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*Physico-chemical Properties of Brain, especially in Senile Dementia and Cerebral Edema.*

Atrophy or œdema of the brain can only be measured quantitatively by the ratio of skull capacity to brain volume or brain weight. The normal difference between skull capacity and brain volume expressed as a percentage of skull capacity is between 4-9%. A ratio below 4% expresses œdema, above 9%, atrophy.

Grey matter contains between 83-87% of water and white matter from 66-80%. The higher water content of grey matter is associated with a higher content in

ash, especially electrolytes. The water content of the white matter shows no positive correlation with that of the grey matter, nor is either positively correlated with oedema or atrophy of the brain. Atrophy or oedema of the brain is not associated with a significant shift in post-mortem pH.

G. W. T. H. FLEMING.

*Mentality of Dispensary Epileptic Patients.*

The writers investigated a group of 35 epileptics, testing them from three to eight times during a period of years. The Babcock deterioration test revealed a loss of efficiency amounting to one year, but no deterioration. The attacks *per se* were not responsible for the decrease in efficiency, as there was no difference on the Babcock test between those cases with many attacks and those with few. Neither bromide nor barbiturates play any part, but, on the contrary, the feeling of security and reduction in the number of attacks more than offset any possible harm. The writers consider that the restrictions on learning and the social limitations imposed by the attacks have a great deal to do with the impairment of efficiency, hence the basic nature of the disease is the determining factor. The personality problems of the epileptic are often due to the social and psychological reactions to the disease, and may be lessened by the provision of training and sheltered workshops.

G. W. T. H. FLEMING.

*The Electroencephalogram in Bromide Intoxication.*

In the case described the electroencephalogram revealed that the alpha frequency was low at a bromide level of 59.6 mgrm. per 100 c.c. of blood, but rose appreciably and was maintained at a higher frequency when the bromide level reached 36.7 mgrm. The alteration in alpha frequency is attributed to changes in the metabolic rate of the cortical neurones studied. The percentage of the record occupied by the alpha rhythm and the average amplitude of the alpha cycles also rose to a consistently high level as the bromide level of the blood decreased. The observations described serve only to determine the presence or absence of physiological bromide intoxication, and possibly of toxicity due to other agents.

G. W. T. H. FLEMING.

*The Medulloblast and the Medulloblastoma.*

A medulloblast or "indifferent cell" of Schaper is an apolar, bipotential, undifferentiated cell which is supposed to leave the ependymal zone during development and migrate through the central nervous system, later differentiating into neuroblasts and spongioblasts. There are none of these cells in the growing cord or cerebrum, but they do occur in the external granular zone of the cerebellum. Medulloblastomas only occur in the cerebellum. The primitive spongioblasts of His are really neuroepithelial cells; spongioblasts are really neuroglial progenitors. A-polar spongioblasts give rise to all forms, spongioblasts, oligodendroglia cells and to astrocytes.

G. W. T. H. FLEMING.

*Myoclonic Epilepsy.*

The writers investigated the electroencephalogram in myoclonic epilepsy. Small bursts of rapid spikes from 10-15 per sec. appear. These may appear in a group of 2-3 early in the course of a cycle. The bursts increase in amplitude and duration. These changes are accompanied by clinical myoclonic twitchings. After this crescendo of rapid activity a major epileptic seizure results, followed by exhaustion and flaccidity represented on the E.E.G. by a flat curve, from which rapid activity is absent. In myoclonic epilepsy forced breathing to the point of giddiness produces only slow waves without spiked components. The myoclonic attack starts from the frontal region, and radiates over the brain posteriorly before it culminates in a major seizure. Myoclonic epilepsy requires several days before it terminates in the

major attack. Myoclonia is a homologue of continuous or intermittent prodromata, sometimes evident, but often obscured in other types of epilepsy.

G. W. T. H. FLEMING.

*Anoxia and Neural Metabolism.*

The respiration of the brain is about thirty times as intense as that of muscle and nerve. The cerebellar cortex has the most intense rate of respiration. The respiratory rate of the brain is determined not by the concentration of oxygen or of substrate, but by enzyme activity. Oxygen tension rather than oxygen use controls the rate at which sugar is glycolysed to lactic acid. The normal substrate for brain is dextrose, and more of this leaves the blood than could be burned by the oxygen obtained simultaneously. Hypoglycæmia, therefore, acts much like hypoxia on the brain. Interference with oxidation in the brain leads to a secondary "overshooting", with increased activity related perhaps to the liberation of potassium. Insulin shock, metrazol, thyroid, prolonged sleep and hyperthermia all directly or indirectly act by increasing the oxidation of sugar by the brain. Dyes also stimulate brain respiration, and the results of tests of their therapeutic action, especially that of pyocyanin in the treatment of schizophrenia, have been encouraging.

G. W. T. H. FLEMING.

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*Histologic Changes in Senile Dementia and Related Conditions.*

The method of microincineration was used, demonstrating the total heat-resistant mineral ashes in their original topographic arrangement. Neurofibrillar structures which appeared thickened, massed and hyperargyrophilic when examined by silver impregnation appeared hypermineralized in microincineration preparations. This applied to the intracellular strands, rods, globules, granules and nets characteristic of Alzheimer's disease, Pick's disease, pellagra ganglion cell disease.

Senile plaques were found to be localized metaplasias of the glial reticulum.

The gliosis in the white matter in Pick's disease is so intensive as to cause hypermineralization of the affected areas. The intracerebral arterioles and capillaries in Pick's disease show thickening and hyalinization of their walls. No instances of complete occlusion or thrombosis were seen. G. W. T. H. FLEMING.

*Evaluation of Artificial Fever Therapy for Neuropsychiatric Disorders.*

The method of choice is combined artificial fever and chemotherapy. Fever therapy is of doubtful value in multiple sclerosis. It is of considerable value in relieving pain in severe neuritic disturbances. For chronic meningococcal infections fever therapy may be curative, and in infectious chorea and other manifestations of the rheumatic state it shortens the course. For cerebral arteriosclerosis, functional psychoses and chronic encephalitis, fever therapy is of no value. G. W. T. H. FLEMING.

*Anticonvulsive Action of Vital Dyes.*

Neutral red and brilliant vital red appear to show anti-convulsive action in four species of animals. Electrical convulsions in rabbits are not inhibited by brilliant vital red, but convulsions due to drugs are. The dye is present in the choroid plexus, pia and perivascular spaces of the brain, so probably acts on the chemical convulsants on their passage into the central nervous system.

Seven out of ten patients showed temporarily some diminution in the number of convulsions coincidental with administration of brilliant vital red. One patient had complete remission of convulsions. Transient albuminuria occurred in four patients. Two patients treated with neoprontosil showed marked diminution in the number and severity of convulsions with no harmful complications. G. W. T. H. FLEMING.

*Brilliant Vital Red as an Anticonvulsant in Treatment of Epilepsy.*

From a study of the effects of brilliant vital red on thirteen institutionalized epileptic boys the authors found that it diminished the number and severity of the seizures in a little over half of the cases. In some cases there was an increase in



the number of seizures. Vital red tended to have a greater anticonvulsant effect on *petit mal* than on *grand mal*. In large amounts it caused temporary renal irritation, but no signs of permanent renal damage. G. W. T. H. FLEMING.

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*Somnolence Caused by Hypothalamic Lesions in the Monkey.*

The theory of a sleep centre is based on a misinterpretation of facts. If the term "waking centre" be used instead and the centre placed in the hypothalamus, there is no conflict between this concept and that of Kleitman. When the hypothalamus is thrown out of action there is quiet and relaxation favouring the onset of sleep. Destruction of the hypothalamus causes somnolence. This "waking centre" on stimulation produces combined sympathetic and somatic excitation.

G. W. T. H. FLEMING.

*Genesis of Microglia in the Human Brain.*

The youngest forms of microglia were amœboid elements often containing fat-droplets and granular inclusions. These migrated into the brain mainly from certain locations which the author calls fountains, and which occur where the choroid plexuses are attached to the brain, round certain large blood-vessels in tract areas and beneath the meninges where the latter come in contact with tracts. The precursors of the microglia cells were embryonic wandering mesenchymal elements. After invading the central nervous system as amœboid forms, microglia cells gradually became pseudopodic and gradually developed into branched forms. The first evidence of microglia was observed in the basal plate of the rhombencephalon in a 5.8-mm. embryo. There was no evidence that microglia played any role in the process of myelination. There is no genetic relation between microglia and neuroglia. The latter is developed from cells lining the wall of the neural canal. Microglia is of mesenchymal origin, and is related to the reticulo-endothelial system.

G. W. T. H. FLEMING.

*The Hematoencephalic Barrier.*

The brain has no connective-tissue stroma, so that nerve-tissue proper has a lack of affinity for trypan blue. Those regions of the brain which do stain vitally (i.e., hypophysis, tuber cinereum, area postrema, paraphysis, pineal gland and preoptic recess) have an extensive connective-tissue stroma. The electrical charge of the injected dyestuff appears to be the determining factor; basic dyes pass into nerve tissue, acid dyes do not. The author points out that the theory that the vascular endothelium of the brain is in some sense different from that in the rest of the body is not a very sound hypothesis. The reason for the difference between the brain and all other tissues in the body lies in the unique constitution of nerve tissue. When both basic and acid dyes are placed in the spinal fluid they pass diffusely into the brain from the surface, the depth of penetration being roughly parallel to the diffusibility in gelatin.

G. W. T. H. FLEMING.

*Epileptogenic Cortical Scars.*

In 10 out of 29 cases operated on for the removal of cortical scars there was complete relief from convulsions, and in 9 there was definite improvement. The results were assessed after from one to eight and a half years after operation. The longer the convulsions have existed prior to operation the poorer the results. The pathological lesions varied from simple degeneration of ganglion-cells, through degeneration with glial proliferation to dense glial and fibrous scars. Definite glial scars were seen in the walls of porencephalic cavities. Localization was based on focal characteristics of the convulsions in 25 out of the 29 cases. Pneumoencephalographic examination was disappointing, being normal in 9 out of 22 cases. The electrical reproduction of convulsion occurs more readily when the stimulus is applied at the margin of the scar than when the scar itself is stimulated.

G. W. T. H. FLEMING.

*Studies in Mongolism. I: Growth and Development.*

The mongoloid skull is not microcephalic at birth, but shows a lack of growth, especially apparent during the first six months of life. After six months all mongoloid children appear microcephalic. The lack of growth is due to early arrest in the development of the base of the skull. The abnormal shape and configuration of the skull are due to the abnormal position and configuration of the base and of the orbits. Early ossification and fusion of the epiphysial lines is present. The mongolian appearance has nothing to do with the Mongolian race or any kind of atavistic regression.

G. W. T. H. FLEMING.

*Cerebral Arteriosclerosis: Signs and Symptoms from Compression and Erosion of Parenchymatous Tissue.*

The author describes a case of an aged man whose brain at autopsy showed erosion of the cortex by sclerotic and tortuous blood-vessels which were bound down to the cortex. It is suggested that the irritation to the cortex of these pulsating hard vessels may have been responsible in part for the convulsive attacks.

G. W. T. H. FLEMING.

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*Individual Differences in the Sentencing Tendencies of Judges.*

One judge may give twice as many penal sentences as his colleagues. There is a relative consistency which differentiates the severe from the lenient judges. Judges appear to come on to the bench with a certain sentencing tendency which remains at a relatively constant level. Reform of these conditions must prove very difficult, as someone says: "The lawyer believes he may one day be judge, and does not want anyone to destroy the throne before he sits on it".

G. W. T. H. FLEMING.

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*The Origin of the Corpus Callosum and the Fate of the Structures Related to it.*

The author found that the callosal fibres do not traverse part of the primitive hippocampal commissure but make a new pathway by passing through the subiculum, dorsal to the hippocampus and across the top of the lamina terminalis. The supracallosal formation is not hippocampal, but is formed by the eversion of a small lip of subiculum. The septum pellucidum is formed by the drawing up of the anterior part of the lamina terminalis within the concavity of the frontal callosal arc. The cavum appears when tension from the expanding arc produces condensation of the septum into two laminae with a cavity between them. The paraterminal body takes no part in the formation of the septum pellucidum and there is no such thing as an open cavum septi. G. W. T. H. FLEMING.

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*Vitamin B Deficiency and Nervous Diseases.*

Considering the various noxious agents producing a neuropathy and the uniform morbid anatomy an intermediary link has to be assumed. This factor is seen in the liver. All such agents as may produce neuropathies act upon or involve the liver; for example, diabetes, pregnancy, hunger, cachexia, pernicious anæmia, heavy metal poisoning and infections. In all these conditions the liver-cell becomes depleted of its glycogen depot and simultaneously of its vitamin B stock.

From his investigations the author concludes that there is only one direct ætiological factor in the peripheral neuropathy—the vitamin B deficiency; this B avitaminosis is effectuated through the liver, which is primarily attacked by the various noxious agents and is eventually depleted of its vitamin depot. Glycogen stability and lability and possibly vitamin stability and lability of the liver represent

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a familial and also an individual constitutional factor in the tendency to nervous diseases.

Another mechanism in B avitaminosis acts through the stomach, the glands of which become affected through the neuropathy of the vagus nerve. In this way a deficiency of an intrinsic factor occurs, and simultaneously the normal utilization of the introduced vitamins is prevented.

S. M. COLEMAN.

*Pattern Features and Constitutional Susceptibility.*

Four cases are reported of individuals who, having had previous psychotic attacks, subsequently developed general paralysis. The mental state of each during the general paralysis period was identical with that exhibited during the previous psychotic attacks. One case had two subsequent psychotic episodes, during which the mental state was the same as during all previous attacks.

The writer concludes that these cases indicate that the mental symptomatology in an organic brain disease, such as general paralysis, is not symptomatic in the sense that it depends on the localization of the cerebral pathology, unless it is granted that the factors that determine the localization of that pathology are inherent in the individual. In organic psychoses pattern features are exaggerated or released from previous control. The organic brain disease serves as a release for previous personality tendencies or patterns of behaviour. The particular kind of mental symptoms in organic brain disease is determined by the individual's personality organization and previous experience.

