marked changes in the mineral content of the cerebral neurons. These changes consisted of dust formation, hypomineralization, vacuolation or complete demineralization of the ganglion cells. The changes were prominent in the cornu ammonis, but were also observed in other parts of the brain and appeared to correspond with those in sections stained with cresyl violet. Dust formation and complete demineralization indicated severe damage to the protoplasm, and could be observed as long as 17 days after completion of treatment.

Brains of normal and hypoglycaemic rabbits and guinea-pigs did not present any significant difference in total water content.

Since comparative studies of the brains of normal and of treated guinea-pigs did not show any significant difference in the total amount of minerals present, it was thought that there was no actual loss of total ash in the central nervous system.

Experiments in which material was obtained for biopsy during the individual insulin shock and during and at certain intervals shortly after a metrazol seizure showed that changes were present immediately after a convulsive seizure, but that these changes were completely reversible after a certain time.

(Authors' abstr.)

The Electroencephalogram in Cases of Neoplasms of the Posterior Fossa.

Electroencephalographic findings in seven cases of neoplasms of the posterior fossa and one case of neoplasm of the third ventricle with secondary involvement of the posterior fossa have been presented. In all cases pathologic foci of delta waves were shown posteriorly, primarily over the occipital lobes. Of three cases in which examination was made before and after operation, post-operative improvement was clear-cut in two and partial in one. Delta waves were present in a fourth case after partial removal of a cerebellar tumour. This patient was examined only a few days prior to recurrence of symptoms. It is suggested that the recorded delta waves were the result of secondary damage to the occipital lobes produced by pressure exerted by the lesions upward through the tentorium.

(Authors' abstr.)

Dissociation of Deep Sensibility at Different Levels of the Central Nervous System.

1. Dissociated loss of postural and vibratory sensation was found to be not uncommon with lesions of the cerebrum, brain-stem and spinal cord.

2. In seven patients with cerebral lesions causing disturbance of deep sensibility, position sense, stereognosis and two-point discrimination were lost or markedly diminished, while the appreciation of vibration was spared or slightly affected. There were no instances in which the converse was true.

3. With lesions at the thoracic and lumbar levels of the cord the opposite type of dissociation was found. Vibratory sense in the lower extremities was affected earlier and more severely than was the sense of position.

4. In three patients with compression of the cervical region of the cord and medulla, with dissociated loss of deep sensation involving the upper extremities, sense of position was more affected than that of vibration, again with astereognosis.

(Authors' abstr.)

Colloid Cysts of the Third Ventricle.

1. The most reasonable explanation of the origin of these cysts is that they arise from the paraphysis, which is an embryonic structure derived from the foetal ependyma of the anterior portion of the roof of the third ventricle. The histologic structure of the cysts seems to substantiate this view, as tubules are frequently observed in their walls and suggest origin from a glandular structure.

2. The symptoms are usually suggestive, and when combined with evidence of blockage of one or both foramina of Monro, as shown in a ventriculogram and with other neurologic findings indicating increased intra-cranial pressure and pressure on adjacent parts, make possible a preoperative diagnosis with a fair degree of certainty.

3. Surgical treatment of these cysts is remarkably successful. Both patients in this series who underwent operation recovered with cessation of all symptoms referable to the tumour. (Author's abstr.)

Myoclonus Epilepsy.

Three cases of myoclonus epilepsy are reported. A familial history of the disorder was found only in Case 2. In Cases 1 and 2 the myoclonus was associated with mental symptoms and generalized convulsions. In addition to extrapyramidal symptoms and signs present in all three cases, cerebellar signs were noted in Case 2.

In Case 1 the central nervous system was studied histopathologically. Inclusion bodies, consisting of amyloid and argentophilic substances, with amitotic division in some, were observed throughout the nerve and glia cells of the central nervous system, except the spinal cord. The substantia nigra and the dentate nuclei were the main sites of these bodies. In correlating the clinical picture with the pathologic changes we are inclined to attribute the mental symptoms to involvement of the cerebral convolutions, especially the frontal, and the so-called extrapyramidal symptoms to lesions in the substantia nigra. The myoclonus may possibly be due to the changes in the dentate mechanism, as in the palatal myoclonus. (Authors' abstr.)

Electrical Activity of the Exposed Human Brain: Description of Technique and Report of Observations.

A method is described whereby action potentials may be recorded from the exposed human brain under the aseptic conditions of the operating room.

The records obtained in a mixed series of 22 cases are briefly discussed.

Records from the frontal cortex of four patients with "normal" brains in which no space-occupying lesion was present are characterized by activity of the beta type. Reduction of potential was observed when electrodes were inserted in the deeper layers of the cortex.

Large potentials were not observed in six cases of increased intracranial pressure without primary cerebral tumour. In one case of hydrocephalus high potentials were noted only after release of ventricular fluid.

In ten cases of cerebral tumour characteristic waves of high amplitude and slow frequency were observed in tissue overlying or adjacent to the tumour. Tumour tissue itself is not electrically active, but apparently exerts an effect only through functional change in the surrounding brain.

A comparison is made of activity from tissue overlying a cerebellar tumour and that from a similar area in a case of Menière's disease.

The aforementioned observations suggest as possibilities for further investigation: (1) More precise localization of potentials in the layers of the cortex; (2) the association of large potentials with normal activity observed elsewhere in the brain; and (3) the relation of the abnormal waves to the response to sensory stimulation. (Authors' abstr.)

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Temporary Arrest of the Circulation to the Central Nervous System.

The circulation to the entire body can be stopped abruptly and completely by clamping the pulmonary artery. When the pulmonary artery is released, the moment at which the circulation returns to the cerebrum can be determined accurately by observation of the retinal vessels. With this method it is possible to produce severe neurologic disability and still keep an animal alive for long periods. Twenty-four animals were subjected to periods of circulatory arrest, ranging from two minutes to ten minutes and fifteen seconds. Arrest of the circulation for three minutes and ten seconds, or less, was tolerated without any obvious neurologic disturbances. Permanent alterations in behaviour and psychic

function occurred in animals subjected to three minutes and twenty-five seconds or more of circulatory arrest. After six minutes of circulatory arrest vision and sensation suffered some degree of permanent injury. After seven minutes and thirty-six seconds of circulatory arrest there were permanent and practically complete dementia, blindness, serious sensory and auditory defects, motor and postural defects and reflex abnormalities. When the circulation was interrupted for eight minutes and forty-five seconds or longer, life could not be restored for more than a few hours. In a subsequent paper the pathologic studies on this material will be presented. (Authors' abstr.)

Tuberculoma of the Brain.

Tuberculomas of the brain occur at all ages and in a variety of types. With a few exceptions, they arise by haematogenous metastasis from a tuberculous focus elsewhere in the body, usually in the lungs or related lymph nodes. Clinical and pathologic studies indicate that tuberculomas producing the symptoms of tumour of the brain develop most frequently in adolescents and young adults with a single extracranial tuberculous focus. Tuberculomas associated with tuberculous meningitis tend to occur chiefly in children and in the presence of generalized tuberculosis. The pathologic characteristics of tuberculomas are not different from those of tuberculosis elsewhere. Tuberculomas may be positively identified by finding acid-fast bacilli in them.

Tuberculomas constitute only a small and declining percentage of verified tumours of the brain. The clinical syndromes which they produce are not significantly different from those produced by other varieties of cerebral tumour. A correct aetiological diagnosis is made only when the patient has active tuberculosis in another organ or in the presence of a positive tuberculin reaction in a child. A history of tuberculous disease in the past is suggestive but not conclusive. Laboratory studies do not aid in the differential diagnosis. Calcified tuberculoma must be considered in the differential diagnosis of calcified intracranial masses noted in the roentgenogram.

The treatment of tuberculomas of the brain must be directed against tuberculosis as a disease, as well as toward the removal of the local lesion if possible. Experience has shown that attempts at removal of cerebellar tuberculomas almost always end in disaster, owing to the development of tuberculous meningitis. Decompressive operations may afford relief until healing can take place. Fibrocaseous tuberculomas of the cerebrum and arachnoid tuberculomas, particularly those in the Rolandic region, form the best subjects for surgical extirpation. They produce symptoms permitting early diagnosis and are accessible to removal in one piece. Good results will follow in a gratifying percentage of cases. (Authors' abstr.)

Metrazol Convulsions.

Changes in the oxygen, carbon dioxide and sugar contents of blood from the basilic vein, the internal jugular vein and the brachial artery were followed in a group of subjects with dementia praecox in whom convulsions were induced with metrazol. The following observations were made :

A. Changes in basilic venous blood :

1. The oxygen content becomes lowered as the convulsion progresses, reaching its lowest levels near the end of the seizure and quickly returning to basal or higher than basal levels soon after the convulsion.

2. Sugar gradually increases as the convulsion progresses, usually reaching its highest levels some time after the convulsion.

B. Changes in arterial and internal jugular venous blood :

1. A gradual fall in oxygen with a rise in carbon dioxide occurs in the arterial blood during the convulsion, these changes being most marked at the end or soon after the end of the seizure. The oxygen quickly returns to original levels within

a few minutes after the convulsion, at which time the carbon dioxide gradually diminishes during the stage of hyperpnea.

2. Blood collected from the internal jugular vein immediately before or at the very beginning of the convulsion is unchanged in oxygen and carbon dioxide content. As the convulsion progresses the oxygen content gradually diminishes, so that at the end of the seizure it is at its lowest level. At this time the carbon dioxide content is increased. During the stage of hyperpnea the oxygen quickly returns to original or higher than original levels, while the carbon dioxide gradually falls.

3. An increase in sugar usually occurs as the convulsion progresses, with little change in the difference between arterial and internal jugular venous blood.

These data support the following comments: Although local cerebral vasoconstriction may immediately precede a metrazol convulsion, there is no evidence from these studies that cerebral anaemia initiates the seizure. As the convulsion progresses, however, a change occurs in cerebral blood flow, dependent on the altered relationship of blood gases and changes in blood pressure. Any change in cerebral blood flow following the convulsion is temporary, as indicated by the return of blood gases to original levels within a short time after the convulsion. There is no similarity between insulin hypoglycaemia and a metrazol convulsion as regards changes in the relationship of dextrose and oxygen. The cerebral hypoxia occurring in the former condition has only a superficial resemblance to the cerebral hypoxia of the latter condition. So far as these data are concerned, changes in mental states following metrazol convulsions and insulin hypoglycaemia cannot be explained on the basis of any common alteration in either cerebral chemistry or cerebral blood flow. (Authors' abstr.)

Action Potentials of Muscles in Rigidity and Tremor.

Electrical records were taken by means of single or multiple surface or coaxial leads from the muscles in a variety of cases of tremor and rigidity.

In paralysis agitans voluntary movements produce electrical records characterized by abnormal synchronization of the motor units innervated. A similar synchronization is reported in cases of spasticity.

The state of parkinsonian rigidity is characterized by a continuous slight innervation of the rigid muscles, even when the limb is placed in its most relaxed position. No such constant innervation is observed in cases of spasticity.

Stretching of a rigid muscle, by means of either active or passive movement, produces a marked increase in this innervation. In this respect, rigidity resembles spasticity. Deep reflexes in cases of rigidity may or may not take a "spastic" form, but they do not spread to other muscles, as in true spasticity.

A characteristic parkinsonian tremor consists of bursts of innervation affecting alternately protagonists and antagonists, at an average rate of 5.5 per second. The rate is surprisingly constant over long periods and in all the muscles affected. No such constancy is seen in "cerebellar" and in "essential" tremors.

The bursts of innervation of tremor affect all activated motor units synchronously. There is usually quiescence of antagonists during them.

The electrical activity characteristic of tremor is abolished temporarily by injection of curare under favourable circumstances. It is greatly diminished, apparently permanently, by section of the pyramidal tract in the lateral column of the spinal cord and by resection of the cortical area 6a. (Authors' abstr.)

Influence of Insulin and of Stimulation of the Sympathetic Nervous System on the Blood.

When insulin leads to a fall of the blood sugar below 50 mgm. per hundred cubic centimetres this is accompanied by a fall in the carbon dioxide tension of the alveolar air. Restoration of the blood-sugar level leads to a rise in the carbon dioxide tension (experiments on schizophrenic patients).

In deep coma the carbon dioxide tension of the alveolar air at a given level of the blood sugar is higher than at similar levels before coma occurs.

The carbon dioxide tension of the arterial blood is lowered during insulin hypoglycaemia, and restored to control levels in unanaesthetized dogs on injection of dextrose.

General excitement induced by painful stimuli and struggle leads to rise of the blood sugar and lowering of the carbon dioxide tension of the arterial blood in unanaesthetized dogs.

Injection of metrazol or epinephrine has effects on the carbon dioxide tension and the sugar of arterial blood similar to those of general excitement. All effects are reversible and are not accompanied by a change in the pH of the arterial blood.

It is assumed that excitation of the sympathetic nerve centres is responsible for the decrease in carbon dioxide tension of the arterial blood and of the alveolar air.

(Authors' abstr.)

Paraplegia in Flexion.

The frequent involuntary movements of the lower limbs characteristic of spastic paraplegia in flexion are identical with the flexor reflex or withdrawal reaction, which is greatly exaggerated in the condition. These movements result from various stimuli to which parts below the level of the lesion are unavoidably exposed. Although the patellar and Achilles reflexes, particularly the former, may be sluggish or unobtainable, the hamstring reflexes remain active.

Extramedullary tumour and caries of the spine are perhaps the most frequent causes of paraplegia in flexion. The condition has been seen, however, in a number of cases of intramedullary tumour, multiple sclerosis, acute myelitis, acute encephalomyelitis and subacute combined degeneration. It may be associated with any lesion of the cord which leaves the reflex pathways of the lumbosacral segments functionally intact, and isolates these segments to a considerable degree from the influence of higher levels.

Although always the result in cases of lesions of the cord of extensive interference with spinal conduction, paraplegia in flexion is not necessarily indicative of an irreversible lesion. Though generally coming on some time after the lower limbs are entirely paralysed, it may appear relatively early when the paraplegia has an abrupt onset or is rapidly progressive.

When reflexes return to the lower limbs after complete transection of the cord, they behave in a manner more or less characteristic of paraplegia in flexion; if a spastic contracture develops it is generally one in flexion. When the cord is gradually compressed to a degree amounting to total section, however, the extensor muscles may remain in a spastic state over long periods.

Paraplegia in flexion resulting from supraspinal lesions appears to be most frequent in cases of diffuse cerebral degeneration with progressive dementia and pseudobulbar palsy.

Development of a spastic contracture in flexion is due primarily to exaggeration of the flexor reflex. As the lower limbs are brought into the flexed position, a fixation reflex, or shortening reaction, is induced in the flexor muscles. This reflex tends to hold the limbs in a flexed position for longer and longer intervals until the stretch reflex becomes augmented to the degree that the limbs can no longer be passively extended.

There is ample evidence, both clinical and experimental, to support the view that for any great release of flexor reflexes not only the pyramidal tracts but other descending pathways must be involved.

Decubitus ulcers and other sources of painful stimuli are a potent factor in the exaggeration of the flexor reflex. A poor general condition, which is believed to have a depressing effect on the extensor reflexes, may also contribute to the development of a flexion contracture. There is reason to suspect that, on occasion, these two factors have the effect of a more extensive anatomic lesion in the central nervous system.

(Author's abstr.)

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The Forms of Growth in Gliomas and their Practical Significance.

The mode of growth of 120 necropsy cases of glioma was studied by means of large celloidin sections including the whole tumour with surrounding tissues from one end of the glioma to the other (incomplete serial section study). This method is indispensable because the true limits and extent of most gliomas are not macroscopically visible. The great majority of gliomas are more extensive than their macroscopic aspect might lead us to suppose.

Only one rare kind of glioma shows a purely expansive mode of growth, the ependymoma. However, even in rare cases of ependymoma, a circumscribed infiltrative form of growth has been observed.

All the other gliomas, without exception, show an infiltrative type of growth, although in widely differing degrees. This degree by no means corresponds to the more or less "malignant" aspect of the glioma cells. On the contrary, cerebral astrocytomas are the most invasive of all cerebral tumours, while glioblastomas include a considerable percentage of fairly well-defined neoplasms with a narrow zone of growth. The cytological tumour entities include gliomas of quite different types of growth; thus proving yet again that cytology and histogenesis are insufficient to characterize the biological behaviour of a given glioma.

Only about 30 per cent. of all gliomas are relatively circumscribed tumours the real extent of which exceeds but moderately their macroscopically visible limits. This group includes oligodendrogliomas, about 20 per cent. of glioblastomas, many cerebellar astrocytomas and certain medulloblastomas. Factors underlying this surgically rather favourable mode of growth are: (1) A narrow, compact zone of growth; (2) a halting of the tumour at certain pre-existing structures, especially the cortex; (3) degenerative processes at the edge of the glioma. Tumours of the hippocampal region and the septum lucidum grow frequently in the form of round, expansive masses in the ventricular cavity.

About 60 per cent. of all gliomas have a more diffuse character with a widespread zone of growth considerably exceeding the macroscopically visible "tumour," and involving more than one lobe. Nearly 35 per cent. show what is probably a secondary diffuse growth (especially in the form of "secondary structures"),

while 25 per cent. must be considered as primarily diffuse neoplastic processes forming no circumscribed tumour. All cerebral astrocytomas, without exception, belong to this group. In the common case of malignant dedifferentiation of an astrocytoma into a glioblastoma, often the glioblastoma alone is visible as a macroscopic "tumour," surrounded by a large astrocytoma zone the true character of which is discovered by microscopic examination only.

About 10 per cent. of all gliomas—most of them belonging to the glioblastoma group—show a primarily multicentric type of growth; in half of the cases this multicentricity is only visible on complete microscopic study, the macroscopic examination showing only one main tumour.

Infiltration and destruction by growth are by no means necessarily associated in gliomas. Long-continued preservation of nerve cells and nerve fibres in the midst of tumour tissue is not specific for astrocytomas (although most constant in this group), but occurs also in glioblastomas.

The practical importance of these various findings is discussed.

(Author's abstr.)

Pyramidal Lesion in the Monkey.

Reinterpreting the results of pyramidal lesion, the functions of the pyramidal tract are characteristically organized both in space and in time. The spatial organization derives from a relatively stable topographical relationship between loci in the cortical field of origin of the tract and loci in the motor mechanism of the spinal cord. The fineness of this topographical organization underlies the unique feature of corticospinal function: the ability to bring into action any portion of the skeletal musculature, and in all combinations. This detailed control of the skeletal musculature enables the discrete usage of the musculature, especially of the digits, and the modulation of extrapyramidal activity, which are outstanding pyramidal functions. Furthermore, by increasing the excitation in specific portions of the segmental mechanism, it may enable fragments of the stereotyped patterns of extrapyramidal activity to be brought to threshold as part reactions, detached from the frame which usually gives them usefulness. The pyramidal tract operates in a crossed relationship on the extremities, but bilaterally on the axial musculature other than abdominal.

The functions of the pyramidal tract are not, however, covered by description, no matter how detailed, of results of stimulation in its field of origin because the organization in time is not in this manner brought out. In time, the pyramidal tract operates in two phases. On the one hand is a continuous, or tonic action in effect at all times in the waking state. On the other hand is a specially timed increase of discharge, or phasic action, which is evoked in relation to particular situations. The tonic function contributes to the excitatory state throughout the spinal cord, supporting muscle tone, keeping thresholds low, facilitating, reinforcing, steadying and moderating whatever tonic or phasic activity may be set in train at segmental or suprasegmental levels. The delivery of this excitation is not to all parts equally, but is influenced by original preponderance, and by postural and other immediate factors. Its volume is a function of the temper of the individual and of extraneous factors of great variety, reaching its lowest level short of sleep when the animal verges on sleep either from exhaustion or from boredom.

The phasic or episodic function initiates movement or speeds initiation. It enters into all somatic motor activity or any complexity, to confer on the stereotyped extrapyramidal performances: adjustability in space, modifiability in the course of execution, and all the modulations of pattern which make for aim, accuracy, economy, lability and finish. More than this in the primate, this function enables the discrete usage of the musculature, and especially of the digits, which is characteristic of the order.