S. M. COLEMAN.

*Difficulties in Differential Diagnosis of Brain Tumour in Older Age-groups.*

The cardinal symptoms of brain tumour are often absent in cerebral neoplasm in patients over forty years of age. In this age-group tumour may simulate cerebral vascular disease or be superimposed on a luetic infection or lead intoxication. The difficulty in differential diagnosis is apparent when twenty-five cases of undiagnosed brain tumour in patients over forty were discovered at autopsy during a seven-year period at a general hospital.

S. M. COLEMAN.

*Hydration Studies in Epilepsy.*

Water in excessive quantities will precipitate seizures in a large proportion of epileptics. This occurred in 8 out of 16 patients tested. Although extreme amounts of water were a positive factor in precipitating seizures, average amounts did not have this effect. The findings cast doubt on the efficacy of dehydration in controlling convulsions.

S. M. COLEMAN.

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*Notes on the Psychology of Metrazol Treatment of Schizophrenia.*

During the aura of the metrazol convulsions the patient feels the threat of annihilation and death. He experiences, after the fit, a slow revival of his interest in the world and an enormous feeling of relief in which he grasps at any contact offered him. Hypomanic elation, which often follows the fit, is the joy of rebirth. The previous fixations of libido lying in a more personal layer of experience are washed away by the recovery from a cataclysmic catastrophe in the depth of the

organism. The patients do not know the psychic conflicts which are reflected in their symptoms, and their fundamental attitude towards life problems remains unchanged. The fact that the results of treatment with the help of modern psychology can be understood does not say that the metrazol treatment acts as a psychological agent in the common sense. Its effects are deeper than the effects of what are called psychic influence. The treatment is an organic treatment reflected in psychological attitudes.

S. M. COLEMAN.

*Cerebral Mechanisms.*

On the basis of morphological, experimental and clinical data the writer concludes that there are three main streams of physiological potentials which reach the cerebral cortex. The first is a stream of diverse and specific sensory excitations which underlies the general stream of perceiving. The second is a stream of excitations of a more global nature passing to the corpus striatum and to the frontal lobe, which underlies the focalizing and orientative processes. The third is a stream of excitations which passes through the pars ventralis thalami to the hypothalamus and thence to the gyrus cinguli. This underlies general consciousness and the emotive reactions. In the cortex these three streams are probably united into a common process of varying composition. The cortex is not an independent level of activity, but has recurrent relations to all the lower levels of the central nervous system, and the hypothalamus is no exception to this principle.

S. M. COLEMAN.

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*Vasomotor Reactions in the Hypnotic State.*

The vasoconstriction of the digital vessels in response to a painful stimulus is partly dependent on the feeling tone associated with the awareness of the stimulus. The state of the cutaneous blood-vessels cannot be altered by hypnotic suggestion, except in association with induced emotional states. (Authors' abstr)

*Brain Potential Changes in Man Induced by Metrazol.*

The electroencephalogram in anoxia is similar to that found in a "depressed" cerebral cortex, namely, one of high amplitude and low frequency. Sub-convulsive doses of sodium cyanide produce 3-6 per second waves when the cortex is functionally depressed. Cyanide probably acts directly on the cortical neurones, enhancing their activity. The electroencephalogram reverts to the pre-metrazol level at about the same time that the blood constituents return to their normal values. Metrazol does cause a pronounced sympathetic discharge, which is accentuated if anoxia exists. Emotional stimulation has been shown to increase the amount of slow brain potential changes.

G. W. T. H. FLEMING.



*The Effect of Cardiazol Convulsions on the so-called " Bulbocapnine Catatonia " in the Monkey.*

The effects of moderate doses (15 mgrm. per kilo) of bulbocapnine on monkeys are fairly uniform in different animals and in the same animal on different occasions. The effect of cardiazol convulsions on the state produced by bulbocapnine was studied on five monkeys, and compared by means of its effect on the grasp-reflex, on the cataleptoid phenomena, and on the general motor state of the animal. The action of the convulsion is greatly to increase the cataleptic component of the state produced by bulbocapnine, producing a very marked cataleptic state, and to prolong the action of the drug both in its action in producing an akinetic state and in causing a reappearance of the neonatal grasp-reflex. These effects are not produced by the convulsion alone, which causes only a transient akinesia and appearance of the grasp-reflex.

No change was found in the animal's response to bulbocapnine after it had been given convulsions, and the same type of curve was produced by the grasp-reflex technique a week after a convulsion as was obtained a week before.

When a non-convulsive dose of cardiazol was given, an excited, irritable state was produced in the animals, with hyperkinetic movements, but no convulsions. When twice the minimum convulsant dose was given, *status epilepticus* resulted.

(Author's abstr.)

*A Clinical Study of the Effects of Short Periods of Severe Anoxia, with Special Reference to the Mechanism of Action of Cardiazol " Shock ".*

(1) A report is made of the clinical picture observed during short periods of severe anoxia administered to four schizophrenic patients on 44 occasions in all. Anoxia was produced by means of a mask from a gas anæsthetic apparatus, which was adjusted to deliver 3.5% oxygen in nitrogen for 2 minutes, followed by 2% oxygen for about 3 minutes.

(2) The clinical effects are reported. A rise of pulse-rate, respiration-rate and blood-pressure occurred continuously throughout, and subsided rapidly after cessation. The neurological disturbances are described in two stages. One and a half minutes after the beginning of the 2% oxygen administration there was loss of consciousness with, in some seconds, myoclonic twitchings and various ill-defined spontaneous movements. After a further half minute there followed a transitional phase of slight tonus abnormalities, which culminated after a further minute in the fully developed second stage or phase of tonic extensor hypertonus. If the mask was removed within half a minute of the onset of this stage, the patient woke within thirty seconds, after which mild after-effects lasted a further five minutes.

(3) The clinical state of short, severe anoxia was considered to differ significantly from the effects of convulsive doses of cardiazol, particularly in respect of the absence of epileptic fits. The spontaneous movements were less frequent and vigorous, and the vascular effects subsided more rapidly.

(4) No clinical benefit was observed in these cases.

(5) The recovery phase observed after one excessive dose of anoxia was strongly reminiscent of the rare delayed recovery from severe cardiazol fits or " irreversible " insulin coma.

(Authors' abstr.)

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*The Localisation in the Brain Stem of the Œstrous Responses of the Female Guinea-pig.*

Typical œstrous responses were obtained from ovariectomized guinea-pigs after suitable hormone injections following removal of neocortex, caudate-putamen, hippocampus, septal nuclei, and other portions of the fore-brain. Œstrous responses were observed in the guinea-pig and cat after transection of the brain-stem anterior to the mammillary bodies. Partial or complete transection of the brain-stem at the level of the inferior colliculi abolishes sexual behaviour, so that the anterior limit of the neural mechanism controlling sexual behaviour lies between the inter-collicular level and the anterior limit of the mammillary bodies.

Unilateral lesions in the posterior quadrant of the cord are followed by completely normal and bilaterally equal sexual responses, which can be evoked only by stimulation of the animal on the side contralateral to the lesions. These animals also show a tactile deficiency involving the exteroceptors in the hair-follicles, which is limited to the side of the animal ipsilateral to the lesion. A similar deficiency on the contralateral side is noted after unilateral lesions in the tectum.

The experiments show that an afferent pathway for the sexual responses runs through the cord within the posterior quadrant, decussates at some point below the inferior colliculi and runs through the roof of the mesencephalon.

(Authors' abstr.)

*Responses Following Electrical Stimulation of the Cerebellar Cortex of the Normal Cat.*

Electrical stimulation of the cerebellum in normal unrestrained cats is followed by visible movements involving the various parts of the animal's musculature. These movements may appear in three phases, the first with the stimulus, the second appearing as a rebound opposite to the first and immediately following the end of the stimulus, the third prolonged and involving the various parts of the animal in a series of relatively slow movements in a definite sequence lasting several minutes.

The pattern of movements which may be elicited from the same point in a cat from day to day remains the same both with respect to the character of the separate movements and the time of their appearance in the sequence. Different large areas of the cerebellum respond to stimulation with patterns of movement having a recognizable specificity for the area. There is a certain common quality to the movements elicited from the cerebellum which is different from the movements that occur in clonic phases of epileptic attacks provoked by stimulating the cerebral cortex.

(Author's abstr.)

*Temperature Changes in the Cortex and Hypothalamus during Sleep.*

In the conscious, as in the anæsthetized animal, basal brain regions are warmer than the cortex. Absolute temperatures fluctuate during the waking state, sometimes in a semirhythmic manner, and the positive temperature difference between hypothalamus and cortex increases in irregular fashion with activity.

Emotional states, as fear, rage, or anticipation of food, increase the relative temperature of the hypothalamus; sleep, especially, decreases and stabilizes it.

On awakening from sleep, hypothalamic temperature rises earlier and further than that of the cortex, caudate nucleus, or Ammon's horn.

The specific temperature decrease of the hypothalamus in sleep is shown to be due to lowered cell metabolism rather than to any marked change in blood-flow. This indicates that sleep is associated with a decreased rather than an increased activity of a hypothalamic "sleep centre". (Author's abstr.)

*Factors Influencing Brain Potentials during Sleep.*

(1) Minute to minute fluctuations in brain potentials through the night are superimposed on a gradual trend from hour to hour. This latter is compared with the sleep stages described by others. The potentials are present simultaneously over much of the cortex. In sequence, the patterns are: alpha + delta, delta, null, intermittent alpha.

(2) During increasing sleep depth, early in the night, delta waves appear before alpha waves are gone; while later, during diminishing depth of sleep, the deltas disappear before the alphas return. In other respects also, potentials of the rising sleep phase do not mirror those of the falling phase.

(3) Subjective reports of sleep and dreams can be correlated with potential patterns, sometimes quite sharply.

(4) Movement is accompanied by a shift of potentials towards lighter sleep in nine-tenths of the present cases, by no change the remaining times.

(5) Hypersomnia, due to prolonged voluntary insomnia or to narcolepsy, is associated with delta waves at relatively higher levels of consciousness than in normal sleep.

(6) A stimulant drug, benzedrine, diminishes delta waves; a depressant, alcohol, enhances them. (Authors' abstr.)

*Hypothalamic Regulation of Body Temperature.*

Large lesions in the hypothalamus in cats cause marked disturbances in temperature regulation and frequently result in the death of the animal. The farther back the hypothalamic lesions are placed, the greater is the impairment of the ability to keep the body temperature up to the normal level and the more rapidly does death occur.

Large lesions in the region dorsal to the optic chiasma and ventral to the anterior commissure may cause serious impairment in the ability to prevent overheating without much disturbance in the ability to prevent chilling.

Bilateral lesions in the anterior part of the lateral hypothalamus cause a moderate impairment in the ability to prevent chilling and marked impairment in the ability to prevent overheating.

Bilateral lesions in the caudal part of the lateral hypothalamus have caused marked impairment in the ability to prevent both overheating and chilling.

Moderate-sized medially placed lesions which do not invade the lateral hypothalamus have not caused much disturbance in temperature regulation irrespective of whether they were situated at the level of the infundibulum or at the level of the mammillary body. (Authors' abstr.)

*Similarity of Effects of Barbiturate Anæsthesia and Spinal Transection.*

The striking similarity of the effects of low spinal transection and barbiturate anæsthesia upon the flexion reflex of the leg is reported. Isotonic and isometric muscle studies with muscle action currents have been used to demonstrate that under ether anæsthesia a relatively sustained, cumulative reflex contraction of the leg flexors is regularly found upon repeated central stimulation of the sciatic nerve or its popliteal division; whereas, under barbiturate anæsthesia ("evipan") larger isolated non-cumulative twitches of the muscle occur in response to stimulation. The difference appears to be a matter of after-discharge, great in the case of ether,

but little under barbiturate anæsthesia. From this it is inferred that the "long-circuiting" of sensory impulses is much more seriously curtailed under barbiturate anæsthesia than under ether. (Authors' abstr.)

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*The Course of Recovery of the Spinal Cord from Asphyxia.*

(1) The effect of asphyxia on the lumbo-sacral cord of spinal cats was investigated, the asphyxia being produced by raising the intradural pressure above that of the arterial blood, thereby preventing blood from reaching the region involved. Asphyxia was maintained for periods of 25-75 min., and the behaviour of spinal reflexes observed during this time and for as long as three weeks following.

(2) After long asphyxia (55 and 65 min.) tendon reflexes and tone returned for 48 hours at the most, then disappeared. In three of the 55-minute cats a moderate extensor tone returned again after 5 to 6 days. After shorter periods (35 to 55 minutes) these reflexes and the extensor tone returned permanently and were intense. Moderate tone and all the usual reflexes returned shortly after 25 minutes of asphyxia and remained.

(3) The strong extensor tone is of reflex origin, since transection of the dorsal roots of the lower cord abolishes it.

(4) Histological preparations of the cord showed that only 3 to 75% of the normal number of anterior horn-cells were present 14 days following the asphyxia. The number surviving diminished with increasing duration of asphyxia.

(5) It is concluded that the increased reflex excitability and the exaggerated tone are the result of release, the normal inhibitory systems of the cord being more damaged by asphyxia than the excitatory systems. (Authors' abstr.)

*Cortical Response to Sensory Stimulation under Deep Barbiturate Narcosis.*

(1) A previous paper described a widespread electric response of the cerebral cortex to stimulation of the sciatic nerve appearing in the deeper stages of narcosis with pento-barbital or avertin. We propose to call it the "secondary discharge". The same effect is found with dial (di-allyl barbituric acid).

(2) The secondary discharge is invariably characterized by its immediate and complete extinction when the initial stimulus which evokes it is followed by succeeding stimuli at frequencies above about 3 per second, by the need of a rest of considerably more than a second before a full-sized discharge can again be evoked, by its subnormal magnitude if evoked at intervals between about 0.5 sec. and at least 1.5 sec., and by its complete failure to reappear after its initial extinction even if the rapid series of stimuli is continued for several seconds. In like manner, shortly after a spontaneous wave the secondary discharge cannot be evoked. In these

respects it is sharply differentiated from the primary response which precedes it, whose magnitude declines only slightly in the successive responses to rapidly repeated stimuli.