Together, the tonic function provides for smooth, continuous, efficient action while the phasic function contributes, outstandingly, precision and lability to total

performance. In the realm of somatic motor function both of these are unquestionably motor or excitor functions. Of inhibitory function as such there is no evidence.

On the vascular system, the corticospinal system likewise exercises a continuous influence in the waking state which supports dilator tone and facilitates, reinforces and moderates reflex action. Whether this influence is excitatory of dilatation or inhibitory of constriction is uncertain. Also whether or not there is a further phasic action has not been determined.

Function of the pyramidal tract is thus co-extensive in time at least with the waking state, and determined in intensity by both general and specific demands of that condition. It is distributed to the entire somatic motor mechanism of the body, and to parts of the autonomic mechanism, the survey of the autonomic relationship being as yet incomplete. It is organized in complexity to match virtually the full range of activity, from simple tonic functions wherein it merely assists, to complicated performances which are primarily its responsibility. Although traditionally the pyramidal system has been considered "the voluntary motor pathway," this is too sweeping. An impressive capacity for voluntary movement survives pyramid section, especially if the lesion be bilateral, forcing the issue. Conversely, some activities eliminated by pyramidal lesion, for example the contact replacing reactions, must be considered, if not involuntary, at least highly automatic. By virtue of its tonic action on the spinal cord, pyramidal function must assist all somatic motor activity, if not, indeed, all motor activity of the waking animal, at whatever level initiated, even the spinal reflex level, without regard for the voluntary or automatic quality of particular acts. As the agent of lability, however, the pyramidal tract makes a unique contribution to total performance. Together, the all-pervading, and the discrimination qualities of cortico-spinal action afford the cerebral cortex that influence in virtually all realms of final motor action, and that minuteness of control which determines its effectiveness as an agent of choice. In this service of choice the pyramidal tract is unquestionably the outstanding, though not the exclusive voluntary motor pathway.

(Author's abstr.)

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Variations in Sodium and Magnesium in the Blood during Convulsion Treatment with Acetylcholine in Schizophrenia.

The author found an hour after intravenous injection of acetylcholine in convulsive doses that there was an increase in the amount of sodium in the blood and a decrease in the amount of magnesium. G. W. T. H. FLEMING.

VOL. XXXIV. L'ENCÉPHALE. JUNE, 1939.

- *Investigations on 100 Patients Admitted to the Special Service for Alcoholic Insanity in the Department of the Seine. *Dublineau, J., and Duchêne, H.* 275
 The Combination of Amyotrophic Sclerosis of Charcot-Marie-Tooth and Friedreich's Ataxia in Several Members of a Family. *Van Bogaert, L., and Moreau, M.* 312

Investigations on 100 Patients Admitted to the Special Service for Alcoholic Insanity in the Department of the Seine.

A detailed report and statistical analysis of 100 consecutive admissions. The main factors considered are the family, personal and social background, the drinking habits and the physical and mental symptoms. The series is divided into three groups, heavy (36), moderate (31) and non-drinkers (33).

The first group was characterized by a prolonged history of steady, heavy drinking, a late onset of psychotic symptoms and well-marked somatic evidence of alcoholism. There was frequently an alcoholic heredity and the onset of the psychosis was often associated with behaviour disorders, which had brought the subject into conflict with the police. For this group, alcohol was considered the essential aetiological factor and the immediate prognosis was good.

In the second group there was only moderate or periodic excess and a poor tolerance for alcohol. The psychosis occurred earlier and was preceded by evidence of mental instability. Somatic signs of chronic alcoholism were absent. Many showed a psychotic or epileptic heredity. The confusional onset usually evolved towards chronic mental illness. In this group alcohol was regarded as only an associated cause. In the third group alcohol intake was absent or considered to be without significance for the psychosis. S. M. COLEMAN.

VOL. XXI. INT. J. PSYCHOANAL. JANUARY, 1940.

- Sigmund Freud. *Jones, E.* 2
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An Outline of Psycho-analysis.

This work, commenced in 1938, was left unfinished. The first part deals with the nature of mind ; its division into id, super-ego and ego ; the theory of instincts ; the development of the sexual function and the hypothesis of the unconscious. The second part is concerned with the technique of psycho-analysis and with the male and female reactions to the oedipus situation. In the third part, left incomplete, the value of the practical application is reviewed. S. M. COLEMAN.

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- Mourning and Its Relation to Manic-depressive States. *Klein, M.* 125
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The Effect of Sodium Phenobarbital on Learning and "Reasoning" in White Rats. <i>Mendenhall, M. C.</i>	257

The Effect of Testosterone on the Sex Behaviour of Female Rats.

Ten normal young adult female rats were given injections of testosterone and testosterone propionate over a period of two months. Sex behaviour was tested, and vaginal smears were made throughout this time and for several weeks before and after it.

Vaginal cycles and high degrees of heat behaviour were repressed, but eight of the ten rats continued to accept aggressive males throughout the injection period in spite of diestrous smears.

Masculine sex behaviour was considerably increased during the injection period and disappeared rather rapidly thereafter.

The ovaries made a prompt recovery also, as shown by resumption of normal cycles and sex behaviour and by subsequent reproductive performance about equal to that of the untreated females of the colony. But the clitorides, which had hypertrophied under the influence of the injections, were not noticeably smaller in the animals autopsied twelve months after the last injection than in those sacrificed immediately after the cessation of injections.

The existence of the male copulatory behaviour pattern in the untreated female and certain stimuli which are especially effective in bringing it out are discussed. The failure to lower its threshold by permitting only female companions during pubescence and early adult life is also mentioned.

It is concluded that the male copulatory pattern in more or less rudimentary form is part of the equipment of the normal female rat. The threshold of this behaviour pattern is very high normally, but it can be lowered by testosterone administration which, however, although suppressing vaginal cycles, does not completely eliminate female sex behaviour. (Author's abstr.)

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*A Comparison of the Medical and Surgical Treatment in Hypertension, with Special Reference to the Importance of Psychic Factors in Evaluating the Results, with a Report of 92 Cases Treated Medically. <i>Robinson, S. K.</i>	157
*Insulin Shock Therapy in Korsakoff's Psychosis. <i>Talkington, P. C., and Cheavens, T. H.</i>	175
Neurodermatitis—Pain Shock—Distilled Water. <i>Foxe, A. N.</i>	184
A Simple Version of Aphasia. <i>Alford, L. B.</i>	190

A Comparison of Treatment in Hypertension.

This report is based on a study of 92 consecutive cases. It is concluded that most instances of hypertension are central in origin and that psychotherapy is the most important factor in treatment; it should be supported by dietary, rest and medicinal treatment. The wide use of operation, splanchnic resection, adrenalectomy, etc., is not to be encouraged.

S. M. COLEMAN.

Shock Therapy in Korsakoff's Psychosis.

Report of a case of Korsakoff's psychosis successfully treated by insulin shock. It is concluded that this form of therapy is particularly suited for the more chronic types of alcoholic psychosis.

S. M. COLEMAN.

J. NEUROL. PSYCHIAT.

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Antibodies to Brain and Their Relation to Demyelination.

It was found impossible to produce lesions in the brain of rats who had received injections of rabbit serum containing brain antibodies. The rabbits had received intraperitoneal injections of brain emulsion for three months, the technique corresponding to that employed by Masugi and others to produce experimental glomerulonephritis in animals. The result suggests that the demyelination found in animals is probably not to be explained as due to the development of autogenous antibodies to brain or to some "cerebrotoxin" developed in the presence of brain lipoids.

(Authors' abstr.)

Atrophy of the Thalamus in a Case of Acquired Hemiplegia Associated with Diffuse Porencephaly and Sclerosis of the Left Cerebral Hemisphere.

Clinical and pathological details are given of a case in which a hemiplegia, acquired in childhood, is associated with diffuse atrophy of the corresponding cerebral hemisphere and conspicuous atrophy of the optic thalamus.

With the exception of a few specified areas the cortex is replaced by spongy

glial tissue from which almost all the neurones have disappeared. The result is practically equivalent to an experimental hemidecortication.

Thalamic atrophy is practically complete on the affected side with the exception of the centre median nucleus, the lateral geniculate body, and a narrow subependymal zone of small cells. From this it is concluded that all other parts of the thalamus are concerned with the projection of impulses on to some part of the cerebral cortex. The connections of the centre median nucleus remain obscure.

(Author's abstr.)

J. PARAPSYCHOL.

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J. PHYSIOL. U.S.S.R.

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*Micro- and Ultra-Elements in the Brain. <i>Borovik, S. A., and Kovalsky, V. V.</i>	692
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Micro- and Ultra-Elements in the Brain.

In the investigation of the elementary constituents of living organism the composition of nerve tissue and especially of the brain of vertebrates has not received due consideration. The object of the present work was a study of the elementary composition of the various parts of the brain in the cat (*Felis domestica*). The distribution of the elements Si, Cu, Zn, Mn, Al, Pb, Mo, Ti is of special interest.

The copper content of the white and grey substance and of the cerebellum is equal in the cat, while there is a definite accumulation of copper in the medulla. Zinc is entirely absent from the medulla, in the cerebellum there is but a faint indication of Zn lines, in the grey substance they are somewhat more clearly marked, while a concentration of Zn takes place in the white substance of the brain.

The partition of molybdenum is of particular interest.

In the cat's brain molybdenum is present in noticeable amount in the white substance: there are traces of Mo in the cerebellum, while none are detectable in the other parts of the brain.

(Authors' abstr.)

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NO. 7.

*The Conditioned Cortical Bonds Established by Morphine Administration. <i>Sboroskaya, I. I.</i>	3
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On the Conditioned Cortical Bonds Established upon Morphine Administration.

1. The conditioned morphine vomiting reflex is completely identical, with regard to functional structure and sequence of phases, with the complex act of vomiting in response to direct morphine administration. The conditioned reflex is acquired fairly rapidly provided that the isolated conditioned stimulus is regularly applied prior to the moment of morphine administration. The reflex is of the delayed type with a lag time of 8–10 minutes, corresponding to the time interval required for the full development of the act of vomiting with all its phasic phenomena.

2. The conditioned morphine reflex (vomiting and hypnotic) displays the character of a generalized response to the entire pattern of experimental surroundings. Its specialization without the counteraction of an inhibitory stimulus is rather difficult, though quite possible in principle.