(3) The secondary discharge is widespread in the cerebral cortex, appearing with nearly the same latency and duration in both hemispheres in response to stimulation of one sciatic nerve, and with similar time relations (though sometimes with reversed polarity) in regions of the cortex remote from the sensory area.

(4) On stimulation of one sciatic nerve, the primary response differs far more when compared in the two hemispheres than does the secondary discharge which follows it. A few millimetres away from the sensory area the primary response may not be discernible, although in the same preparation it exceeds the secondary discharge in voltage when recorded from the sensory area for the sciatic nerve.

(5) The latency of the primary response in the sensory cortex identifies it with the afferent volley, which can be recorded at various points in the afferent path from the medulla to the cerebral cortex.

(6) Incisions through the cortical grey matter between the sensory area and other regions to which electrodes were applied, in some cases reduced the response in a manner that suggested a spread of the disturbance from the sensory area by way of the cortical grey matter. But the long delay between the primary response and the secondary discharge, and the approximate synchronism of appearance of the discharge in widely separated regions of the cortex, suggest that the afferent volley may act upon the thalamus or other subcortical centres, and that these centres may then distribute the discharge throughout the cortex.

(7) The failure of all but the first of a series of repeated stimuli above a critical frequency to evoke the discharge suggests the existence of an intermediate mechanism between the afferent tract and the cortical cells whose discharge is recorded. A pace-making mechanism, normally producing the synchronized rhythmic discharge of cortical cells, having its threshold raised by the narcotic and in this state rapidly fatigued, might be the intermediate mechanism whose failure would explain the extinction of the response to repeated stimuli.

(Authors' abstr.)

*A Search for Changes in Direct-current Potentials of the Head during Sleep.*

Two methods of measuring D.C. potentials from the human subject are described, one a push-pull vacuum-tube millivoltmeter, the other an adaptation of the usual type of capacity-coupled ink-writing oscillograph. The second method is based upon mechanical interruption of the input potential. The sensitivity of both methods is about 0.05 m.v.

Convenient electrodes of the Zn-ZnSO<sub>4</sub> and also Cu-CuSO<sub>4</sub> types are described. Neither combination is entirely satisfactory, but the errors introduced are small compared with potential-differences arising apparently in the skin.

No correlation could be detected between the stage of sleep and the D.C. potential-differences or changes in D.C. potential observed between chest and head, scalp and mastoid region, frontal and occipital regions, or right and left sides of the head.

(Authors' abstr.)

*On the Influence of Anoxia on Pupillary Reflexes in the Rabbit.*

Experiments are reported in rabbits on the influence of stimulation of the sciatic with weak faradic currents on the reflex pupillary dilatation. Six to 8% oxygen inhaled for a period of 20 minutes increases considerably the threshold for the reflex dilatation. The reaction is reversible on administration of air, and is identical in the sympathectomized and normal eye. The simultaneous inhalation of 4% CO<sub>2</sub> prevents the effects of anoxia. An analysis of the conditions of the experiments makes it highly probable that the pupillary reflex studied in this paper involves only the inhibition of the parasympathetic. If this is the case it may be stated that both excitatory and inhibitory processes in the central nervous system are diminished under the influence of anoxia.

(Authors' abstr.)

*Factors Controlling Brain Potentials in the Cat.*

The normal spontaneous rhythms of the cat's geniculate body, especially the dominant one at 3 per sec., are independent of impulses reaching these neurones from optic nerves, cortex or brain-stem. The background level of excitation, determined largely by optic impulses, however, strongly influences their character. The slow rhythm fades out over hours in the dark and is reinitiated after brief illumination.

The enhanced spontaneous and evoked optic potentials induced by potassium, citrate, acid, strychnine, insulin and polarizing currents and the diminished potentials resulting from calcium, alkali and glucose are described and interpreted. (Authors' abstr.)

*Control of the Potential Rhythm of the Isolated Frog Brain.*

The olfactory bulb of the isolated frog brain, which continues its *in vivo* electrical activity (especially a large regular 6 per sec. rhythm), was used to investigate physico-chemical and nervous factors controlling such spontaneous potentials.

Wave size and regularity are enhanced immediately upon isolation, without change in frequency, then gradually decrease to zero during about three hours in Ringer's solution and four in serum. Wave-frequency usually increases with each step of further isolation (single bulb, bit of bulb), and regularity, if anything, is improved.

Electrical stimulation can restore some activity of the "run-down" brain; and, even in the freshly isolated one, stimulation of the olfactory nerve for seconds increases bulb potentials by 25% for ten minutes following.

Rise in temperature, between 5 and 30° C., increases frequency (the average  $Q_{10}$  is 2.3) and amplitude, and always improves regularity. Cooling has the reverse effect.

Doubled osmotic pressure, radically reduced Na-ion, moderately increased Ca- or Mg-ions or lowered pH produce slow waves; while increased K, Na, or pH and reduced Ca produce fast ones. Na and K are antagonistic to Ca, K in small concentrations being more effective than Na. Effects are generally progressive with concentration. Changes in frequency are usually discontinuous, and when extreme are irreversible. Anions are generally without marked effects.

Although originating in a small homogeneous neurone population, potential patterns may vary greatly in frequency, wave-shape and regularity, depending on the factors studied. These and other related facts are discussed in relation to the problems of frequency and amplitude of single neurone rhythms and of the mechanism co-ordinating them to give the recorded potential. Significant parallels appear between rhythmic nerve potentials and those of cerebral neurones.

(Authors' abstr.)

*Brain-wave Frequencies and Cellular Metabolism: Effects of Dinitrophenol.*

(1) Occipital alpha brain-wave frequencies and occipitally independent alpha type waves from the vertex, which are about one cycle per second slower, were studied simultaneously with independent double recording systems in four subjects before and after doses of dinitrophenol.

(2) The independent rhythms from both regions are accelerated along two smooth curves in a manner to conform with the view that the frequencies, under the conditions of these experiments, are a measure of cortical respiration.

(Authors' abstr.)

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*A Comparison of the Neurotic Tendencies of Students of Different Racial Ancestry in Hawaii.*

The Thurston personality schedule was used to compare the degree of neuroticism of college students of different racial ancestry in Hawaii. The students of Chinese ancestry were found to be more neurotic than those of Caucasian origin; they had special difficulty in family relationships, made many physical complaints, were over-submissive and somewhat fearful. The Japanese were social and self-confident. The Caucasians had the happiest family relationships, fewest physical complaints, were unsocial, lacking in self-confidence and given to fantasy. The Koreans were a peculiarly unhappy group. There is possibly a greater femininity of the Oriental groups.

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*The Hypothalamus : A Review of the Experimental Data.*

The variety of functions attributable to such a small structure as the hypothalamus seems almost incredible. The evidence for many of them, however, is convincing, and who knows what new viewpoints will yet be added by future research? The contributions made clearly indicate that this portion of the brain contains important integrating mechanisms for the so-called vegetative functions. Many of these mechanisms produce their effects by influencing lower, subordinate complexes. In turn, the hypothalamus is undoubtedly under a certain measure of control by higher regions, including the cerebral cortex. It has been pointed out, also, that the hypothalamus may itself play a part in regulating the activities of the cortex, and students of psychic activity would do well not to ignore this possibility. The hypothalamic mechanisms concerned with sleep and with emotional expression, with the control of body temperature in warm-blooded animals, with the activities of the viscera, etc., are by no means entirely clear. A great deal of work remains to be done upon the possible roles of the hypothalamus in the metabolism of mineral substances, carbohydrates, fats and proteins. Much has been done in relation to water metabolism, but as yet not all of the features of this problem are clear. The relation of the hypothalamus to reproduction is another fascinating field. Attempts at localization of functions in the hypothalamus have met with little success except as to a few general areas. So far as specific cell-groups are concerned, the nucleus supra-opticus is the only one definitely linked with a certain activity. Perhaps no precise localization will be possible in many instances: the group or mass pattern reactions suggested by Beattie may be the answer.

(Author's abstr.)

*Some Cardiovascular Manifestations of the Experimental Neurosis in Sheep.*

Sheep in which an experimental neurosis has been developed reveal, upon examination, a cardiac disorder which is characterized by a rapid and irregular pulse, and by extreme sensitivity of the heart's action to conditioned and other stimulation. Rapid increases of rate occur in response to mildly startling stimuli which have no effect upon the pulse of normal sheep. Spontaneous variations of rate are observed both in the barn and in the laboratory. Conditioned stimulation produces a considerable and long-continued increase in pulse-rate associated with premature beats and sometimes with coupled rhythm. A case-history depicts the gradual onset of these cardiac manifestations in a sheep during the development of experimental neurosis.

(Authors' abstr.)

**RASS. DI STUDI PSICH.**

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*The Kite, Fire and the Thunderbolt.*

A psycho-analytic investigation into the symbolic significance of the kite, fire and the thunderbolt as they occur in folklore, legend and fiction. All three are found to symbolize the soul, life, the creative urge, power, revolt and domination. A single principle is found to underlie these manifold meanings: the affirmation of individual virility represented for the unconscious by phallic aggression and generative power. The author includes an interesting analysis of Dickens's Mr. Dick and his kite. He also shows the unconscious relation between Benjamin Franklin's childhood experiences, political activities and his most notable scientific invention, the lightning conductor.

S. M. COLEMAN.

*The Greek Miracle.*

The miracle of Grecian culture, so-called by Renan, was the sudden appearance of a fundamentally different intellectual approach to objective phenomena—the scientific method of thinking. Previous civilizations, the Egyptian for instance, had considerable technical knowledge on astronomy, agriculture, surgery and metallurgy, but, for psychological reasons, they were unable to pass from the stage of practical application to that of elaborating a science.

In this monograph the author attempts to answer the question: "What were the factors that made it possible for this new form of thinking to develop at that particular time?" Historical and geographical explanations are discussed and found to be inadequate. Economic and above all psychological changes were responsible for the new intellectual era. A penetrating investigation into the religious beliefs and rituals of earlier cultures shows that it was the conflict around the Œdipus situation which had effectually prevented an objective and non-mystical approach to reality.

In the middle age of Greece, economic factors drove many of the indigent population from the soil and the home of their fathers. They colonized new lands, lived together in towns, became merchants and established a monetary system. In their new surroundings ancestral worship, dominance of the father and Œdipus guilt would be less oppressive. They became to a varying and increasing degree a democratic people with equal rights, and free thinkers with laws based upon rational thinking. This new social order provided the soil from which the scientific method of thinking took birth.

S. M. COLEMAN.

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## 1. Physiology, Pathology and Biochemistry.\*

*Action of Sodium Fluoride and Methylene-blue on the Electrical Activity, Spontaneous and Provoked, of the Cerebral Cortex (of the Cat). (Compt. Rend. Soc. Biol., vol. cxxix, pp. 884-9, 1938.) Moruzzi, Giuseppe.*

Cortical oscillograms are shown. The intracarotid injection of 50 mgrm. NaF produced a transient decrease in activity. NaF also inhibited the marked electrical discharges produced by application of strychnine solution to the surface of the cortex. The effects of NaF are probably due to temporary inhibition of glycolysis. The intracarotid injection of methylene-blue caused a marked increase in the frequency and amplitude of the brain-waves. L. E. GILSON (Chem. Abstr.).

*The Effects of Pre-ganglionic De-nerivation on the Superior Cervical Ganglion. (Amer. Journ. Physiol., vol. cxxv, pp. 276-89, 1939.) Rosenblueth, A., and Cannon, W. B.*

The effect of denervation of the superior cervical ganglion upon its sensitivity to acetylcholine was studied in cats. The problem of the sensitization of the nictitating membrane to adrenaline after pre-ganglionic de-nerivation was also studied. The sensitivity of the membrane to both adrenaline and acetylcholine is increased by chronic de-centralization. E. D. WALTER (Chem. Abstr.).

*The Physiological Role of the Sympathetic Nervous System in Man. II. The Effect of the Sympathetic Nervous System and of Adrenaline on the Excitability of the Human Vestibular Apparatus. (Journ. Physiol. [U.S.S.R.], vol. xxv, pp. 41-8, 1938.) Babskii, E. B., Vinodarov, V. E., and Lampert, F. M.*

A prolongation of vestibular chronaxia is observed on the operated side after cervico-thoracic sympathectomy. The diminished excitability persists in some cases for several years. Subcutaneous injection of adrenaline (I) augments the excitability of the vestibular apparatus. Rheobasis and vestibular chronaxia are diminished. The action of I persists for over a day.

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

\* 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.

*The Sympathetic Nervous System and Anaphylactic Shock.* (*Amer. Journ. Physiol.*, vol. cxxiv, pp. 637-41, 1938.) Lissák, K., and Hodes, B. R.

The symptoms of anaphylactic shock are not significantly different in normal and completely sympathectomized cats. The drug 933F (piperidinomethylbenzodioxane) prevents the appearance of anaphylactic shock in the cat, but does not influence histamine shock. Ergotoxine has no effect on anaphylactic and histamine shock.  
E. D. WALTER (Chem. Abstr.).

*Cholinesterase of the Superior Cervical Sympathetic Ganglions of the Cat.* (*Compt. Rend. Soc. Biol.*, vol. cxxix, pp. 830-33, 1938.) Nachmansohn, D.

The ganglions are relatively rich in cholinesterase. The fibres contain about one quarter as much. The central synapses contain enough enzyme to hydrolyze, during the refractory period, all the acetylcholine liberated during stimulation.  
L. E. GILSON (Chem. Abstr.).

*The Action of Acetylcholine on Summer Frog Muscles Capable, and those Incapable, of Residual Contraction.* (*Journ. Chosen Med. Assoc.*, vol. xxviii, pp. 724-31, 1938.) Kim, C. T.