3. The stability of the conditioned vomiting reflex and the intensity of its experimental manifestation depend upon the excitational condition of the nervous centres controlling the act of vomiting.

4. Supraliminal inhibition called forth by chronic over-excitement of the central regulatory apparatus of the act of vomiting results in a more or less marked depression of the conditioned morphine response. (Author's abstr.)

Conditioned Dyspnoea of Toxic Origin.

1. The conditioned morphine response, manifesting itself in combined disturbances of the activity of various physiological systems (circulation, secretion, respiration) represents a peculiar conditioned cortical bond established upon definite alterations of bodily function.

2. Alteration of respiratory function is the most sensitive index of the disturbances arising through the effect of morphine, or of the conditioned stimulus acting as a substitute for the drug.

3. Conditioned reflex dyspnoea is less subject to external or internal inhibition than is the basic vomitory conditioned reflex. Upon partial inhibition of the vomitory reflex owing to supraliminal inhibition of the parabioc condition of the centre the respiratory phenomenon exhibits no decrease, persisting as a sensitive reagent to conditioned and non-conditioned stimulation.

4. This viewpoint supplies a basis for the understanding of the importance of functional polypnoea and dyspnoea in various nervous diseases where they play the part of prodromal phenomena preceding disturbances of wider extension arising from obstacles to nervous function. (Authors' abstr.)

NO. 9.

*Solution of the Ukhtomsky Problem. <i>Gulayev, P. I.</i>	275
*Measurement of Motor Chronaxie as a Method for the Investigation of Sleep Inhibition in Man. <i>Kisselev, P. A., and Mayorov, F. P.</i>	290
*The Phenomenon of Equalization of the Chronaxies of Antagonists during Sleep in Man. <i>Kisselev P. A., and Mayorov, F. P.</i>	299
*Alterations of Motor Chronaxie in the Course of Natural Sleep in Healthy Human Subjects. <i>Kisselev, P. A., and Mayorov, F. P.</i>	309
On the Influence of Duration of Rotation and of Angular Acceleration upon Vegetative Labyrinthine Reflexes. <i>Yarotzky, A. I.</i>	353

Solution of the Ukhtomsky Problem.

A method has been developed for the stimulation of nerve with varying sinusoidal potentials at different frequencies. The curve of thresholds of the frog's nerve-muscle preparations has been investigated in relation to the frequency of applied potentials (from 10 to 14,000 Hz). The conditions have been determined for the existence of Ukhtomsky's area and its shape has been established. The

curve of onset of maximal tetani has been explored in relation to frequency (from 10 to 14,000 Hz). A determination has been made of the curve of Wedensky's optima at varying frequencies. (Author's abstr.)

Measurement of Motor Chronaxie as a Method for the Investigation of Sleep Inhibition in Man.

The alterations of motor chronaxie during sleep, established by Bourguignon and Haldane, are fully corroborated by the author's experiments. The values of motor chronaxie undergo a gradual rise as the sleep grows deeper, attaining a maximum level at the stage of profound sleep and rapidly decreasing in the stage of awaking, the original level being restored at wakefulness.

The relation between these changes of chronaxie (and also of rheobase) and the development of sleep is evidently a direct one. It is suggested that peripheral chronaxie reflects the functional state of the centres, undergoing alterations that depend upon the intensity of sleep inhibition which arises, according to the concepts of the Pavlov school, in the cerebral cortex and gradually spreads to the subcortical ganglia, including the red nuclei.

The application of the chronaximetric method to the investigation of the physiology of human sleep is very promising, and will doubtless be of considerable theoretical and practical importance. The authors are happy to state that the present work is a reply to the challenge of Prof. Lopicque, in his report to the XVth Physiological Congress, to attempt a synthesis of the theory of chronaxie and Pavlov's theory of conditioned reflexes. (Authors' abstr.)

The Phenomenon of Equalization of the Chronaxies of Antagonists During Sleep in Man.

The authors have demonstrated for the first time a phenomenon consisting in the equalization of the chronaxies of antagonists during normal sleep in human subjects. In two experiments (without the use of hypnotic drugs) they observed a distinct tendency to equalization of chronaxie in antagonists: as the sleep grows deeper, the increase of the flexor's chronaxie is several times superior to the increase of the extensor's chronaxie. In other experiments made with the administration of hypnotics, the authors observed complete equalization of the chronaxies of the antagonists in 10 cases. Equalization is attained at a high level, coincides with the objective symptoms of maximal sleep and occurs simultaneously with the moment of equalization of the chronaxies of the antagonists. On this basis, the authors believe that the phenomenon of equalization can be utilized as an objective quantitative index of the maximum depth of sleep, possibly the limit of depth of sleep. From the viewpoints of Lopicque's and Pavlov's teachings, a hypothetical explanation of these data is suggested: sleep inhibition, arising in the cerebral cortex and gradually descending to the subcortical region and lower, reaches the system of the red nuclei and abolishes their function of subordination. Such might be the mechanism of the phenomenon of equalization of maximal depth of sleep. (Authors' abstr.)

Alterations of Motor Chronaxie in the Course of Natural Sleep in Healthy Human Subjects.

On the basis of their experimental investigations the authors arrive at the following conclusions:

1. The development of sleep is associated with corresponding alterations of motor chronaxie, namely, increase of chronaxie with deepening of sleep and decrease of chronaxie as the sleep becomes less deep. A regular relation exists between the variations of the level of chronaxie and the dynamics of sleep inhibition.
2. At the stage of profound sleep a phenomenon of equalization of the chronaxies of antagonists is observed, coinciding with complete relaxation of the muscles.
3. At maximal depth of sleep a reversal of the ratio of chronaxies of the antagonists takes place, the level of the flexor's chronaxie being superior to the level of

the extensor's chronaxie. This phase of reversal is always attained at a higher level than the phase of equalization.

4. The data obtained justify the application of chronaximetry as a new method for the investigation of sleep and hypnotic states in human subjects.

(Authors' abstr.)

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- *Chronaxie during Exercise as Related to the Dynamics of Nervous Processes. *Popov, G. W.* 428
- The Technique of Investigation of Conditioned Reflexes as Applied to Mice. II. *Hanicke, E. A.* 477

Chronaxie during Exercise as Related to the Dynamics of Nervous Processes.

The author made an investigation of the alterations of the chronaxie in the biceps muscle of the right arm, resulting from the influence of work performed by different muscles of the upper extremities.

It has been shown that exercise affects the chronaxie not only of the working, but likewise of the resting muscles; the character of the alterations of chronaxie in the muscle not involved in exercise depends upon which muscles perform the exercise.

Work of the extensors of the right arm mostly results in increase of the chronaxie of the homolateral biceps during the exercise and in its decrease after the exercise.

Work of the extensors of the contralateral arm usually leads to decrease of the chronaxie of the biceps during the exercise and to an increase after the exercise.

During exercise of the flexors of the opposite arm the chronaxie of the right biceps is increased in most cases. A decrease of chronaxie after the exercise is of considerably less frequent occurrence.

It is likely that the phenomena here reported are related to the processes of successive and simultaneous induction in the central nervous system and to the reciprocal division of impulses in the muscles of the upper extremities.

(Author's abstr.)

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Biotypological Studies on Cases of Schizophrenia Treated by the Meduna Method.

Observations on a small number of cases showing complete or partial remission after shock therapy gave no evidence of the efficacy of the therapy being related to the biological type of the patient.

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*A Statistical Study on the Age of Insane Patients. <i>Rene, R.</i>	345

The Neuroses of the Parents of Neurotic Children.

The fact that neurotic patients frequently have neurotic parents is not considered to be necessarily a proof that neuroses are hereditary, since the symptomatology of the child's neurosis may differ entirely from that of the parent. The author considers that all neuroses arise from conflicts in childhood and that the likelihood of such conflicts occurring is greatest with neurotic parents.

A Statistical Study on the Age of Insane Patients.

During the years 1931-1937, 5,055 first admissions were made to the psychiatric hospital of Recife Pernambuco. Males and females suffering from constitutional psychosis enter between ages of 16 and 35. Organic psychoses are more frequent among females of 16 to 30 years and men of 16 to 40. The toxic and infectious psychoses occur more frequently among males between 21 to 40 and females 16 to 40.

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Organizing an Occupational Therapy Department.

For the successful planning of an occupational department at a mental hospital a number of factors must be taken into consideration. The following points should be taken into account: The type of hospital (private or rate-aided); the number of patients; the situation of the institution; its financial resources and the average age, social status and environmental background of the majority of patients.

S. M. COLEMAN.

PROC. AMER. ASSOC. STUD. MENT. DEF.

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*A Critical Analysis of Five Years' Work with Cases of Cerebral Palsy. <i>Sirkin, J.</i>	107
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Present Needs in the Care of Mental Defectives in New York City. <i>Humphreys, E. J., and McBee, M.</i>	264

Further Clinical and Pathologic Studies in Mongolism.

True mongoloid deficiency represents a growth disorder in which the absence of proliferative growth of cartilaginous and fibrous tissue is an essential factor. This seems to be related to some disorder of the anterior pituitary. Skull measurements of 125 mongoloid children were graphed, and comparison is made between

these growth curves and the normal one. Marked differences in circumference and length are apparent. Histologic study of the skull basis is reported upon briefly. X-ray study showed that skull features are essentially foetal in shape and proportion. The author found that any disease of the foetus producing growth disorder (such as anaemias, infectious diseases including syphilis, and certain congenital heart conditions) is able to exhibit some mongoloid traces. These are temporary arrests in growth.

M. W. KUENZEL (Psychol. Abstr.).

Biochemical Studies in Mongolism.

Opposing the hypothesis that mongolism is due to a racial regression, the author publishes a distribution of the blood groups of 125 American mongoloid defectives. This is seen to be practically identical with that of the general American population and unlike that of people of the Mongolian races. Basal metabolic rates of 25 mongoloids aged 6 to 29 years are reported, and the results rule out hyperthyroidism as a condition of mongolism after the sixth year. Fasting serum cholesterols of 50 mongoloids aged 2 to 29 years were found to be within normal limits. Indications are that hypothyroidism is not present in mongolism at least after two years of age. Fasting blood sugars, glucose tolerances, serum calcium, inorganic phosphorus and phosphatase findings are also reported. Apparently a hypofunction of the pituitary accounts for the disorder. A bibliography of 19 titles is appended.