Those muscles capable of residual contraction (*cf.* Nakanishi), such as rectus abdominis, tonus bundle of ileofibrilis and caput scapulæ of triceps brachii react with acetylcholine, giving a strong and prolonged contraction. Those muscles incapable of residual contraction, such as sartorius, non-tonic parts of ileofibrilis and caput laterale of triceps brachii, give very small and convulsive contraction under a similar condition. The former muscles correspond to so-called tonus bundles of Somnerkamp, and the latter to non-tonic parts.

S. TASHIRO (Chem. Abstr.).

*The Influence of Atropine on Acetylcholine Contraction and Residual Contraction of Frog Muscles.* (*Journ. Chosen Med. Assoc.*, vol. xxviii, pp. 732-37, 1938.) Kim, C. T.

Acetylcholine contraction and residual contraction of gastrocnemius and rectus abdominis of summer frog are not diminished by atropine. It does, however, diminish muscular contraction, thereby causing indirect diminution of residual or acetylcholine contractions.  
S. TASHIRO (Chem. Abstr.).

*Antagonism between Posterior Pituitary Secretion and Acetylcholine.* (*Amer. Journ. Physiol.*, vol. cxxiv, pp. 142-8, 1938.) Necheles, H., and Newwelt, F.

Small doses of pitressin or pituitrin injected intravenously inhibit more or less completely the vaso-depresso effects of small doses of acetylcholine.

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

*Liberation of Acetylcholine by the Perfused Superior Cervical Ganglion.* (*Journ. Physiol.*, vol. xciv, pp. 155-69, 1938.) MacIntosh, F. C.

A method is described for the perfusion of the superior cervical ganglion with diluted blood. Ganglia so perfused show no damage on histological examination. They do not liberate acetylcholine spontaneously, or on stimulation of the vagus or of the post-ganglionic sympathetic fibres. Liberation of acetylcholine begins with stimulation of the pre-ganglionic nerve and ceases promptly after it. The findings of Feldberg and Gaddum and Feldberg and Vartiainen are confirmed.

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

*The Influence of Choline and Acetylcholine on the Chronaxia of the Motor Zone of the Brain Cortex.* (*Journ. Physiol. [U.S.S.R.]*, vol. xxiv, pp. 532-5, 1938.) Markosyan, A. A.

The intravenous injection of 5-10 mgrm. of choline (0.3-1.0 mgrm./kg. wt.) or 25 $\gamma$  of acetylcholine (I) into the jugular vein or carotid artery led, in 20-25 min. and 30-40 min. respectively, to a considerable shortening of the chronaxia of the motor zone of the brain cortex. Large doses (500-625  $\gamma$ /kg. wt.) of I produced a sharp lengthening of the chronaxia. S. A. KARJALA (Chem. Abstr.).

*Acetylcholine in Peripheral Nerves.* (*Arch. Ges. Physiol. [Pflügers]*, vol. ccxl, pp. 769-75, 1938.) Loewi, O., and Hellauer, H.

The ratio of the acetylcholine content of the pre- and post-ganglionic fibres of the cervical sympathetic is 6 : 1. The optic nerve and the posterior roots of the spinal cord are free from acetylcholine. There is no difference between the behaviour of acetylcholine in the nerves and in the central nervous system.

ARTHUR GROLLMAN (Chem. Abstr.).

*Central Control of the Metabolism of Fats.* (*Acta Med. Scand.*, vol. xcvi, pp. 427-39, 1938.) de Langen, C. D.

The severe hyper-lipæmia which develops suddenly when the hæmoglobin content and red-cell count are reduced to about 40% of the original value, either by bleeding or hæmolysis, can be prevented by sectioning the cord between the third and fourth thoracic vertebrae. Under this condition no hyper-lipæmia occurs even if the hæmoglobin is diminished below the critical 40% level. This suggests a central control of the hyper-lipæmia. This view is further borne out by the observation that barbiturates, which act on the mesencephalon, likewise occasion enormous hyper-lipæmia. This effect cannot be brought about by the use of bromides or morphine. Furthermore, the barbiturate hyper-lipæmic effect likewise does not materialize after sectioning the cord. It is suggested that the mobilization of fat through the narcosis of the mesencephalon may be intermediated through the hypophysis. The role which the liver plays in the fat metabolism is also emphasized, and it is shown that the hyper-lipæmia due to the artificial anæmia or mesencephalon narcosis is associated with a large accumulation of lipides in this organ, while the I value of the liver fat decreases toward that found generally in the fat depots.

S. MORGULIS (Chem. Abstr.).

*Alterations in the Excitability of the Motor Nerve under the Influence of the Electrolytes Potassium, Calcium, Magnesium and Sodium.* (*Journ. Physiol. [U.S.S.R.]*, vol. xxiv, pp. 739-45, 1938.) Shirokiĭ, V. F., and Kalikinskiĭ, I. I.

Hypertonic solutions of KCl, MgCl<sub>2</sub>, NaCl and CaCl<sub>2</sub>, when applied to the rheoscopic nerve of frogs, cause an excitation of the nerve after variable periods of time, resulting in muscular contraction. S. A. KARJALA (Chem. Abstr.).

*The Blood Gases and the Expired Air in Decerebrate Dogs.* (*Skand. Arch. Physiol.*, lxxx, pp. 80-93, 1938.) Enghoff, H., Liedholm, K., and Spiegel, E.

The CO<sub>2</sub> concentration as well as the binding capacity of the blood from decerebrate dogs is appreciably diminished; this indicates that the central nervous system may exert an effect on the acid-base balance.

S. MORGULIS (Chem. Abstr.).

*Corpus Striatum and Blood Sugar.* (*Journ. Chosen Med. Assoc.*, vol. xxviii, pp. 1250-1300, 1938.) Taniyama, Yukio.

The mechanical or electrical destruction of whole corpus striatum or pallidum alone produces a marked hyperglycæmia lasting 3-4 hours. Electrical stimulation of pallidum produces a marked hypoglycæmia, while its mechanical stimulation

causes a very slight hypoglycæmia. A destruction or stimulation of putamen or of nucleus caudatus or any part of cerebral cortex produces no change. The pallidum must be the tissue that is concerned with the sugar metabolism.

S. TASHIRO (Chem. Abstr.).

*A Globulin Test for Cerebro-spinal Fluid.* (*Lancet*, vol. i, p. 1333, 1938.) Newman, K. O.

A 5% solution of tannic acid is used in place of the Pandy reagent. Allow 1 drop of spinal fluid to run into 1 c.c. of the reagent on a watch-glass.

E. R. MAIN (Chem. Abstr.).

*"Facilitation" Phenomena in the Cerebral Cortex and the Hypothesis of the Chemical Mediation of the Nervous Influx.* (*Compt. Rend. Soc. Biol.*, vol. cxxix, pp. 27-32, 1938.) Moruzzi, Giuseppe.

"Facilitation" phenomena in the rabbit cortex are discussed. The intra-carotid injection of 0.2γ acetylcholine produces the same phenomena as faradic stimulation. This supports the hypothesis that acetylcholine is liberated in the synapses of the cerebral cortex. Narcotization with barbiturates inhibits the action of acetylcholine.

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

*Comparative Investigations on the Reducing Substances in the Ventricular and Lumbar Fluids in Hydrocephalic Children.* (*Acta Pædiat.*, vol. xix, pp. 141-52, 1936.) Ahnsjö, Sven.

In three children with congenital communicating hydrocephalus simultaneous ventricular and lumbar punctures were made after they had fasted at least 13 hours. The sugar content was the same in both fluids. The blood sugar before and after the punctures, however, varied (usually increased after the puncture) up to 50 mgrm. %. In transient staphylococcus meningitis the sugar content was the same in both fluids except on one occasion, when it was significantly lower in the lumbar fluid.

R. BERGGREN (Chem. Abstr.).

*A Simple Colorimetric Procedure for the Determination of the Cerebro-spinal Fluid Sugar Content with the Pulfrich Step-photometer.* (*Biochem. Z.*, vol. ccxcviii, pp. 141-9, 1938.) Ujsághy, Paul.

Measure 0.5 c.c. filtered or centrifuged cerebro-spinal fluid into a clean test-tube, dilute to 10 c.c. with H<sub>2</sub>O and mix. Place 2 c.c. samples in two tubes. To one tube add 0.1 c.c. 10% alc. α-naphthol solution and underlayer with 4 c.c. concentrated H<sub>2</sub>SO<sub>4</sub>, mix and after 2 minutes place in cold water for 5 minutes. The other sample serves as a blank and should be checked every time the H<sub>2</sub>SO<sub>4</sub> is changed; otherwise it remains constant at least for a week. The coloured solution is examined in the step-photometer with Filter S57. The extinction coefficient is a linear function of the sugar concentration which can be determined within the range of 1-100 mgrm. % from the graph. The special advantage of this procedure is the fact that it can be carried out without preliminary protein precipitation, as long as the protein content does not exceed 100 mgrm. %.

S. MORGULIS (Chem. Abstr.).

*Changes in the Chemistry and Nature of the Cerebro-spinal Fluid during Fœtal Life in the Pig.* (*Amer. Journ. Physiol.*, vol. cxxiv, pp. 131-5, 1938.) Flexner, Louis B.

Distribution ratios of Cl, Na and urea between cerebro-spinal fluid and blood plasma were determined during fœtal life in the pig. Up to a crown-rump length of 5.0 cm. (intra-uterine age 40 days), these substances in the cerebro-spinal fluid are in equilibrium with the plasma. In fœtuses of crown-rump length 6.0 cm.

(intra-uterine age 43 days) or greater these substances are no longer in equilibrium. In the growth interval between lengths of 5.0 and 6.0 cm. (3 days) cerebro-spinal fluid is believed to change from an ultrafiltrate to a secretion.

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

*Biochemical Studies of the Blood and Cerebro-spinal Fluid of the Newborn. I: Clinical Observations of the Fluid of Newborn under One Month.* (Journ. Oriental Med., vol. xxviii, pp. 1043-59, 1938.) Okuda, Sigeo.

The cerebro-spinal fluid of all bodies has icteric colour, which increases quickly with jaundice, but not necessarily at the same rate. The colour disappears gradually in 11-35 days. The colour is due to the presence of bilirubin.

S. TASHIRO (Chem. Abstr.).

*Significance of the Ascorbic Acid Concentration in Human Cerebro-spinal Fluid.* (Skand. Arch. Physiol., vol. lxxx, pp. 193-201, 1938.) Holmberg, Carl G.

The cerebro-spinal fluid ascorbic acid concentration is a good indicator of the state of saturation of the organism. An extensive examination of patients shows that the maximum ascorbic acid is found during August and September, and the minimum in May and June, during which time a deficit as large as 2.5 grm. is not rare.

S. MORGULIS (Chem. Abstr.).

*Cholesterol in the Central Nervous System.* (Biochim. terap. sper., xxv, pp. 347-58, 1938.) Pighini, Giacomo.

The central nervous system contains acetylcholinesterase at varying concentrations in its various parts. The grey substance and especially the ganglions of the base contain more of the esterase than the white matter.

A. E. MEYER (Chem. Abstr.).

*The Influence of the Salts of Potassium and Calcium on the Reflex Activity of the Spinal Cord.* (Journ. Physiol. [U.S.S.R.], vol. xxiv, pp. 727-38, 1938.) Kalinin, I. I.

Ca salts increase the intensity and stability of the reflex reaction of the spinal cord and decrease the threshold of stimulation and the latent period of reflex. K salts in each case have an opposite effect.

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

*Comparative Determinations of the Total Osmotic Pressure of Blood and Cerebro-spinal Fluid.* (Skand. Arch. Physiol., vol. lxxxi, pp. 29-41, 1939.) Blegen, Einar.

The osmotic pressure of serum determined in a number of healthy and diseased persons was always found to be somewhat higher than for cerebro-spinal fluid, the mean difference being about 0.5%. This is in agreement with the expectation from the Donnan law, and could seem to favour the view that cerebro-spinal fluid is formed by filtration.

S. MORGULIS (Chem. Abstr.).

*The Alkali Reserve of the Cerebro-spinal Fluid and Plasma in Chorea.* (Acta Pædiat., vol. xxii, pp. 473-4, 1937 [pub. 1938].) Moschini, S.

The average values of the alkali reserve in the cerebro-spinal fluid and plasma in chorea were 49.3 and 59.6 vols. % CO<sub>2</sub>. The average difference between the alkali reserve of the plasma and cerebro-spinal fluid was about 9% in normal subjects and 17% in choreic patients.

RUTH BERGGREN (Chem. Abstr.).

*The Uric Acid in the Spinal Fluid.* (Biochim. terap. sper., vol. xxv, pp. 464-6, 1938.) Frada, Giovanni.

Uric acid was determined in the spinal fluid of 9 patients with various diseases by use of the method of Brochner-Mortensen. With exception of one patient with a value of 1.2 mgrm. per 100 c.c., the values remained below 1 mgrm. with an average of 0.89.

A. E. MEYER (Chem. Abstr.).



*Cerebro-spinal Fluid Enzymes that Decompose Brain Tissue.* (Orvosi Hetilap, vol. lxxxii, pp. 928-9, 1938.) Kovács, Ernő.

Brain of calves bled to death is dried, powdered, extracted with acetone, and mixed at 80° with physiological NaCl solution. This mixture is inactivated in a 70° water-bath, and 2 c.c. aqueous thymol solution and 2 c.c. absolute alcohol are added to each 400 c.c. of the emulsion to stabilize and make storable. Now to 8 c.c. of this 5% brain emulsion 2 c.c. cerebro-spinal fluid is added with various buffers (to maintain it at pH 7.2-7.8), and the inorganic P is determined immediately, then after 24 and 48 hours. The fluid of normal children did not show any neurolytic effects; that of children suffering from non-inflammatory diseases increased the inorganic P content of the above emulsion, i. e. contained enzymes that decompose brain tissues.

S. S. DE FINÁLY (Chem. Abstr.).

*Polypeptides of the Blood and Spinal Fluid in Pellagra.* (Compt. Rend. Soc. Biol., vol. cxxix, pp. 713-15, 1938.) Slatineanu, A., and Potop, Isabelle.

In the 50 cases studied serum proteins varied from 5.5 to 9.8%, total non-protein N was increased in 74% and serum polypeptides were above normal in 98%. The maximum was 17.6 and the average 9.5% mgrm. polypeptide N. The composition of the spinal fluid varied quite independently of that of the serum. The protein showed small increases in 60%, and polypeptides were increased in 70%. The increase in spinal fluid polypeptides was roughly proportional to the degree of psychic derangement of the patient.

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

*Sodium and Potassium of the Serum and Spinal Fluid in Pellagra.* (Compt. Rend. Soc. Biol., vol. cxxix, pp. 718-20, 1938.) Slatineanu, A., and Potop, Isabelle.

Serum K decreased in 64% of the cases and the decrease was greater in cases with psychic derangement. The values were 7-40, average 19.8 mgrm. %. Spinal fluid K was decreased in 39%, increased in 39%, and normal in 12%. The extremes were 4.2 and 29.4 mgrm. %. Serum Na was 0.17-0.32, average 0.253%. In 91% of the cases it was below normal, but it varied independently of the K. Spinal fluid Na was 0.107-0.285, average 0.18%. It was usually below normal and below that of the blood.

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

*The Determination of Spinal Fluid Protein with the Photoelectric Colorimeter.* (Journ. Biol. Chem., vol. cxxvii, pp. 117-21, 1939.) Looney, Joseph M., and Walsh, Anna I.

The spinal fluid protein is precipitated by sulfosalicylic acid in the presence of gum ghatti, yielding a colloidal suspension stable for at least 30 hours. After standing for 5-10 minutes the tubes can be read in the photoelectric colorimeter at any time up to 24 hours. Spinal fluids containing 5-150 mgrm. can be read directly without dilution, but the greatest accuracy is obtained when the protein content is less than 75 mgrm. The mean difference between duplicates was 1.2 mgrm. with a standard deviation of 0.39 mgrm.

A. P. LOTHROP (Chem. Abstr.).

*A Mechanism of Secretion in the Choroid Plexus. The Conversion of Oxidation-Reduction Energy into Work.* (Journ. Biol. Chem., vol. cxxvi, pp. 603-17, 1938.) Stiehler, Robert D., and Flexner, Louis B.

The potential of the stroma of the choroid plexus has been found to be -0.13 v., of the epithelium, + 0.10 v. These potentials are correlated with the inequality of distribution of indophenol oxidase between these two tissues. The potentials of epithelium and stroma have been found to be equal under cyanide anoxia and N<sub>2</sub> asphyxia and are -0.20 and -0.29 v., respectively. Basic dyes are selectively

transferred from the stroma to epithelium and acid dyes in the reverse direction. With cyanide,  $N_2$  or pH asphyxia this selective transference is abolished. The barrier, demonstrated between epithelium and stroma, is amphoteric with an iso-electric point at pH 5.74. This point may be reversibly shifted to about pH 6.4 by oxidation. The potential of the oxidation-reduction system of the barrier at pH 7.4 has been estimated to be +0.115 v. A deficiency of Ca ions increased the permeability of this barrier. The data are explained by the hypothesis that the difference in potential between epithelium and stroma gives rise to an electric current causing cations to move from stroma to epithelium and anions in the reverse direction. The electrons for this current are carried presumably by the reversible oxidation-reduction system of the barrier between stroma and epithelium. The current disappears when the p.d. disappears. A. P. LOTHROP (Chem. Abstr.).

*Biochemical Changes Associated with the Onset of Secretion in the Foetal Choroid Plexus. An Organization of Oxidation-Reduction Processes.* (Journ. Biol. Chem., vol. cxxvi, pp. 619-26, 1938.) Flexner, L. B., and Stiehler, R. D.

The onset of secretory activity in the foetal choroid plexus is associated with the following changes: In the pre-secretory plexus indophenol oxidase is in equal concentration in epithelium and stroma. In the secretory plexus this oxidase is limited to the epithelium and is in greater concentration. In the pre-secretory plexus there is no p.d. between epithelium and stroma. With the onset of secretion a p.d. of 0.1 v. develops, which increases with age to 0.23 v. In the pre-secretory plexus there is no selective transference of dyes. In the secretory plexus the chosen basic dyes pass only from stroma to epithelium, and the chosen acid dyes in the reverse direction. The reducing ability (dehydrogenase) of the stroma increases with age. Certain histological differences between the pre-secretory and secretory plexuses can be noted. The changes which occur with the onset of secretion are correlated with the theory that the electric current, which develops between epithelium and stroma at this time, is associated with the secretory process.

A. P. LOTHROP (Chem. Abstr.).

*Histopathology of Neuromalacia and Curled-toe Paralysis in the Chick Fed Low Riboflavin Diets.* (Journ. Nutrition, vol. xvi, pp. 451-63, 1938.) Phillips, Paul H., and Engel, R. W.

Conclusion: Riboflavin is necessary in the growing chick for the normal function and maintenance of the nervous system, particularly the main peripheral nerve-trunks, and it may be specifically associated with myelin metabolism. Low riboflavin diets may cause two types of nutritional deficiency. One of these is a rapidly acute paralysis characterized as neuromalacia, and a more slowly developing form which causes "curled-toe" paralysis in the growing chick. Both forms are prevented by the inclusion of crystalline riboflavin in the diet.

C. R. FELLERS (Chem. Abstr.).

*Metabolism of the Nervous System: Phosphorylation in the Central Nervous System. I: Introduction, Technique and Summary of Results.* (Boll. Soc. Ital. Biol. Sper., vol. xiii, pp. 1062-3, 1938.) Ciaccio, C., and Capri, A.

II: *Behaviour of Soluble Phosphorus in Conditions of Relative Repose.* (Ibid., pp. 1063-5.)

In studies on the nerve tissue of *Bufo viridis*, the labile P values were higher and those of directly determined P lower than in mammals. Total P was rather high, and corresponded to about 70% of that in the muscles. The distribution of P in the various fractions differed from that of the muscles. Conclusion: The nerve tissue can bring about phosphorylation of glucides, but accomplishes this in a qualitatively and quantitatively different manner than the muscle.

*III : Behaviour of Soluble Phosphorus in the Nerve Tissue of Bufo viridis Intoxicated with Monoiodoacetic Acid. (Ibid., pp. 1066-8.)*

Monoiodoacetic acid affected the distribution of soluble P in the nerve tissue in a manner analogous to that of the muscle. Esterification values were rather high where reflex activity was inhibited, lower where it was weak and negative where it was maintained.

*IV : Behaviour of Soluble Phosphorus in Macerated Nerves Intoxicated with Sodium Fluoride. (Ibid., pp. 1069-71.)*

Under these conditions the esterification values were rather high at the expense of pre-existing inorganic P and of cleavage products of the labile complexes.

HELEN LEE GRUEHL (Chem. Abstr.).

*Radio-active Phosphorus as an Indicator of Phospholipide Metabolism. IV : The Phospholipide Metabolism of the Brain. (Journ. Biol. Chem., vol. cxxvi, pp. 493-500, 1938.) Changus, G. W., Chaikoff, I. L., and Ruben, S.*

A much slower deposition of radio-active phospholipide occurs in the brain than in liver, kidney or small intestine after the ingestion of labelled phosphate. A progressive increase was observed as long as 200 hours after administration of the phosphate, and once the maximum had been deposited, its loss occurred at a very slow rate, the active phospholipide being present in the brain as late as 4 weeks after ingestion. The rate of formation was identical in the fed and fasted rat, and the brain of the young rat incorporated more radio-active phospholipide than the brain of the adult. The results quite clearly demonstrate that the phospholipide content of a tissue bears no relation to its phospholipide turnover.

A. P. LOTHROP (Chem. Abstr.).

*The Effect of Some Amines on the Central Nervous System. (Klin. Wochenschr., vol. xvii, pp. 1580-3, 1938.) Jacobsen, E., Wollstein, A., and Christensen, J. Tind.*

The antagonism of the HCl or H<sub>2</sub>SO<sub>4</sub> salts of  $\beta$ -phenylisopropylamine, its *N*-Me *N*-Et and *N*-iso-Pr derivatives, phenethylamine and ephedrine to the soporific effect of dormin (allylethylbarbituric acid) is similar in human beings to that in experimental animals. Substitution of HO in the aliphatic chain greatly weakens the effect, and HO substitution in the ring destroys it. *N*-methylation tends to increase the effect, while larger alkyl groups weaken it. Phenethylamine has no antagonism to dormin.

H. L. MASON (Chem. Abstr.).

*Hippuric Acid Synthesis in Schizophrenia. (Lancet, pp. 995-6, 1938 (ii). Ström-Olsen, R., Greville, G. D., and Lennon, R. W.*

The excretion of hippuric acid was equal to or less than 2.9 grm. expressed as BzOH (cf. Quick, *Amer. Journ. Med. Sci.*, clxxxv, p. 630, 1933) in 5 out of 28 catatonic patients, and in 6 out of 34 with other varieties of schizophrenia. A metabolic disturbance in the liver affecting BzOH detoxication does not appear to be a characteristic feature of catatonia.

E. R. MAIN (Chem. Abstr.).

*The Aetiological Factor of Vitamin B Deficiency in Peripheral Neuritis and Optic Neuritis of Alcoholic or Tobacco Habitues. (Med. Woman's Journ., vol. xlvi, p. 30, 1939.) Cushman, Beulah.*

In a man who had indulged excessively in smoking and alcohol for several years, peripheral neuritis and optic neuritis disappeared after 10 days' treatment with large doses of vitamin B + abstention from tobacco and alcohol. Relapse occurred after the patient had returned to his former habits.

MARION HORN (Chem. Abstr.).

*Tabes Dorsalis and Vitamin B Deficiency.* (*Urol. Cutaneous Rev.*, vol. xliii, pp. 56-62, 1939.) Reese, Hans H., and Hodgson, Edward R.

When patients with tabes dorsalis were given large doses of liver extract, vitamin B<sub>1</sub> and yeast for two weeks without specific antiluetic treatment remarkable improvement occurred, especially in the ataxia, sensory power and visual fields. Subsequent addition of antiluetic drugs, e.g., mapharsen, to the vitamin therapy led to further improvements, with no visual complaints (such as often follow administration of the antiluetic agents alone). An adequate vitamin metabolism cannot desensitize syphilitics against arsenicals. However, vitamin saturation protects the tissues against invasion by spirochætes, and, conversely, the focal symptomatology of neurosyphilis is due to regional vitamin depletion.

MARION HORN (Chem. Abstr.).

*Nutritional Deficiency and the Nervous System.* (*Journ. Amer. Med. Assoc.*, vol. cxi, pp. 1729-44, 1938.) Shattuck, Geo. C.

Lesions of the nervous system which are common in beriberi, pellagra, Korsakov's syndrome and pernicious anæmia, as well as in many other morbid conditions are traceable to deficiency of diet, or to conditions that interfere with utilization of factors contained in food which has been ingested. Neurological lesions are often traceable to a lack of the vitamin B complex, or of something contained in liver.

E. P. GRIFFITHS (Chem. Abstr.).

*Peptone Shock in Dogs with Disturbed Function of the Vegetative Nervous System.* (*Journ. Physiol. [U.S.S.R.]*, vol. xxiv, pp. 586-603, 1938.) Baturenko, T. I.

Disconnection of the centre of the vegetative nervous system from the periphery by severance of the common vago-sympathetic nerve-trunk or the separate vagus and sympathetic nerves at the neck had little effect upon shock produced by peptone injection. Paralysis of the peripheral endings of the parasympathetic nerve with atropine (I), pilocarpine (II), arecoline (III) and acetylcholine (IV) a few minutes before peptone injection increased the severity of shock, but with injections 2 hours before peptone injection only a slight shock was obtained. Eserine in each case alleviated the effect of shock, as did combined administration of BaCl<sub>2</sub> and I. The administration of papaverine with I, II, III or IV resulted in intensification of shock. Administration of CaCl<sub>2</sub> weakened the shock, while KCl produced an unfavourable effect.

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

*Adrenaline-like Substance in Post-ganglionic Sympathetic Fibres.* (*Science*, vol. lxxxviii, p. 434, 1938.) Lissák, K.

By using bicarbonate-free Ringer solution containing 1 : 50,000 physostigmine, extracts were made of different nerves from the cat, dog, rabbit and frog. These were dialyzed against the same solvent, and the dialyzate was tested on the isolated frog heart for acetylcholine. Different nerves contain different amounts. Pre-ganglionically denervated superior cervical ganglia of the cat and rabbit, one to two weeks after the operation, no longer contain acetylcholine, but an adrenaline-like substance having positive inotropic and chronotropic effects on the frog heart. The same results were obtained with post-ganglionic fibres along the superior mesenteric artery. If extracts of mixed nerves are made with bicarbonate-free Ringer solution without physostigmine, no acetylcholine is present, but the adrenaline-like substance is. This substance is dialyzable, oxidizable and heat-labile, and has a positive action on the blood-pressure. Is it sympathin?

DOROTHY A. MEYER (Chem. Abstr.).

*A Simple New Method for the Differential Diagnosis of Meningitis and Encephalitis.* (*Klin. Wochenschr.*, vol. xvii, pp. 1656-7; *Orvosi Hetilap*, vol. lxxxii, pp. 1068-70, 1938.) Ujsághy, Pál.

To a mixture of 2 c.c. of concentrated H<sub>2</sub>SO<sub>4</sub> and 0.1 c.c. of a 10% solution of *a*-naphthol, add 0.1 c.c. of spinal fluid and observe the colour in the incident light

of an incandescent lamp. The normal colour is bluish red without yellow tones. In case of meningitis the colour is greenish yellow with a yellowish-red tone, later becoming orange. In encephalitis a wine-red colour develops quickly. In meningo-encephalitis the colour is bluish red with a yellow tinge.