M. W. KUENZEL (Psychol. Abstr.).

A Study of the Frequency of Mongolianism in Negro Children in the United States.

A questionnaire was sent to both state and private institutions for the feeble-minded and to public school systems in over 100 large cities concerning the number of mongolians in their populations. No school system reported any mongolian of the coloured race. Returns from southern schools as well as from southern institutions failed to reveal any mongolians of the coloured race. Of 1,777 mongolians in 45 institutions 21 were coloured. Of 139 cases of the mixed type with mongolian tendencies only one was coloured. Comparisons among age, sex and mental level of coloured and whites are made.

M. W. KUENZEL (Psychol. Abstr.).

Mental Deficiency from Paranatal Asphyxia.

"Examination of the paranatal records of mentally defective infants and children (for whom there was no history of inherited defect, infection, or trauma unassociated with birth) has disclosed a definite relationship between foetal oxygen want and the later neurological defect." In a group of 252 children whose mental deficiency was thought due to conditions at birth, 176 (70 per cent.) were found to have a history of asphyxia. The commonest presenting symptom of cerebral cell disintegration as a result of destructive anoxia is described as a deterioration of intellect, evidenced mainly by character change and memory defect. Several figures show sections of cortex from infants delivered after long labour, illustrating degenerative cellular changes. The inter-relationship between different type mechanisms by which infant brain tissue may be deprived of oxygen with resultant cell necrosis and later evidence of mental deficiency are described. Classification of these types of anoxia follow: anoxic, anaemic, stagnant, and histotoxic. The author urges a re-evaluation of the controllable factors inducing asphyxia, among which are the optional drug and anaesthetic agents used to produce analgesia and amnesia in the mother. A bibliography of 18 titles completes the article.

M. W. KUENZEL (Psychol. Abstr.).

A Critical Analysis of Five Years' Work with Cases of Cerebral Palsy.

Of the 48 cases of cerebral palsy given treatment in one of the New York State institutions for the feeble-minded slightly more than one-third have shown improvement. The Binet IQ range of these patients was 29 to 71. Improvement occurred

in walking, feeding, and dressing. IQ's following treatment ranged from 30 to 72. However, in treatment by physical therapy it is not the degree of the child's intelligence but his degree of co-operation and initiative that counts.

M. W. KUENZEL (Psychol. Abstr.).

A Study of the Effects of Differential Stimulation on Mentally Retarded Children.

Study was made of the effect on mental growth of young children of a radical shift from one institutional environment to another providing superior stimulation. "The experimental group included 13 mentally retarded orphanage children (mean IQ 64, Kuhlmann) from one to two years of age, placed singly or by twos on wards with brighter older girls in a school for the feeble-minded. This environment was stimulating, with many adult contacts provided. As a contrast group, 12 average and dull normal children (mean IQ 87, Kuhlmann) of similar ages in an orphanage nursery were studied. Few adult contacts were afforded, with limited opportunities for play and development. Retests of both groups after two years showed marked gains in intelligence (mean IQ 60.5) for the contrast group." The author points out that "the possibility of increasing the mental capacity of 'functionally' feeble-minded children should be considered as an essential objective in setting up an individualized treatment and educational programme in a school for feeble-minded."

M. W. KUENZEL (Psychol. Abstr.).

The Effect of a Highly Specialized Programme upon the IQ in High-grade Mentally Deficient Boys.

Departing from customary methods of training, where external productivity is more important than internal changes which might take place, this specialized programme aimed at the individuals' own development of means towards ends. Constructive activity was stimulated and social approval directed toward recognition of productions, both concrete and abstract, which showed ingenuity, initiative, and original planning. In social relations individuals were required to work out their own problems. Where help was required suggestion and discussion were preferred. During informal settings abstract problems were presented for solution in order to provide experience in recognition of absurd and illogical statements. This cottage group consisted of 16 boys, aged 15 to 18 years, whose IQ's ranged from 48 to 80. An average gain in IQ of 10 points was made within a year. 81 per cent. of the cases showed a gain of 5 or more points. The gain is shown to be specific to the experimental group and does not hold in other institutional groups or control cases.

M. W. KUENZEL (Psychol. Abstr.).

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- Alcoholism, Its Frequency, Aetiology and Treatment. *Strong, W. A.* 403
- The Involutional Psychoses. *Brew, M. F., and Davidoff, E.* 412

Testosterone in Psychotic Male Homosexuals.

1. Seven psychotic male homosexual patients were treated with testosterone propionate.
2. All showed some stimulation of secondary sex characteristics, as well as an increase in libido.
3. There was no change in the direction of the libido, the result being an increase in homosexual activities.
4. There was little or no change in the mental condition.
5. These results would seem to favour the view that homosexuality is of psychic origin. (Author's abstr.)

The Force Required to Crush Vertebrae : Its Probable Mechanical Relation to the Postmetrazol Fracture.

1. Several related factors probably explain the high incidence of postmetrazol vertebral fractures.
2. The relation of mechanical factors to the production of the fracture is confirmed.
3. The peculiar anatomical nature of the thoracic spine with its limitation in extension may explain in part the mechanical advantage of the spinal flexor muscles.
4. The postmetrazol fracture of the thoracic vertebral body is probably as frequent as that following epileptic convulsions.
5. It is found by direct measurement that the fifth thoracic vertebra, when longitudinally compressed, will be crushed at the periphery of its superior and inferior ventral margins by a force approximately one-third of that required to crush the body.
6. The unique construction of its trabeculae may predispose the vertebral body to a wedge-shaped deformity.
7. The compression load placed upon a vertebra seems of less importance than the recurrent impacts of the clonic-tonic-clonic convulsion.
8. Compression of the intervertebral discs following fracture of the thoracic vertebral body may occur in about 86 per cent. of cases. Invasion of the prolapsed

nucleus pulposus of the disc into the spongiosa of the vertebral body, resulting in the formation of a Schmorl's node, has been demonstrated.

9. The necessity for maintaining spinal hyperextension in preventing post-metrazol vertebral fractures and intervertebral disc complications is emphasized. Its use may result in a reduction of fractures from 50 to 8 per cent.

(Author's abstr.)

PSYCHOL. BULL.

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 *A Study of the Schizophrenic Thought Processes during Treatment by Car-
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 The Conception of Magic in the Paintings of Ancient Peru. *Gutierrez-Noriega,*
C. 426

The Latent Period in the Development of Cardiazol Fits in the Epileptic and Non-epileptic.

Contrary to expectation the latent period from the injection of cardiazol to the development of a fit is longer in epileptics than in non-epileptic schizophrenics and luminal shortens the latent period in epileptics. The length of the latent period in cases of idiopathic epilepsy is greater than in cases of symptomatic epilepsy.

A Study of the Schizophrenic Thought Processes during Treatment by Cardiazol.

This study is devoted to a critical examination of the paper by Zucker and Hubert on the changes in function found in schizophrenic thought disorder and particularly of their subjective nature.

NO. 4.

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*Complications Arising in the Treatment of Schizophrenia by Insulin Shock. <i>Mejia, L.</i>	552

The Zig-Zag Test in Neuro-psychiatry.

It is claimed that examination of zigzag patterns drawn under standard conditions permits certain conclusions as to the mental reactions of psychotic subjects. The paper is illustrated by reproductions of actual graphs, but it is by no means clear on what evidence the conclusions are arrived at.

Complications Arising in the Treatment of Schizophrenia by Insulin Shock.

Ninety-six cases of schizophrenia treated by insulin exhibited some form of complication in 80 per cent. of their number. The complications were distributed as follows: Pulmonary and circulatory 14 per cent., spasm of glottis 6.25 per cent., prolonged coma 21 per cent., gastric and gastro-intestinal 22 per cent.

REV. DI NEUR. E PSYCHIAT. S. PAOLO.

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The Diagnosis of Epilepsy.

Thirteen epileptics, seventeen schizophrenics, five patients suffering from general paralysis and other psychoses were given cardiazol convulsions. It was found that the threshold value of cardiazol for producing fits in cases of epilepsy was .50 gm. In the non-epileptics the threshold was a little above this.

Urea in the Cerebro-spinal Fluid.

Urea estimations are made on 1.5 c.c. of cerebro-spinal fluid by the hypobromite method and the nitrogen extracted by using a van Slyke apparatus for alkali reserve estimations. From 500 determinations it was seen that the urea varies in normal subjects between .15 and .35 mgm. per thousand.

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Psychiatric Nosology.

The author protests against the description of such ill-defined conditions as schizophrenia as morbid entities. He considers that we can now usefully talk of a schizophrenic syndrome, a paraphrenic syndrome, a confusion syndrome, etc., thus recognizing about ten mental syndromes. He divides mental diseases into two groups—organic and functional.

Considerations on a Case of Facial Diplegia Probably Due to Scarlet Fever.

In studying the physiopathology of this case the author arrives at the conclusion that the lesion could not have been either extracranial or nuclear. From the fact that taste was affected in the anterior two-thirds of the tongue he considers that it must have been localized either in the meninges or the petrous bone.

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On the Fundamental Problem of the Spontaneous Fluctuations of the Brain Current.

Electroencephalographic studies were made on many Japanese, and from the results the authors conclude that the time from the sense stimulation to the beginning of the suppression of the alpha waves is dependent upon the intensity of the stimulus, and therefore that the sensation time, threshold, or sensitivity, etc., is measurable objectively from this time relation of the suppression of alpha waves.

T. FUJITA (Psychol. Abstr.).

The Electroencephalographic Study of Taste Sensitivity.

The sensitivity of the tongue-tip to taste stimuli was determined by measuring the time from the moment of stimulation to the beginning of suppression of alpha waves and the duration of the suppression to the reappearance of alpha waves. Distilled water of 38° C. in a volume of 0.1 c.c. dropped on the tip of the tongue evoked no sensation and no suppression of alpha waves. This indifferent tem-

perature and volume were taken as the standard for the investigation of several influences on the latent time and duration, such as the temperature, volume, or concentration of the solution of taste substances. The larger the volume and the more intense the concentration, the earlier the suppression of alpha waves took place and the longer it continued. The threshold concentration which evoked just visible suppression was determined for substances representing four taste qualities. For the solution of NaCl the latent time was shortest and the duration longest at moderate temperatures, i.e. it was most active at these temperatures. The time of the suppression of alpha waves to sense stimulation was shorter than the usual reaction time. The acuity of the tongue surface for the taste sensation measured by the suppression of alpha waves corresponded with the result obtained by the usual subjective method.

T. FUJITA (Psychol. Abstr.).

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1. Biochemistry, Pathology and Physiology.*

Arsenical Encephalopathy. I. Clinical Study. Tzanck, A., and Lewi, S. [Ann. dermatol. syphil., 10, 752-70 (1939).]

Arsenical encephalopathy is produced by trivalent arsenicals of the arsenobenzene type and by quinquevalent arsenicals derived from 3-amino-4-hydroxybenzenearsonic acid, e.g. stovarsol, treparsol, acetylarsan. It is never produced by mineral arsenicals (arsenic anhydride, arseniates, cacodylates, etc.) nor by quinquevalent organic arsenicals derived from p-aminobenzenearsonic acid, e.g. atoxyl or tryparsamide, despite the fact that these compounds may exert toxic action on the peripheral nervous system. Intravenous, intramuscular, subcutaneous, oral and vaginal administration of arsenicals have all led to encephalopathy. According to Budlowsky (*Deut. dermat. Ges. in der Tschech. Rep.* (December 3, 1933)) patients with encephalopathy give negative skin tests to arsenicals. However, Kapuscincki (*Ceska Dermatol. Samberger Festschr., 148 (1931)*) claims to have induced passive sensitization to neoarsphenamine by injection of serum from a patient showing intolerance to this drug. Five cases are presented of encephalopathy due to neoarsphenamine; two of the patients were pregnant women, who seem, as a group, to be especially susceptible to this disorder.

MARION HORN (Chem. Abstr.).

Golgi Apparatus and Vitamin C. I. Review. Miwa, Atunobu. [Oriental J. Diseases Infants, 25, 38-9 (1939) (in English).]

Vitamin C probably plays a part in the fixation of Golgi apparatus by the reduction of AgNO₃ and osmic acid.

II. Experimental Studies. I. [Ibid., 25, 40.]

An aqueous solution of vitamin C, 1 : 50,000, reduces 10 per cent. AgNO₃; a vitamin C solution, 1 : 6,000, reduces 10 per cent. AgNO₃ containing 1 per cent. glacial AcOH. Histochemical pictures showed that the Golgi apparatus and vitamin C in the tissues of rabbits and hens were closely related. The histochemical

* A number of abstracts in this section are reproduced from *Chemical Abstracts* by kind permission of Prof. Crane, of Ohio University, to whom the Editors wish to express their thanks.

pictures of the Golgi apparatus and vitamin C in the tissues were greatly enlarged after an injection of vitamin C into the portal vein of the living rabbit.

RUTH BERGGREN (Chem. Abstr.).

Benzedrine and Brain Metabolism. Mann, P. J. G., and Quastel, J. H. [*Nature*, **144**, 943-4 (1939).]

Benzedrine stimulates the O uptake of brain in vitro when this respire in the presence of certain amines. This is accomplished by an inhibition of the formation of toxic aldehydes.

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

Chemical Changes in the Blood Vessels Occurring with Age. Burger, M. [*Z. ges. Neurol. Psychiat.*, **167**, 273-80 (1939).]

In human aortas from individuals aged 10-70 years, the cholesterol, Ca, total P and acid-soluble P contents increased with age, while the lipoid P and phosphatide contents did not change markedly and the total lipoid increased to 50 years and then decreased somewhat. Aortas from cattle aged 1-15 years and from horses aged 1 to over 25 years likewise showed an increase in cholesterol and Ca contents with age. The human, beef and horse aortas all showed decreases in N content and increases in the S/N ratio as the age increased. Apparently the protein in the aortas is replaced by chondroitinsulfuric acid in the ageing process.

MARION HORN (Chem. Abstr.).

Effects of Changes in Dietary Calcium on Neuromuscular Transmission. Brown, G. L., and Harvey, A. M. [*J. Physiol.*, **97**, 330-7 (1940).]

A kid, kept on a diet deficient in Ca, showed a defect in neuromuscular transmission, such that a single maximum motor nerve volley failed to elicit a maximum response from the muscle. With repeated stimulation, at a sufficiently high frequency, each successive response of the muscle became greater until transmission was fully restored at the fifth or sixth response. Chicks on a similar diet reacted in the same way. A diet rich in Ca did not eliminate the normal peculiarity in neuromuscular transmission in the fowl.

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

Studies of Human Nervous and Related Tissue by the Röntgen-Ray Diffraction Method and the Petrographic Microscope. Reynolds, Lawrence, Corrigan, K. E., and Hayden, Henrietta. [*Am. J. Roentgenol. Radium Therapy*, **43**, 81-92 (1940).]

Standard methods of X-ray diffraction studies of non-cryst. substances were applied to nervous and related tissues; diffraction patterns obtained in 30 cases are reproduced. The diffraction work was supplemented by observations with a standard petrographic microscope and polarized light; 15 colour reproductions of these slides are given. Orientation can be noted in nerve trunks, which have a highly specialized directional function, in dural tissue and in the periosteal layer. Brain tissue gives a pattern similar to that of neuroproteins. Grey and white matter of the cerebrum give slightly different patterns, the differences being shown clearly after drying.

E. H. QUIMBY (Chem. Abstr.).

Chemistry of Lipoidosis. III. Niemann-Pick's Disease and Amaurotic Idiocy. Klenk, E. [*Z. physiol. Chem.*, **262**, 128-43 (1939); cf. *C.A.*, **29**, 6942².]

The lipoids from the brain in various lipoidoses were fractionated. Compared to the lipoids from Niemann-Pick's disease (three cases) the lipoids from infantile amaurotic idiocy (Tay-Sachs) contain considerably less sphingomyelin and much more of a new glycolipide (substance X). The latter is extracted chiefly by hot CHCl_3 -MeOH (1-3) from the organ powder after acetone- and ether-solution constituents have been removed. X contains much more sugar than normal cerebroside. It contains fat acids, a N base very like or identical with sphingosine,

besides the reducing sugar. There is no cerebronic acid present in it. In five cases of juvenile amaurotic idiocy the changes were not so marked, probably because of localization of the lesions to certain centres. MILTON LEVY (Chem. Abstr.).

Metabolism of the Isolated Perfused Cat Brain. Chute, A. L., and Smyth, D. H. [*Quart. J. Exptl. Physiol.*, **29**, 379-94 (1940).]

A method of perfusing the isolated cat brain and an apparatus for recording continuously the O consumption of such a preparation are described. Blood flows were 60-90 c.c./100 gm./min. at pressures of 120-150 mm. Hg. Flows of 45 c.c./100 gm./min. were incapable of maintaining cerebral function as judged by the presence of the corneal reflex. Oxygen consumption was 200-300 c.c./100 gm./hr. Oxygen usage was always in excess of that required for the complete oxidative removal of carbohydrate. Usage of both glucose and lactate were observed. The brain showed a predilection for the former. 32 references.

RACHEL BROWN (Chem. Abstr.).

Acetylcholine Metabolism in the Central Nervous System. Mann, P. J. G., Tennenbaum, M., and Quastel, J. H. [*Biochem. J.*, **33**, 1506-18 (1939); *cf. C.A.*, **33**, 8271⁴.]

Glucose (I) at low concentrations (below 20 mgm./100 gm.) brought about the synthesis of acetylcholine (II) in intact brain slices (rat). Fructose and galactose had only slight effects in the synthesis, but mannose had an activity near that of I. The failure of Stedman and Stedman (*C.A.*, **33**, 8271¹) to confirm this effect of I was shown to be due to limitations of their technique. Preformed "bound" II was found in brain tissue freshly obtained from the rat, and the suggestion that it did not exist (Stedman and Stedman) was based on insufficient evidence. The effect of ether (III) in enhancing formation of II in minced brain tissue at 37° in the absence of an aqueous medium was confirmed. III was highly inhibitory to formation of II in brain tissue in phosphate- or bicarbonate-Locke medium. In brain suspensions in aqueous solutions both III and CHCl₃ rapidly broke down "bound" into free II. The effects of III on brain tissue, in the absence of an aqueous medium, closely resembled the accelerating action of K ions on the formation of II in brain slices. The explanation which was suggested for the effect of K ions was also postulated for the effect of III.

I. W. SCOTT (Chem. Abstr.).

The Histidine Content ("Diazo Value") of the Blood in Peptic Ulcer. Schmidt, E. G. [*J. Lab. Clin. Med.*, **25**, 512-14 (1940).]

The blood from patients and controls shows no differences in the values given by various diazotization procedures (methods of Schmidt *et al.*, *C.A.*, **31**, 8646⁴, and Theis and Benedict, *C.A.*, **18**, 3398). The data do not confirm the theory that a histidine deficiency exists in the blood of patients with peptic ulcer.

HOWARD W. ROBINSON (Chem. Abstr.).

The Haemato-Encephalic Barrier and Some Physicochemical Properties of the Cerebrospinal Fluid and the Serum. Efimov, V. V., and Lokshina, E. S. [*Bull. biol. med. exptl. U.R.S.S.*, **8**, 287-90 (1939) (*in Frenck*).]

The differences in the interfacial tension and the condition between the cerebrospinal fluid and the blood in patients with schizophrenia, progressive paralysis, brain syphilis, epilepsy and arteriosclerosis of the brain show wide variations from the normal with no regularities and cannot be used for diagnostic purposes. These wide differences are attributed to variations in electrolyte concentration rather than concentration of capillar-active substances at the interface.

S. A. KARJALA (Chem. Abstr.).

Spinal-Fluid Chlorides in Meningitis. Barnes, H. D. [*S. African J. Med. Sci.*, **4**, 97-110 (1939).]

The chloride content of the cerebrospinal fluid is lower in severe than in mild meningitis. The likelihood of death does not appear to be greater in the cases with lower chloride content of the fluid obtained at first puncture. The chloride curve in pneumococcal meningitis shows no tendency to rise. When chloride values are within normal limits or, if initially low, the curve rises during subsequent days, the disease is likely to run a mild course and conversely. The likelihood of death is not significantly greater if the curve falls during the first few days. Two references are given.