H. L. MASON (Chem. Abstr.).

*Ammonia Formation in the Brain.* (*Journ. Physiol.* [U.S.S.R.], vol. xxiv, pp. 915-20, 1938.) *Vladimirova, E. A.*

Saturated borax solution (pH 9.1-9.3) does not inhibit enzymic  $\text{NH}_3$  formation (I) in minced brain tissue. I is completely inhibited by 1-2% HCl, which is a satisfactory medium for the determination of pre-formed  $\text{NH}_3$ , since it destroys the de-aminizing enzymes.

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

*Calcæmia and the Vegetative Nervous System at High Levels in the Andes.* (*Bol. soc. quim. Peru*, vol. iv, pp. 173-98, 1938.) *Palti, Victor.*

The blood Ca of 125 young Peruvian soldiers stationed at different altitudes was determined. The average total and physiologically active (ionized) Ca (in mgrm. per 100 c.c.) was: at sea-level, 11.06 and 6.44; at 3,200 m., 11.62 and 6.69. Eleven members of an expedition showed similar results at sea-level, 3,200 m., and 4,500 m. In two cases mountain sickness "soroche" occurred with reduced blood Ca. No relation was found between the vago-sympathetic dystony of high altitudes and blood Ca. Conclusion: At high altitudes total blood Ca is increased and active Ca is slightly increased.

W. C. TOBIE (Chem. Abstr.).

*Comparative Study of the Amount of Syphilitic Antibodies in Serum and in Spinal Fluid.* (*Bull. Soc. Franç. Dermatol. Syphil.*, vol. xlv, pp. 368-72, 1938.) *Auguste, C., and Tarbouriech, L.*

Ravaut believes that syphilitic antibodies are not from the blood, but from the nervous parenchyma, disintegrated by syphilitic lesions, for some patients have positive Wassermann reactions in spinal fluid and negative in blood. Dujardin believes that the antibodies originate in the blood, and appear in the spinal fluid because of the permeability of the meninges; and that the amount of antibodies in serum is always greater than in spinal fluid. Wassermann determinations were run on serum with the fraction precipitable by HCl removed on 104 patients. Auguste believes that reactions on whole serum are not comparable to those on the spinal fluid. Results show that in all cases the amount of antibodies in the blood is equal or superior to that in spinal fluid. This confirms Dujardin's theory.

DOROTHY A. MEYER (Chem. Abstr.).

*A Hexosamine-containing Substance in the Protagon Fraction of the Brain.* (*Skand. Arch. Physiol.*, vol. lxxx, pp. 46-51, 1938.) *Blix, Gunnar.*

The method for preparing the substance is described. It consists of acetylated hexosamine in combination with an acid component. Unlike the carbohydrate constituents of other mucins it yields a red colour with dimethylaminobenzaldehyde even before being treated with alkali. A trace of  $\text{FeCl}_3$  colours its solutions an intense yellow. This substance obtained from brain bears a very close resemblance to the carbohydrate obtained from mucin of the submaxillary gland.

S. MORGULIS (Chem. Abstr.).

*Disturbances in the Central Regulation of the Water Economy in Infancy.* (*Acta Pædiat.*, vol. xxii, pp. 136-40, 1937.) *Kramár, J., and Blazsó, S.*

The central nervous system was considered wholly or partly responsible for the disturbances in the  $\text{H}_2\text{O}$  and salt economy in infants with dysentery. If 1 c.c. of the cerebro-spinal fluid of these infants was injected into the cerebral ventricle of a "diuretic" dog, the diuresis was greatly diminished, the Cl concentration of the

urine increased and albumin, red blood-cells and cylinders appeared in the urine. The same reaction was produced by the cerebro-spinal fluid of infants with pneumonia, but not by that of healthy infants, nor of infants after recovery from dysentery or pneumonia. It was not due to increase in the cells or to changes in the protein content, reaction of the fluid or mineral constituents. The effect may possibly be caused by (1) the action of an endogenous or exogenous toxic substance on the diencephalic-pituitary system, or (2) the pressor substance of the pituitary. Hypertension is present in infants with severe dysentery or pneumonia. In the dog experiments pitressin produced the same effects as the cerebro-spinal fluid of the pneumonia or dysentery patients. But the same reaction was also obtained with toxins, as the Shiga toxin. The experiments thus far would rather favour the first possibility—a toxic action on the diencephalic pituitary system.

RUTH BERGGREN (Chem. Abstr.).

*Metabolism during Periodic Paralysis of the Extremities. II. (Folia Endocrinol. Japon., vol. xiv, pp. 33-4, 1938.) Kitamura, R.*

Paralysis of the extremities could be produced in the patient, a 19-year-old male, by the intake of large amounts of carbohydrate, and could be almost entirely prevented by limiting the carbohydrate consumption. The attacks often lasted 1-2 days. The patient had a slight goitre, but the basal metabolism was normal. He was sensitive to adrenaline. The respiratory exchange and lactic acid content of the blood were studied after the injection of 20 c.c. 25% neutral Na lactate during and between attacks. In the recovery stage after a slight attack, and in the interval free from attacks, the respiratory exchange was slightly increased, while the blood lactic acid first increased and then returned in 30 minutes to the initial value. During severe attacks the increase in blood lactic acid and O<sub>2</sub> consumption after lactate administration were much more marked. The results agree with the view of K. Tsuji that the occurrence of periodic paralysis of the extremities is connected with a disturbance in lactic acid metabolism.

RUTH BERGGREN (Chem. Abstr.).

*Syntropan Test of Convulsive Manifestations, especially Epilepsy. (Arch. soc. sci. méd. biol. Montpellier et Languedoc, vol. xix, p. 6, 1938.) Euzière, J., Lafon, R., and Roche.*

When 1 cgrm. of syntropan is injected intravenously per kgrm. body-weight normal human subjects show merely vasomotor phenomena or discrete sympathetic phenomena; epileptics show either typical generalized crises or localized convulsions or no response; pithiatic patients show frank pithiatic crises; and patients with concussion of the brain show crying or laughing spells, transitory aphasia or loss of vision.

MARION HORN (Chem. Abstr.).

*Cytochrome Content of the Nervous System. (Biochem. Z., vol. ccxcviii, pp. 137-40, 1938.) Huszák, Istvan.*

Indophenoloxidase and cytochrome are found in the same location in the central nervous system, the largest amount being in the cortex and in the central grey nuclei. The strongest absorption spectrum is given by cytochrome c, b, a and d being progressively weaker. Neither indophenoloxidase nor cytochrome is found in the white substance or in the peripheral nerves. The sympathetic ganglia contain no indophenoloxidase. The oxidation mechanism of the brain cortex, grey nuclei or sensory ganglia belongs to the iron-porphyrin catalytic system.

S. MORGULIS (Chem. Abstr.).

*Pyruvate Oxidation in the Brain. IV: The Oxidation Products of Pyruvic Acid. (Biochem. Journ., vol. xxxii, pp. 1711-17, 1938.) Long, Cyril.*

Lactic acid and AcOH were found in definite amounts when pigeon brain brei was respired in pyruvic acid solutions in the presence of O. The quantities found

accounted for 30% of the pyruvic acid which disappeared, the remainder being oxidized completely to CO<sub>2</sub> and water, thus enabling a complete balance sheet to be drawn up.  
E. W. SCOTT (Chem. Abstr.).

*Imbecillitas Phenylpyruvica. A New Metabolic Anomaly.* (Tids. Kjemi Bergvesen, vol. xviii, p. 97, 1938.) Fölling, A.

A colour reaction with FeCl<sub>3</sub> giving deep green colour, hitherto unknown, was discovered in the urine of imbeciles. The compound responsible for this colour reaction was isolated and identified as phenylpyruvic acid. The presence of this compound has never been found in urine from normal persons. Samples of urine from 23 imbeciles showed a positive reaction of phenylpyruvic acid. In different countries of Europe and in America the question is being examined.

V. ASCHEHOUG (Chem. Abstr.).

*Metabolic Investigations on a Case of Phenylpyruvic Oligophrenia.* (Journ. Biol. Chem., vol. cxxvi, pp. 305-13, 1938.) Jervis, Geo. A.

Phenylpyruvic oligophrenia, a disease in which there is urinary excretion of phenylpyruvic acid by mentally defective patients, is characterized biochemically by an inhibition in the metabolism of phenylalanine at the stage of phenylpyruvic acid, the subject being unable to oxidize this keto acid at a normal rate. When proteins containing various amounts of phenylalanine were fed, the higher the content of this amino-acid in the protein the greater the increase in the output of phenylpyruvic acid. Of a number of pure amino-acids fed, only phenylalanine increased the output of phenylpyruvic acid, and the *d* form induced a greater increase than the *l* form. The formyl and acetyl derivatives of the *d* form did not yield phenylpyruvic acid, but its excretion was augmented by ingestion of these derivatives of the *l* form. Phenylpropionic, phenylglyceric, cinnamic, *p*-hydroxyphenylpyruvic and homogentisic acids were without effect on the phenylpyruvic acid excretion. On the other hand, the amount is increased by ingestion of phenylpyruvic and phenyllactic acids. The subject was a well-developed and otherwise healthy male imbecile, aged 28 years.

A. P. LOTHROP (Chem. Abstr.).

## 2. Pharmacology and Treatment.

*Contribution to the Study of the Hæmato-encephalic Barrier in Tuberculous Meningitis.* (Acta Pædiat., vol. xxii, pp. 371-2, 1937 [pub. 1938]. Mórítz, D., and Wollek, B.

Various factors connected with the acid-base equilibrium were studied in the blood and cerebro-spinal fluid (c.s.f.) of 2 infants and 15 children, 2-14 years old, with tuberculous meningitis. Hyposalæmia was present. The Cl, fixed base and molecular concentration of the blood and c.s.f. were diminished and the freezing-point raised. The Cl in the blood and c.s.f. continued to decrease as the disease progressed. The diminution in fixed base was less marked. The ratio of the Cl in the blood to that in c.s.f. was below normal. The coefficient of permeability, which was always below the normal value, diminished progressively during the disease. There was a constant increase in the permeability of the hæmato-encephalic barrier to Cl, while the coefficient of permeability to the fixed base remained almost normal and invariable during the disease. Variations in the other factors concerned with the acid-base equilibrium were less marked. The amount of organic acids was increased, more so in c.s.f. than in the blood. The ratio of organic acids in the blood to those in the c.s.f. was rather variable during the disease. The alkali reserve was lowered to a greater extent in the c.s.f. than in

the blood, and the coefficient of permeability showed the same variability as that for the organic acids. Azotæmia was usually normal and the coefficient of permeability rather variable. The difference in behaviour of the blood and c.s.f. may be explained by (1) the increase in the permeability of the hæmato-encephalic barrier, and (2) the laws of the acid-base equilibrium and of the osmotic regulation.

RUTH BERGGREN (Chem. Abstr.).

*Action of Certain Poisons on the Central Nervous System when given by Sub-occipital Injection.* (Compt. rend. Soc. biol., vol. cxxix, pp. 318-19, 1938.) Mercier F., Delphaut, J., and Boujart, M.

Physiological doses of pilocarpine and atropine had little or no effect. Small doses of sparteine stimulated respiration and larger doses paralyzed it. Ergotamine tartrate, 2 mgrm. per dog, accelerated respiration and produced hypertension and renal constriction. Eserine salicylate, 0.5 mgrm., produced hypertension and bradycardia; larger doses were often fatal. Ephedrine produced the same effects as adrenaline, previously reported.

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

*The Comparative Physiological Action of Benzedrine (Amphetamine) and Derivatives on Daphnia Magna.* (Amer. Journ. Pharm., vol. cx, pp. 526-32, 1938.) Viehoever, Arno, and Cohen, Isadore.

From tests made on *Daphnia magna* the following criteria were used to evaluate the activity of benzedrine sulphate and derivatives, the speed of the onset of convulsive locomotion, depression of respiratory and cardiac systems and death at similar concentrations. Judged by these responses to solutions of comparative percentage concentrations, benzedrine sulphate is considered more active physiologically than paredrinol sulphate or paredrine hydrobromide, while paredrinol sulphate is rated more active physiologically than paredrine hydrobromide.

W. G. GAESSLER (Chem. Abstr.).

*Pharmacodynamic Action of Benzedrine.* (Compt. rend. Soc. biol., vol. cxxix, pp. 497-9, 1938.) Dautrebande, L., Philippot, E., and Charlier, R.

Intravenous injections of 3-60 mgrm./kgrm. produce bradycardia and increases in blood-pressure, respiration, diuresis and kidney volume. The hypertension is due largely to peripheral vasoconstriction. The bradycardia is of reflex origin; it is not produced in the vagotomized dog. If the injections are repeated at suitable intervals the effects on blood-pressure and on the kidneys are reversed.

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

*Subjective Effect of  $\beta$ -Phenylisopropylamine Sulphate (Benzedrine) on Normal Adults.* (Acta Med. Scand., vol. xcvi, pp. 89-131, 1938.) Bahnsen, P., Jacobsen, E., and Thesleff, H.

A carefully controlled experiment was carried out with 400 adults, engaged chiefly in intellectual occupations, of which 100 persons received a 10-20 mgrm. dose of benzedrine (200 persons served as normals for comparison, while 100 persons receiving starch tablets served as the control group).

The benzedrine-treated group reported as follows: In about 25% there was an improved attitude toward work, lessened fatigue, greater well-being, good humour and talkativeness; in about 20-25% there was palpitation with various temperature sensations; in 25% there were disturbances of sleep. In the experimental group 28 describe their sensation as pleasant, 18 as unpleasant, while 3 report the effect as thoroughly unpleasant, but in none were any alarming clinical symptoms noted. The effect of the benzedrine appears in about  $\frac{1}{2}$ -4 hours, and in about a fifth of the subjects the subjective effects persist after 24 hours. The subjective effects of the drug are weakened when administered repeatedly at 24-hour intervals.