W. R. HENN (Chem. Abstr.).

The Comparative Iodine Content of Blood and Cerebrospinal Fluid. Klassen, Karl P., Bierbaum, Ruth L., and Curtis, Geo. M. [*J. Lab. Clin. Med.*, **25**, 383-7 (1940).]

Iodine determinations by the method of Matthews, Curtis and Brode (*C.A.*, **32**, 9138⁹) were made on whole blood and cerebrospinal fluid of two groups of patients. In group 1 (10 patients without thyroid disease, fever or meningeal disease, and on a relatively low I intake for at least one month) the average blood I was 3.6 γ per cent., the range 2.9 to 5.1; in group 2 (10 patients with hyperthyroidism, who had not received I for one month) the average blood I was 8.8 γ per cent., the range 5.1 to 15.7. The increase in blood I was most marked in those patients with a more recent onset of the disease. The average cerebrospinal fluid I in both groups was 0.5 γ per cent. Conclusion: Iodine is a normal constituent of the cerebrospinal fluid, and its concentration is not increased in patients with hyperthyroidism without meningeal involvement, fever and I therapy.

HOWARD W. ROBINSON (Chem. Abstr.).

The Sources of the Enzymes of Normal and Pathologic Cerebrospinal Fluid. Kaplan, Irving, Cohn, David J., Levinson, Abraham, and Stern, Beatrice. [*J. Lab. Clin. Med.*, **25**, 495-505 (1940); cf. *C.A.*, **33**, 8782⁷.]

A discussion is given of the two possible sources of the enzymes in normal fluid (blood plasma and neural tissue fluid). Tryptic and phosphatase activities of the fluid of purulent meningitis are due mostly to the desmotrypsin and the desmophosphatase respectively of the polymorphonuclear cells; the lipase, tributyrinase and esterase activities are due in part (about 50 per cent.) to the desmolipolytic enzymes, and the amylase activity is due, in a lesser degree, to the desmoamylases of these cells; the remainder of the enzymic activity in this disease is probably due to lyo-enzymes of the same cells and to plasma enzymes which enter the fluid because of increased permeability. The antitryptic power of the fluid of tuberculous meningitis varies with pH in the same manner as serum antitrypsin; this suggests that the antitrypsin enters from the blood plasma because of increased meningeal permeability. The enzymic activity of the fluid in tuberculous meningitis which is not due to the polymorphonuclear cells or to the passage of plasma enzymes across the meningeal barriers is due to the presence of lymphocytes which are particularly rich in lipolytic enzymes. The sources of the enzymes in the fluids in hydrocephalus and brain tumour are discussed.

HOWARD W. ROBINSON (Chem. Abstr.).

The Lange Test. II. The Influence of Particle Size and Hydrogen-Ion Concentration of Gold Sols upon Lange Test Readings on Syphilitic and Tabetic Spinal Fluids. Glasoe, P. K., and Sorum, C. H. [*J. Lab. Clin. Med.*, **25**, 534-7 (1940); cf. *C.A.*, **34**, 512³.]

The sensitivity of the test in syphilitic and tabetic spinal fluids, as in that of paresis, increases with increase in particle size of the Au sol and decreases with increase in pH.

HOWARD W. ROBINSON (Chem. Abstr.).

The Cerebrospinal Fluid at Various Ages, with Special Reference to Degeneration and Senility. Riebeling, Carl. [*S. ges. Neurol. Psychiat.*, **167**, 133-46 (1939).]

Graphs are given, showing the changes in the protein ammonia and water contents of the brain, and the protein, cell and ammonia contents of the cerebrospinal fluid from birth to senility in man. Changes in the cerebrospinal fluid are discussed in relation to normal and pathological changes in the brain.

MARION HORN (Chem. Abstr.).

The Xanthoprotein Colorimetric Value of Non-deproteinized Cerebrospinal Fluid in Comparison with the Remaining Humoral Syndrome. Bruns, Trude. [*Z. ges. Neurol. Psychiat.*, **166**, 759-87 (1939).]

The quantitative xanthoprotein test (Becher's method, *cf. C.A.*, **20**, 1666) performed on 229 samples of human spinal fluid gave values which roughly paralleled the results of the usual tests for spinal fluid pathology (lipoid, sugar, globulin, sedimentation, etc.). In general, spinal fluids which were normal by the usual tests showed xanthoprotein values within normal limits (20-32 by Becher's scale), while those which were pathological by the usual tests showed xanthoprotein values occasionally below the normal limit but usually far above, extending up to 1,000. The highest xanthoprotein values were found in meningitis, untreated paresis and diabetic neuritis. However, 32 (14.5 per cent.) of the 229 samples showed no correlation between the results of the xanthoprotein and the other tests: in 11 cases the xanthoprotein values were elevated and the others normal, in 4 the xanthoprotein values were low and the others normal, and in 17 the xanthoprotein values were normal and the others pathological. It is suggested that the alterations in the tyrosine and tryptophan portions of the protein molecules in the cerebrospinal fluid, as shown by abnormal xanthoprotein values, may be the first signs of impending disturbance of the nervous system, and that the xanthoprotein test may hence provide a more sensitive indicator than the previously used tests for spinal fluid pathology.

MARION HORN (Chem. Abstr.).

The Vitamin C Content of the Cerebrospinal Fluid. VII. The Passage of Vitamin C into the Cerebrospinal Fluid in Cases of Injured Blood-Brain Barrier. Kasahara, Mitio, and Gammo, Ituo. [*Z. ges. Neurol. Psychiat.*, **166**, 733-4 (1939); *cf. C.A.*, **33**, 8743⁸.]

When ascorbic acid was injected intravenously into adult male rabbits, it appeared in the cerebrospinal fluid to a greater extent after meningeal irritation by subdural injection of 0.5 c.c. 3 per cent. aleuronate than it appeared before such meningeal damage.

MARION HORN (Chem. Abstr.).

The Cerebrospinal Fluid in the Bovine: Its Composition and Properties in Health and Disease with Special Reference to Turning Sickness. Carmichael, J., and Jones, E. R. [*J. Comp. Path. Therap.*, **52**, 222-8 (1939).]

Thirty-three bovine spinal fluids gave the following average values: 10.6 leucocytes per cu. mm., 34.3 mgm. total protein per 100 c.c., 36.8 mgm. glucose, 685.1 mgm. chlorides as NaCl, 16.1 mgm. nonprotein N, 10.8 mgm. urea N, 1.4 mgm. creatinine and 5.5 mgm. Ca per 100 c.c. The Lange colloidal gold test was negative. In 15 cases of turning sickness increases were noted in cell count, globulin and total protein and in one there was a positive Lange reaction. Five specimens taken from rinderpest, trypanosomiasis and East Coast fever showed little abnormality.

RACHEL BROWN (Chem. Abstr.).

Changes in the Chemistry of Cerebrospinal Fluid During Encephalography. Levinson, A., Kaplan, I., and Cohn, D. J. [*J. Lab. Clin. Med.*, **25**, 225-37 (1939).]

The phosphatase, sugar and total protein contents of cerebrospinal fluid are increased after injection of air into the spine and ventricles; Ca and P contents are

increased in some cases; chlorides, nonprotein N, lipase, tributyrinase, esterase, amylase and antitrypsin contents show no significant variation. Probable causes for these changes are discussed. HOWARD W. ROBINSON (Chem. Abstr.).

2. Pharmacology and Treatment.

Use of Pentamethylenetetrazole (Metrazole) as a Respiratory Stimulant in Acute Alcoholic Depression. McCrea, F. D., and Taylor, Haywood M. [*J. Pharmacol.*, **68**, 41-4 (1940).]

Dogs given 3-5 c.c. absolute EtOH per kgm. intravenously went into a coma from which they were partially aroused for periods of 30-45 minutes by injection of moderate doses of metrazole, after which they again became comatose. If they were given 7 c.c. EtOH per kgm. even large doses of metrazole did not arouse them. Recovery from coma began 3-12 hours after injection of the alcohol, depending on the amount injected. The metrazole had no effect on the duration of the coma or on the rate of disappearance of the alcohol from the blood stream.

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

Effect of Metrazole on Recent Learning. Ziskind, Eugene, Loken, Robert, and Gengerelli, J. A. [*Proc. Soc. Exptl. Biol. Med.*, **43**, 64-5 (1940).]

Preliminary experiments indicate that metrazole impairs the memory of recently acquired learning. L. E. GILSON (Chem. Abstr.).

Effect of Hypnotics and Several Centrally Acting Drugs (Naphthylamine, Picrotoxin) on Glomerular Filtration and Tubular Reabsorption. Koiwa, Makoto. [*Tohoku J. Exptl. Med.*, **37**, 163-78 (1939).]

Chloral hydrate, 0.15 g. per kgm. body weight, subcutaneously injected, increased glomerular filtration 18 per cent. on the average in the 1st hour after administration, with resultant diuresis. Larger doses (0.3 gm. per kgm. body weight) decreased urinary excretion about 58 and 62 per cent. on the average in the 1st and 2nd hours respectively, and decreased the rate of glomerular filtration 62 and 66.7 per cent. on the average in the 1st and 2nd hours respectively. Barbital (2 c.c. of a 10 per cent. solution of the Na salt per kgm.) decreased the quantity of urine excreted on the average 48 and 56 per cent. in the 1st and 2nd hours respectively; this amount correspondingly decreased the rate of filtration 51.2 and 56 per cent. Phenobarbital (Na salt) in doses of 0.1 gm. per kgm. body weight inhibited diuresis 54 and 66 per cent. on the average in the 1st and 2nd hours respectively. These hypnotics act to reduce the blood pressure and slow up the general circulation. Consequently the blood flow through the kidneys is diminished and glomerular filtration reduced. Picrotoxin (1 c.c. of a 1 per cent. solution per kgm. body weight) diminished the urine output 40-70 per cent in the 1st hour and 28-70 per cent in the 2nd hour. Tetrahydro- β -naphthylamine (0.2 c.c. of a 5 per cent. aqueous solution per kgm. body weight) generally diminished urine excretion. These two drugs stimulate the sympathetic nervous system centrally and effect constriction of the renal blood vessels. Forty-six references. MAURICE M. RATH (Chem. Abstr.).

Effect of Potassium Chlorate upon Poliomyelitis Experimentally Produced in the Monkey. Contat, C., and Soycher, C. [*Schweiz. med. Wochschr.*, **69**, 719-22, (1939).]

A virulent poliomyelitis strain was inoculated intracerebrally into *Macacus rhesus*, all of which died in 7-11 days after inoculation. To the virus suspension in vitro was added $KClO_3$ (2.5-5.0 per cent.) for two hours. Injection of the suspension had no effect. When $KClO_3$ (0.1 gm. per kgm. body weight) was given

by mouth every two hours 100 hours after inoculation, poliomyelitis appeared to be checked. Given within 48 hours after injection, KClO_3 prevented poliomyelitis from developing. Animals cured by KClO_3 proved immune to a second inoculation 10–15 days after the first injection or end of treatment. Five to ten times the therapeutic dose for humans proved nontoxic in monkeys. KClO_3 was successfully used to treat 40 patients with acute poliomyelitis.

MAURICE M. RATH (Chem. Abstr.).

The Significance of Neurovegetative Disturbances in Throat, Nose and Ear Diseases and their Treatment with Bellergal. Theissing, Gerhard. [*Münch. med. Wochschr.*, **86**, 1121–3 (1939).]

Bellergal, a combination of bellafolin and ergotamine, together with phenobarbital, gave good results in patients suffering from migraine and Menière's disease. Complex disturbances of the autonomic nervous system, which apparently is hyperactive, are benefited by the use of the three drugs, which are used because they act favourably on both the vagus and sympathetic systems.

MAURICE M. RATH (Chem. Abstr.).

Treatment of Multiple Sclerosis with Lecithin. Miner, I. [*Münch. med. Wochschr.*, **86**, 1038–40 (1939).]

Lecithin (10–20 mgm. in 5 c.c. of physiological saline solution) was injected intrathecally in persons with disseminated sclerosis with considerable improvement in 80 per cent. of 130 cases. Lecithin has a specific antilipase activity and is an activator of cellular processes in the organism. Both of these reactions probably account for its favourable therapeutic action. It may be that lecithin acts further to inactivate the pathogenic virus by fixation of the pathological lipase to an exogenous substrate. Administration by this method caused no apparent toxic reactions.

MAURICE M. RATH (Chem. Abstr.).

Tutin : Its Pharmacological Action and Its Antagonism to Sodium Amytal. Swanson, Edward E. [*J. Am. Pharm. Assoc.*, **29**, 2–4 (1940).]

Tutin, $\text{C}_{20}\text{H}_{23}\text{O}_8$, a glucoside of *Coriaria thymifolia*, has a convulsant action similar to that of coriamyrtin and picrotoxin; it is slower in the onset of action but longer in duration. Comparisons were made with coriamyrtin, picrotoxin, metrazole and thujone, in mice and rabbits, by the determination of convulsive and lethal doses, injected subcutaneously and intravenously. In rabbits Na amytal can detoxify 55 minute lethal doses of tutin, 45 of coriamyrtin, 40 of picrotoxin, but only 7.5 of metrazole and 5 of thujone. Intravenously, tutin can detoxify in rabbits a little more than 2 minute lethal doses of Na amytal injected subcutaneously.

A. PAPINEAU-COUTURE (Chem. Abstr.).

Two New Substituted Vinyl Barbituric Acids. Hendrix, James P. [*J. Pharmacol.*, **68**, 22–35 (1940).]

5-Ethyl- and 5-propyl-5-(1-methyl-1-butenyl) barbituric acids are potent narcotics showing a wide margin of safety in rats and dogs. The Et compound has been tried in human subjects with satisfactory results. The action was relatively brief. Both compounds were less depressant to blood pressure upon intravenous injection in dogs than was isoamylethylbarbituric acid, and, like the last-named, decreased the O utilization of white rats.

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

The Effect of Certain Barbiturates on the Response of Vaso-Active Substances. Kohn-Richards, Richard, and Grimes, Clyde. [*Anesthesia and Analgesia*, **19**, 31–4 (1940).]

A study of the influence of several barbiturates on blood-pressure changes produced by acetylcholine in decapitated cats showed that some, like pentothal,

increased the depressant action of the acetylcholine, and others, like evipal, counteracted the drug. These drugs did not change the typical effect of histamine. The vasopressor responses to pituitrin were increased 15–20 per cent. by both pentothal and nembutal.

G. H. W. LUCAS (Chem. Abstr.).

The Distribution of Bromine in the Organism After the Administration of Bromides.
I. *The Distribution of Bromine Between the Brain and Blood in the Quiescent Organism and After Excitation with Camphor.* Ephstein, Ya. A. [*Arch. sci. biol. (U.S.S.R.)*, **55**, No. 2, 50–6 (in English, 56) (1939).]

The ratio of blood Cl to brain Cl in white mice is 2.33. The injection of 136 mgm./kgm. body weight of NaBr yielded a blood Br to brain Br ratio of 3.91 within 1.5 hours. This remained almost constant for 10 days, during which four additional doses of NaBr were given. Brain excitation by the hypodermal injection of 0.2 c.c. of 20 per cent. camphor/25 gm. body weight simultaneously with NaBr did not change this ratio.

S. A. KARJALA (Chem. Abstr.).

The Passage of Bromide, Iodide and Thiocyanate into and out of the Cerebrospinal Fluid. Wallace, G. B., Brodie, B. B., Leshin, Seymour, and Brand, Elliott, [*J. Pharmacol.*, **68**, 50–5 (1940); cf. *C.A.* **33**, 2986².]

When the salts are injected intravenously into dogs the anions begin to pass promptly into the spinal fluid, but their passage into the spinal fluid, unlike the case of other tissue fluids, is slower and never reaches the concentration present in the blood serum. Furthermore the serum must attain a certain minimum concentration of iodide or thiocyanate ion before any passes into the spinal fluid. The bromide ion may also have a threshold value, but if so it is very low. When injected into the spinal cistern all three of the ions pass quickly into the blood at the same rate and there is no evidence of any barrier to their passage.

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

The Effect of Intravenous Injections of Sodium Diphenylhydantoinate (Dilantin) on Respiration, Blood Pressure and the Vagus Nerve. Haury, Victor G., and Drake, Miles E. [*J. Pharmacol.*, **68**, 36–40 (1940).]

Na diphenylhydantoinate when injected intravenously in dogs or rabbits produces an immediate 30–65 per cent. fall in blood pressure. This action is peripheral. The compound has a depressant action on the vagus nerve and has a marked depressant action on respiration. Lethal doses produce death by respiratory failure.

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

The Action in the Perfused Liver of Acetylcholine, Sympathomimetic Substances and Local Anaesthetics. Chakravarti, M., and Tripod, J. [*J. Physiol.*, **97**, 316–29 (1940).]

In the perfused liver of the dog evidence was found for three effects of adrenaline : (1) opening of the hepatic veins with increased portal inflow and diminished liver volume ; (2) increase of resistance due to constriction of the small vessels from the hepatic artery and portal vein ; (3) in the presence of pre-existing adrenaline, an increased resistance on the outflow side. When adrenaline is present in the blood, acetylcholine injected into the hepatic artery causes an expansion of liver volume, probably because of increased arterial inflow. Expansion of the liver diminishes the portal flow and the net effect on outflow is a diminution. Tyramine, ephedrine, veritol, synephrine and benzedrine all act like adrenaline, though their effects are more prolonged. Stovaine and cocaine both have a typical adrenaline-like action. Butyn, percaïne and procaine have little or no direct action of their own, but all of them enhance the action of adrenaline.

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

Antagonism of Evipan by Picrotoxin, Coramine and Cardiazole. Das, S. C. [*Quart. J. Exptl. Physiol.*, **29**, 355-65 (1939).]

The production of a steady state of respiratory depression by continuous intravenous infusion of Na evipan (I) into rabbits affords a convenient method for measuring the efficiency of analeptic drugs and for comparing their relative activities. Picrotoxin (II) causes an increase in the depth of respiratory movement as well as in the rate, whereas coramine (III) and cardiazole (IV) improve the rate of respiration rather than the depth. Three-tenths mgm. of II causes the same increase in amplitude of respiratory stimulation as 10 mgm. of III or of IV. II takes 3-5 minutes to develop its maximum effect, while III or IV reaches its maximum very quickly. When the respiratory depression is severe III often fails to produce a stimulant effect and may even augment the depression. II produces a stimulant effect in such cases. II is detoxified at the rate of 1/10 and the doses of I and the log of the doses of II which balance the continuous infusion of I at first show an increase in respiratory activity and then a fall and a final depression which may be greater than that produced by I alone.

RACHEL BROWN (Chem. Abstr.).

The Clinical Applications of Electrically Induced Convulsions. Shepley, W. H., and McGregor, J. S. [*Proc. Roy Soc. Med.*, **30**, 267 (1940).]

The authors state that the electrical method is well tolerated by the patient who is freed from the dread which hitherto was associated with these necessarily continued treatments. The disagreeable sequelae of drug-convulsant treatment are notably absent; such features as vomiting, confusion and psychomotor restlessness which formerly required close "after-supervision" are not evident. The method by its nature is devoid of such former technical complications as thrombosis of veins—a feature of special importance where insulin is used either subsequently or in combination. The method can readily be combined with other treatments such as insulin, and being a physical therapy, removes all question of toxicity or cumulative action. In virtue of the last-mentioned facts, the procedure is completely controllable, a succession of fits not intended being unknown. The method is ideally suitable for the indefinitely prolonged maintenance treatment in those non-infrequent cases where an occasional convulsion is essential to prevent relapse. The method may well reduce the incidence of fracture since their impression was that the fits upon the whole appear less strong. In their series of some 200 induced major fits neither fracture nor dislocation has so far occurred. The method offers of ready repetition without the attendant difficulties of a struggling patient, and indeed the abortive fit induces quiescence and a ready acquiescence to further treatment, in marked contrast to cardiazol administration under similar circumstances. From the administrative point of view the method offers advantages of economy, also less nursing attention and supervision.

(Authors' abstr.).