S. MORGULIS (Chem. Abstr.).



*A Colour Reaction for Benzedrine.* (*Lancet*, vol. i, p. 1275, 1938.) *Richter, Derek.*

Extract 60 c.c. urine, to which 4 c.c. 2 N NaOH has been added, with 6 c.c. of petroleum ether. Centrifuge the extract and to 3 c.c. of the clear solution add 3 c.c. CHCl<sub>3</sub> and 0.6 c.c. of 1% solution of picric acid in toluene. Allow to stand for 12 hours for separation of picrates of other basic substances. Compare the clear, yellow solution with standards containing 0, 1, 2, 5, 10 and 20 $\gamma$  benzedrine per c.c. A blank value of 0.5-1 $\gamma$  per c.c. is due to amines normally present. After administration of 20 mgrm. benzedrine, 30-50% is excreted in 24 hours, and some can be detected after 40 hours.

E. R. MAIN (Chem. Abstr.).

*Action of Insulin Hypoglycæmia on the Spontaneous and Provoked Electrical Activity of the Cerebral Cortex (of the Rabbit).* (*Compt. rend. Soc. biol.*, vol. cxxviii, pp. 1181-4, 1938.) *Moruzzi, Giuseppe.*

Cortical oscillograms are shown. The injection of 5 units per kgrm. of insulin produces a transient increase in the amplitude of the waves, followed by a decrease to almost zero when the convulsion stage is reached. At this point the injection of glucose restores the normal activity, while the injection of Na lactate or pyruvate has no effect.

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

*Insulin Shock Therapy at Florida State Hospital.* (*Journ. Florida Med. Assoc.*, vol. xxv, pp. 229-33, 1938.) *Huskey, A. L.*

Of 15 schizophrenic patients completing treatment with insulin (I) shock, 33% were greatly improved, 20% moderately improved, 33% slightly improved, and 14% unimproved. The duration of the psychosis in these patients before treatment was 2 months to 7 years. In all cases showing great improvement, the psychosis was of less than 1 year's duration. All patients improved physically under I, with weight gains of 10-30 lb. and improvement in general skin condition. Of 3 cases of moderately advanced acne, 2 were entirely healed and 1 was greatly improved at the termination of treatment. There were 13 convulsions, 1 dislocated shoulder and no fatalities. A preliminary trial of metrazole (II) at the same hospital gave results which were not quite as encouraging as those with I. However, it is believed that with improved technique II will compare favourably with I.

MARION HORN (Chem. Abstr.).

*A Comparative Study of the Development of the Clinical, Electro-encephalographic and Biochemical Changes during Insulin Hypoglycæmia.* (*Albany Med. Ann.*, vol. lvii, pp. 135-6, 1938.) *Himwich, Harold E.*

During the first two hours after the injection of insulin in the shock treatment of schizophrenia, there occurred a beginning decline in the brain metabolism and in the frequency of the  $\alpha$  waves of the electro-encephalogram, with somnolence, perspiration and hypotonia. During the next three hours there occurred a great decrease in the O consumption of the brain, loss of the  $\alpha$  waves and augmentation of the  $\delta$  index, unconsciousness, tremors, forced grasping, torsion spasms, extension spasms and clonic spasms. With the administration of sugar the  $\alpha$  waves reappeared, the cerebral metabolism returned to pre-insulin values, the delta index decreased and consciousness returned. Clinical results revealed that the best therapeutic effects were associated with the second phase.

MARION HORN (Chem. Abstr.).

*Experimental and Clinical Considerations of the Actions of Camphortetrazole, Metrazole, and of Schizophrenic Psychoses.* (*Journ. Lab. Clin. Med.*, vol. xxiii, pp. 1240-8, 1938.) *Jackson, D. E., and Jackson, Helen L.*

Injection of camphortetrazole (methylisopropylidenepentamethylenetetrazole) (I) into dogs causes clonic convulsive seizures with symptoms similar to those caused by metrazole (II). A dose of 20-40 mgrm. I, given intravenously, is about

equivalent in effects produced to 300 mgrm. II. The possibility that the drugs act by increasing the flow of blood to the brain, thereby stimulating oxidation, is discussed.  
E. R. MAIN (Chem. Abstr.).

*Technique and Indication of Cures with Insulin and Cardiazol in Schizophrenia.* (Journ. belge neurol. psychiat., vol. xxxviii, pp. 831-46, 1938.) Gross, M., and Gross-May, G.

Techniques are presented for the treatment of schizophrenia by (1) insulin, producing hypoglycæmia comas, (2) cardiazol, producing epileptic crises, and (3) the two treatments combined. Gross recommends psychotherapy during the treatment. (1) or (2) is used with patients in the early stages of the disease, but if no good results are obtained, treatment (3) is tried. The latter therapy is also recommended for catatonic stupor.  
DOROTHY A. MEYER (Chem. Abstr.).

*Insulin Therapy for Schizophrenia in an English Clinic.* (Journ. belge neurol. psychiat., vol. xxxviii, pp. 604-12, 1938.) James, G. W. B., Freudenberg, R., and Cannon, Tandy.

118 cases of schizophrenia were treated with insulin, often combined with cardiazol. No difference was noted between the action of crystalline insulin and the glandular extract. The dose to produce coma varied, even in the same individual, as patients often increase their resistance to insulin. The duration of the daily insulin coma was gradually prolonged, the patient being revived by sugar syrup given by stomach-tube, or by intravenous injections of 20-33% glucose solution. The treatment lasted from 26 to 118 days. Complete or partial recovery was obtained in 61 cases, but no amelioration in 57 cases. The patients in the latter group were all cases of long standing.

DOROTHY A. MEYER (Chem. Abstr.).

*Metrazole Treatment of Psychosis at the Mississippi State Hospital, Whitfield, Mississippi.* (Mississippi Doctor, vol. xvi, pp. 35-9, 1939.) Magiera, Estelle A.

Metrazole shock treatment led to recovery, improvement and no improvement in 9, 20 and 4 cases of schizophrenia; in 4, 6 and 1 cases of manic-depressive psychosis; in 3, 1 and 0 cases of involuntional melancholia; and in 0, 0 and 2 cases of psychosis with chronic alcoholism. No serious complications were produced.

MARION HORN (Chem. Abstr.).

*Newer Treatment Methods in Schizophrenia.* (Ohio State Med. Journ., vol. xxxv, pp. 163-8, 1939.) Baber, E. A.

Of 55 schizophrenics treated with insulin (I) shocks, 22 showed a complete symptomatic recovery, 17 a social recovery, 15 some improvement, and 1 no benefit. A "combined" metrazole (II) therapy was used in 70 cases. (It is not clear whether the II was combined with camphor and (or) with I.) Of these 70, 4 showed complete symptomatic recovery, 7 social recovery, 35 some improvement, and 24 no benefit. II has only a limited value when used alone, and generally is of greater value when combined with I. However, several depressed and stuporose as well as a few noisy and over-active patients responded favourably to II.

MARION HORN (Chem. Abstr.).

*Comparative Experimental Studies on the Effect of Insulin and Cardiazol Determined by the Donaggio Reaction.* (Boll. Soc. Ital. Biol. Sper., vol. xiii, pp. 897-8, 1938.) Colombati, S.

A single injection of cardiazol produced a marked positive Donaggio reaction which diminished on succeeding doses. Insulin produced a positive Donaggio reaction which persisted on decreased doses, and even for a time after suspension of the injections.

HELEN LEE GRUEHL (Chem. Abstr.).

*Cerebral Lesions in Hypoglycæmia. II: Some Possibilities of Irrevocable Damage from Insulin Shock.* (*Arch. Path.*, vol. xxvi, pp. 765-76, 1938.) Baker, A. B.

In the study of the cerebral lesions in two cases of hypoglycæmia extensive changes were observed within the vessels, the myelin and particularly the glia. The possibility of such injury to tissue should make one cautious in the use of hypoglycæmia as a therapeutic agent. HARRIET F. HOLMES (Chem. Abstr.).

*Electrical Studies on the Pharmacology of Autonomic Synapses. I: The Action of Parasympathomimetic Drugs on Sympathetic Ganglia.* (*Journ. Pharmacol.*, vol. lxx, pp. 18-35, 1939.) Marrazzi, Amedeo S.

The oscillographic recording of post-ganglionic action potentials proved a delicate and accurate index of changes in ganglionic activity induced by drugs. An improved amplifying circuit is described. Pilocarpine, a typical stimulant of the parasympathomimetic group, increased the response of the superior cervical sympathetic ganglions of rabbits to natural or test stimuli. Atropine had the opposite effect. There was a mutual antagonism between atropine and pilocarpine in the ratio 1 : 10. So-called parasympathomimetic drugs act also on sympathetic synapses and might better be called "cholinotropic". "Cholinotropic" is used in a descriptive sense to indicate that the action is exerted on cholinergic systems, but not necessarily through direct reaction with acetylcholine. The results are consistent with the hypothesis that cholinotropic drugs act by altering the equilibrium of cholinergic systems wherever found. Numerous oscillograms.

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

*The Combined Effect of Narcotics. III: Narcotic and Derivative Effects.* (*Journ. Physiol. [U.S.S.R.]*, vol. xxiv pp. 630-5, 1938.) Shtessel, T. A.

The lethal effect of  $\text{CHCl}_3$ - $\text{Me}_2\text{CO}$  mixtures is additive, while  $\text{Me}_2\text{CO}$ - $\text{PhCH}_3$  mixtures are less lethal by 30% than when used alone. The actions of  $(\text{CH}_2\text{Cl})_2$  (I) and  $(\text{CHCl}_2)_2$  (II) which resulted in "subsequent" death in 1-3 days were also studied. Mixtures of I- $\text{Et}_2\text{O}$  and II- $\text{Et}_2\text{O}$  indicated that  $\text{Et}_2\text{O}$  has no effect on either increasing or decreasing the toxicity of I and II. Large quantities of  $\text{Me}_2\text{CO}$  (II+30 mgrm./1  $\text{Me}_2\text{CO}$  and I+75 mgrm./1  $\text{Me}_2\text{CO}$ ) resulted in a great increase in the toxicity of I and II. However, the narcotic action of I- $\text{Me}_2\text{CO}$  mixtures was additive.

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

*The Effects of Anæsthetics and of Convulsants on the Lactic Acid Content of the Brain.* (*Biochem. Journ.*, vol. xxxii, pp. 1908-17, 1938.) Stone, Wm. E.

In order to avoid post-mortem changes and the use of anæsthetics a liquid air technique was developed for the determination of lactic acid (I) in the brain of the mouse. The animal was killed and completely frozen by immersion in liquid air for 2-3 sec. The brain was then removed and kept frozen until the lactic acid was determined by the method of Friedmann and Graeser (*C.A.*, 27, 2651). The normal brain I was 12-25 mgrm./100 grm. of tissue with a mean value of 18.9 mgrm. This was increased to 26.8 mgrm. by strenuous exercise. Phenobarbital, amytal and ether caused significant decreases in the amount of I in the brain. During insulin convulsions a significant decrease also occurred. During insulin shock without convulsions a decrease was sometimes observed. The results with insulin may be explained by the decreased supply of blood glucose. During picrotoxin convulsions which had progressed for 2-10 minutes the amount of brain I was significantly increased, even above the level shown after strenuous exercise. During metrazole convulsions the brain I varied from normal to significantly increased values. Nicotine convulsions caused no increase. During cyanide convulsions there was a large increase in the brain I. High values for I in the brain cannot be attributed to the diffusion of lactate from the blood into the brain. The most obvious

hypothesis to account for the variations observed would be that the amount of I is dependent on the activity of the tissue. Except for the results with nicotine, the results could also be explained by inhibition of various enzyme systems.

E. W. SCOTT (Chem. Abstr.).

*The Mode of Action of Anæsthetics in Decreasing the Negative Potential of the Brain Cortex, with Resulting Anæsthesia.* (*Anæsthesia and Analgesia*, vol. xvii, pp. 335-44, 1938.) Burge, W. E., and Burge, E. L.

The decrease in negative potential of the brain cortex in light anæsthesia can be attributed to the excess of outgoing negative charges over the incoming. In surgical anæsthesia, as in exhaustion, the loss of these negative charges is so great as to render the brain cortex electro-positive.

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

*The Influence of Various Factors on the Absorption of Narcotics by the Blood. I: The Dependence of the Solubility Coefficient of Benzene Vapour in the Blood and in Hæmolyzed Erythrocytes upon the Dilution of the Solution and the Atmospheric Concentration of the Toxic Agent.* (*Journ. Physiol.* [U.S.S.R.], vol. xxiv, pp. 636-43, 1938.) Ikonnikova, S. A.

The solubility coefficient (I) of  $C_6H_6$  vapour in the hæmolyzed erythrocytes (II) of undiluted rabbit blood is 5.6. Upon dilution 1:2, 1:4 and 1:8 with  $H_2O$ , the values obtained were 4.9, 4.1 and 3.0 respectively, the theoretical values being 3.9, 3.0 and 2.6 respectively. As the concentration of  $C_6H_6$  in air increases, the value of I for defibrinated blood and II falls.

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

*The Electrocardiogram (of the Rabbit) during the Onset of Urethan Narcosis.* (*Compt. rend. Soc. biol.*, vol. cxxix, pp. 895-8, 1938.) Drohocka, Zenon, and Drohocka, Jadviga.

For 30 minutes or more after the injection the cortical oscillogram continually changes. The small high-frequency waves disappear first.

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

*The Relation of the Autonomic Nervous System to Pharmacy.* (*Journ. Connecticut State Med. Soc.*, vol. iii, pp. 19-21, 1939.) Myerson, Abraham.

Myerson described the pharmacological effects of amphetamine (benzedrine) sulphate, mecholyl, atropine and prostigmine on the eye, skin, gall-bladder, heart, blood-pressure, gastro-intestinal tract and urinary bladder, based on an investigation performed on dementia præcox patients, supposed to be organically healthy.

MARION HORN (Chem. Abstr.).

*Treatment of Tabetic Lightning Pains with Thiamine Chloride.* (*Amer. Journ. Syphilis, Gonorrhœa, Venereal Diseases*, vol. xxiii, pp. 1-6, 1939.) Metildi, P. F.

Six cases of tabes dorsalis were treated, with encouraging results. It is suggested that the pathogenesis may depend on the inter-relation of dietary deficiency (possibly of vitamin B) in patients with previously existing neurosyphilis.

PHILIP D. ADAMS (Chem. Abstr.).

*Effect of Vitamin B<sub>1</sub> in a Case of Alcoholic Polyneuritis.* (*Arch. soc. sci. méd. biol. Montpellier et Languedoc*, vol. xix, pp. 295-300, 1938.) Rimbaud, Boucomont, Serre and Godlewsky.

In a 36-year-old man suffering from alcoholic polyneuritis, injection of vitamin B<sub>1</sub> (Benerva) every 3-4 days for 1 month led to dramatic amelioration of neurological and digestive symptoms.

MARION HORN (Chem. Abstr.).

*Ephedrine Agents Active in Combating Anoxæmia.* (*Compt. Rend. Soc. Biol.*, vol. ccvii, pp. 543-5, 1938.) Binet, Léon, and Strumza, Moïse V.

The duration of the resistance of a dog under chloralose anæsthesia to acute anoxæmia (2.41% O<sub>2</sub> in the atmosphere) can be tripled by an intravenous injection of 450-500γ of ephedrine, norephedrine, or of pseudonorephedrine. The effect is explained by a central and peripheral action of the agent.

RACHEL BROWN (Chem. Abstr.).

*The Central or Peripheral Action of Bulbocapnine.* (*Arch. Néerland. Physiol.*, vol. xxiii, pp. 254-5, 1938.) Jager, W. A. Den Hartog.

The effect of bulbocapnine is a purely central one and quite identical with the effect of strychnine. If bulbocapnine caused a contraction of the muscle by acting directly on the muscle, then the action currents could be expected also after severing the sciatic nerve, but not after the iliac artery had been ligated. Bulbocapnine causes a lower discharge-limit for the spinal reflexes. The name "pseudo-cata-tonia" because of muscular action seems to Jager to be erroneous and superfluous.

F. L. DUNLAP (Chem. Abstr.).

*Effect of Strychnine Sulphate on the Emotional Mimetic Functions of the Hypothalamus of the Cat.* (*Journ. Pharmacol.*, vol. lxiv, pp. 335-54, 1938.) Masserman, Jules H.

The experimental results are in accord with the findings of others as to the action of strychnine on the nervous system, and confirm the thesis that the hypothalamus has an integrative and regulatory function in controlling the various physiological mechanisms of emotional expression.

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

*Cardiac Depression by Barbituric Acid Derivatives. A Study of the Relative Antidotal Action of Certain Cardiac Stimulants.* (*Journ. Pharmacol.*, vol. lxiv, pp. 330-4, 1938.) Johnston, Robert L.

Arrest of the isolated turtle heart by perfusion with 0.0005 M barbiturates is always preceded by a great decrease in rate and amplitude of contraction. The action is both indirect, through the vagus, and directly on the heart muscle. Atropine lessened the indirect action, but did not prevent the muscle flaccidity. Glycine counteracted the latter effect to a large extent and also lessened the tendency to heart-block. With prolonged perfusion the depressant action finally predominated. Coramine and metrazole slightly decreased barbiturate depression, but were less effective than theobromine Na salicylate (diuretin), caffeine Na benzoate and theophylline Ca salicylate (phyllicin). None of the drugs used proved to be the ideal antidote.

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

*Inactivation and Elimination of Picrotoxin.* (*Journ. Pharmacol.*, vol. lxiv, pp. 319-29, 1938.) Dille, James M.

Picrotoxin is rapidly detoxified after intravenous injection in rabbits. It is possible to repeat the convulsive dose within 1.5 hours. Traces of a convulsion-producing substance assumed to be picrotoxin were detected in the urine of rabbits 18 hours after administration of a convulsive dose.

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

*Trypanocidal Activity and Arsenic Content of the Cerebro-spinal Fluid after Administration of Arsenic Compounds: II. With Appendix by R. E. Barrett.* (*Journ. Pharmacol.*, vol. lxiv, pp. 146-63, 1938.) Hawking, F., Henelly, T. J., Wales, W. T., and Chinnick, W.

Eight more compounds were tested by injecting them in patients and examining the spinal fluid for trypanocidal activity and total As. Only Na 3-amino-4 (β-hydroxyethoxy)-phenylarsonate ("As 190") was approximately as potent as

tryparsamide and worthy of further study. Sulpharsphenamine produced a moderate trypanocidal activity in the spinal fluid, while none was produced by the other compounds, viz., the quinquevalent arsenicals stovarsol (Na 4-hydroxy-3-acetaminophenylarsonate), solvarsin (ethanolamine salt of 4-hydroxy-3-ethylaminophenylarsonic acid), acetylarsan and parosan (Na 8-acetamino-3-oxo-1,4-benzisoxazinarsonate); the trivalent arsenical K 352 (the Na salt of diglutathionyl 4-acetamino-2-hydroxyphenylthioarsinite) and the Sb compound neostibosan. In the appendix the treatment of sleeping-sickness with parosan is described. It was quite ineffective.

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

*Quinquevalent Arsenicals in the Treatment of Paresis.* (*Gaz. Hopitaux.*, Aug. 24, 1938; *Urol. Cutaneous Rev.*, vol. xlii, p. 854, 1938.) Babonneix.

Babonneix describes the treatment of 500 cases of paresis by stovarsol. Favourable results were obtained in two-thirds of the agitated cases showing delusions of grandeur, in half of the cases with mental deterioration, and in one quarter of the cases with true paranoid dementia. Improvement was rare in mental depression, melancholia and ideas of self-effacement. All cases showed increased weight and recovery of muscular strength, and almost all showed a favourable action on the cerebro-spinal fluid. There was no parallelism between the improvement of the cerebro-spinal fluid and the clinical condition. The drug is contra-indicated in the presence of liver, kidney or optic nerve damage.

MARION HORN (Chem. Abstr.).

*A Peculiar Disturbance of Higher Nervous Activity Cured by Bromide.* (*Journ. Physiol.* [U.S.S.R.], vol. xxiii, pp. 697-701, 1937.) Usievich, M. A., and Shmulevich, M. G.

A case of disturbed higher nervous activity in a dog, caused by the experimental use of an excessive number of inhibitory stimuli, was cured by daily administration of 0.5 grm. of NaBr.

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

*The Antinarcotic Effect of Sympathicotropic Amines.* (*Skand. Arch. Physiol.*, vol. lxxix, pp. 258-81, 1938.) Jacobson, E., Christensen, J. T., Eriksen, F., and Hald, J.

Male mice were treated with an intraperitoneal injection of a narcotic, and, when its maximum effect was obtained (1 min. to 1 hour), the substance studied was also injected intraperitoneally. Control animals were injected with physiological saline. It was found that the amines were antagonistic to various narcotics, their action, however, being slower and longer than that of cardiazol. Only such amines are generally effective which have the NH<sub>2</sub> attached to the middle C of a 3-C chain and the phenyl group in the β position, otherwise they are inactive. Secondary and tertiary amines are also active, but not quaternary ammonium bases. The action is weakened by the presence of an oxy-group in the side chain, but the introduction of any oxy- or methoxy-group into the nucleus practically abolishes the effect.

S. MORGULIS (Chem. Abstr.).

*Action of Nicotine on the Spinal Cord.* (*Journ. Physiol.*, vol. xciv, pp. 136-47, 1938.) Schweitzer, Alfred, and Wright, Samson.

Nicotine depresses or abolishes the knee-jerk in cats under chloralose anaesthesia and in the decerebrate or spinal preparation. It also depresses or abolishes strychnine convulsions. Nicotine inhibits spinal reflexes by a direct action on the spinal cord.

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

*An Investigation of Acquired Tolerance to certain Short-acting Barbiturates.* (*Journ. Amer. Pharm. Assoc.*, vol. xxvii, pp. 830-6, 1938.) Masuda, M., Budde, R., N., and Dille, James M.

Acquired tolerance to amytal, pentobarbital, ortal, pernocton and evipan was studied in rabbits, by use of sleeping time as criterion. On daily administration of ortal and evipan there was no significant change in the sleeping time. Tolerance to a certain degree was developed for pentobarbital, pernocton and amytal, as evidenced by significant decrease in sleep; the tolerance developed almost immediately following the first injection, and reached its limit in 4-7 days. The acquired tolerance disappeared rapidly after the ending of the daily injections, and within 3 or 4 days the animal responded to the barbiturate in practically the same way as it had done to the first dose. The destruction of amytal, as determined by its rate of disappearance from the blood, liver and muscle, appears to take place somewhat more rapidly in tolerant than in non-tolerant rabbits.

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

*Rapid and Sensitive Method for Detecting Barbituric Derivatives in Urine.* (*Journ. pharm. chim.*, vol. xxviii, pp. 49-60; 1938.) Griffon, H., and LeBreton, R.

To 20 c.c. urine in a mortar add 1 : 10 AcOH until acid to litmus, then triturate with 35 grm. anhyd. Na<sub>2</sub>SO<sub>4</sub> in portions. Put the dry powder obtained into an extension tube containing in its open base a layer of cotton, upon it 0.20 grm. vegetable C (Acticarbonate, C 1035; cf. Mohrschultz, C.A., 28, 4760<sup>7</sup>), then 0.20 grm. MgO and 2 grm. anhyd. Na<sub>2</sub>SO<sub>4</sub>. Put 30 c.c. Et<sub>2</sub>O into the extension tube and collect the Et<sub>2</sub>O slowly in a tall test-tube beneath it. This tube fits into a wider tube which forms part of a steam bath. When the Et<sub>2</sub>O layer in the extension tube has disappeared, finish evaporation of the Et<sub>2</sub>O solution in the tube below. If a crystalline residue is visible, add to a particle of it on porcelain 0.5 c.c. of 0.3% Co(NO<sub>2</sub>)<sub>2</sub> in absolute alcohol then 0.1 c.c. of 1% Et<sub>2</sub>NH in absolute alcohol; a violet tint is produced at once. In a 24-hour urine, 100 mgrm. (and less) of barbiturates per day can thus be detected.

S. WALDBOTT (Chem. Abstr.).

*Barbiturates with Reference to Individual Susceptibility.* (*Anæsthesia and Analgesia*, vol. xvii, pp. 218-22, 1938.) Kohn, Richard.

Solutions of nembutal, Na amytal, seconal Na and pernocton were given slowly intravenously into rabbits. Concordant results were obtained on a small number of animals by this method. No connection was established between sex, season, etc., and the animal variation. The sensitivity of the same animal varied considerably on different occasions. Two types of respiration were found—the first a gradual decrease in rate until respiration failed and the second respiration was depressed and finally was of the Cheyne-Stokes type.

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

*The Hypnotic Effect and Excretion of Dormovit.* (*Klin. Wochenschr.*, vol. xvii, pp. 1372-4, 1938.) Fretwurst, F., and Never, Henry E.

Dormovit (5-furyl-5-isopropyl-barbituric acid) is similar to noctal and phandorm in hypnotic properties. It is quickly destroyed, only about 2% being excreted in the urine.

H. L. MASON (Chem. Abstr.).

*Anæsthesia and Liver Damage. II: Effects of Anæsthesia on Blood Sugar, Liver Glycogen and Liver Fat.* (*Journ. Pharmacol.*, vol. lxiv, pp. 111-29, 1938.) Ravidin, I. S., Vars, H. M., Goldschmidt, S., and Klingensmith, L. E.

In dogs the blood-sugar level during CHCl<sub>3</sub> anæsthesia is essentially the same whether the CHCl<sub>3</sub> is volatilized with air or O<sub>2</sub>. Anoxæmia during anæsthesia causes a marked increase in the blood-sugar level. In any case the blood sugar rises, but the rise is not proportional to the original glycogen concentration of the

liver. About 35% of the liver glycogen disappears during a 2-hour period of anæsthetization and nearly all of the remainder disappears during the 24 hours after such anæsthetization. As the glycogen decreases the fat acids of the liver increase. At first glycogen decreases faster than fat acids increase, but after several hours the fat acids increase faster than the glycogen decreases. This effect is due to injury of the liver parenchyma.

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

*Concentration of Procaine in the Cerebro-spinal Fluid of the Human Being after Subarachnoid Injection.* (*Arch. Surg.*, vol. xxxvii, pp. 603-8, 1938.) Koster, H., Shapiro, A., and Leikensohn, A.

In 122 patients anæsthetized by the injection of 150 mgrm. of procaine into the subarachnoid space, the concentration was determined at various intervals as follows: (1) In 6 patients at the site of injection, (2) in 40 patients, three interspaces above, and (3) in 40 patients in the cisterna magna. The anæsthetic is rapidly distributed cephalad. The peak concentration reached at a particular level during anæsthesia decreases rapidly in the cephalad direction, so that in the cisterna magna the concentration of procaine was never above 0.21 mgrm. per c.c., and in 14 of 22 samples it was less than 0.02 mgrm. The Trendelenburg position does not cause concentrated solutions of procaine to flow down to the cisterna magna, as do coloured solutions in inanimate models.

JOHN T. MYERS (Chem. Abstr.).

#### CORRIGENDA.

In the article "Diagnosis and Prognosis in Psychiatry," by J. H. Masserman and Hugh T. Carmichael, published in the November, 1938, issue of the *Journal of Mental Science*, a number of changes were made in the proof that were not incorporated in the published text. The following are the major addenda:

*Page 7.*—(With regard to the high incidence (20%) of patients of the Jewish faith in the group of 100.) This disparity in distribution with regard to religious affiliation is attributable first to the relatively high incidence of people of the Jewish faith in the middle-class population served by the University of Chicago Clinics, and second, the sensitivity and concern as to immediate therapy shown by many Jewish families with regard to early mental aberration in one of their number, leading to prompt psychiatric consultation and therapy.

*Page 27.*—(Recommendations for psycho-analytic therapy.) For 4 cases, read 5 cases.