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Bioelectric Responses in Metrazol and Insulin Shock.

1. The bioelectric potentials from the brain of the rabbit have been studied during metrazol and insulin shock. Insulin, administered subcutaneously, causes a marked increase in the slow wave activity during the coma stage. Cortical potentials during the convulsions are masked by the potentials artefacts caused by the violent movements. Except for a few cases of localized spike potentials recorded from the cortex during the pre-convulsive stage, no characteristic cortical potentials are seen immediately preceding the convulsion.

2. The potentials recorded from the cortex following a shock injection of metrazol may be divided into four phases. These phases are correlated with the various stages of the physical shock.

3. Thalamus, midbrain and cerebellum show abnormal electrical activity during metrazol shock.

4. Sections at various levels in the central nervous system show that the electrical response in the cortex due to the action of metrazol is not primarily dependent on the severed pathways. Characteristic shock potential sequences may even be recorded from small areas of neurologically isolated cortical tissue. The physical shock, on the other hand, is altered profoundly by these neurological sections.

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5. Minute quantities of metrazol, applied locally to discrete areas of the cortex of the rabbit, initiate a bioelectric response which, although much more localized, resembles closely that seen following intravenous injection. This activity may spread to other cortical or even sub-cortical areas, presumably by facilitation.

6. An attempt is made to explain something of the action of metrazol on the brain, on the basis of what is already known regarding the effects of faradic stimulation of the cortex. (Authors' abstr.)

The Mechanism of Fractures of the Vertebral Bodies. Fractures of the Mid-thoracic Area Complicating Metrazol Therapy : Prevention and Treatment.

1. A study of the anatomy and of the practical considerations of the spine shows that fractures of the vertebral bodies are usual at those areas of the spine that are mechanically weak or exposed to the effects of traumatism.

2. Metrazol acts to cause convulsions attendant with very forcible muscular contractions sufficient to fracture the bodies of the vertebræ in the mid-dorsal region which is anatomically and dynamically vulnerable. The localization differs from the more usual sites of fracture because of a modification of the type of stress and strain peculiar to the muscular contractions caused by metrazol injections and their effects on the anatomy of the parts affected. The degree of injury varies directly with the force of the muscular contractions and inversely with the resistance offered by, or the strength of, the vertebral bodies. The force of the muscular contractions and the energy expended is so great that a convulsion continuing for 90 seconds may exhaust the patient for 8 to 24 hours.

3. The mid-dorsal area of the spine is anatomically vulnerable, and fractures occur at this site following metrazol therapy because the site is midway between the forward physiological curves of the cervical area above and the lumbar below. The degree of flexion occurs through an arc sufficiently small to make the mid-dorsal spine the recipient of its greatest effects. The vertebral bodies are here wider anteriorly while the discs are smaller, less resilient and more narrow anteriorly ; and the dynamic centre of the flexor contracting force of the trunk muscles is at this level.

4. The number of metrazol injections has no relation to the number of vertebral bodies fractured or to the degree of wedging. The extent and degree of injury are rather dependent upon the intensity of the muscular contractions, due to any one particular convulsive treatment, and the strength of the spine to withstand the shock. Undoubtedly if a fracture occurs early in the course of treatment and if treatments continue without the prophylactic measures recommended, increased wedging of the vertebræ may obtain.

5. Rupture of the nucleus pulposus with protrusion into the neural canal is most unusual following fractures of the vertebral body.

6. No practical type of mechanical fixation can prevent injury to the vertebral bodies.

7. Prophylaxis is possible, and the use of spinal anæsthesia given prior to the metrazol injections as suggested by Hamsa and Bennett is recommended.

8. If fracture occur, immobilization of the trunk between treatments and reduction of the deformity, if it is present, with fixation in a plaster jacket for six months after the treatments are completed should result in entire healing of the fractures. (Author's abstr.)

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Personality Changes Accompanying Cerebral Lesions. I. Rorschach Studies of Patients with Cerebral Tumours.

Examination of the Rorschach records of patients with cerebral tumours has shown that both as composite pictures and as individual records they differ markedly from the normal. Twenty-eight records of 25 patients with tumours of the brain, even when expressed in graphic form only, show restricted and constricted personality, extraordinarily uniform when contrasted with the variety found in the records of the normal subjects.

When considered in terms of the preoperative and postoperative status of the patient, the records of the postoperative group were found to be slightly superior.

When considered in terms of the pathologic character of the lesion, the slowly growing and rapidly growing tumours, the records showed no significant difference.

The location of the lesion was not an important factor. Twenty-six of the 28 records differed so greatly and consistently from the normal records that the smaller differences between records of patients with lesions in various locations

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were relatively insignificant. However, further differential studies are necessary and are in progress.

In differential diagnosis, the author finds that the Rorschach method may be useful in distinguishing between a cerebral lesion and conditions with symptoms simulating this condition.

The attempt to differentiate more exactly within the group of patients spoken of in the Rorschach literature as having " organic " lesions can be completed only when this comparatively uniform group of patients with cerebral tumours is compared with groups of persons with cerebral lesions of other types.

(Author's abstr.)

Vascular Bed of the Retina in Mental Disease.

The cross-sectional area of the vascular bed of the retina has been measured in a group of psychiatric patients classified as having either schizophrenia or manic-depressive psychosis. It is believed that these measurements are an index of the developmental status of the general vascular constitution of the patient.

There is no correlation between the capacity of the retinal vascular bed and either of the two diseases studied. Contrary to previous impression, no correlation was found between habitus in the Kretschmerian sense and the capacity of the vascular bed.

In the schizophrenic group there was a high degree of correlation between the clinical status of the patient and the capacity of the retinal vascular bed. When the measurements of the vascular bed are corrected for differences in stature in the group, the correlation between clinical status and the size of the vascular bed becomes even more significant. (Authors' abstr.)

Serum Protein, Non-Protein Nitrogen and Lipoids in Schizophrenic and Manic-Depressive Psychoses.

Long-term studies of 14 patients with schizophrenia, 11 with manic-depressive psychoses and 7 with symptoms of both conditions revealed abnormal variations in the non-protein nitrogen of the blood and in the total proteins, cholesterol and fatty acids of the serum in all the persons who showed marked changes in clinical status. The patients whose symptoms showed little change rarely had abnormal variations in these constituents.

These results demonstrate that there are abnormally large metabolic changes in the blood which accompany the variations in mental symptoms, particularly those symptoms which can be attributed to dysfunction of the brain stem. When changes in nutritional status were not extreme, the serum lipoids rose during the manic or the depressed phase of the illness and fell with recovery.

Manic-depressive patients as a group were found to have high cholesterol and fatty acid values, while, in contrast, the schizophrenic patients had lipoid values that were below the normal average, in many instances being below the normal limits. (Authors' abstr.)

Histologic Changes following Metrazol Convulsions, with Note on a Fuchsinophilic Reaction as an Index of Early Neurocytologic Change.

Seizures and other motor activities produced in a series of experimental animals by injections of metrazol were observed and recorded.

In contrast to the experience of some other observers, serious lesions were found in the brains of all animals in this series which underwent convulsions from metrazol. Strong evidence of chronic neuropathologic lesions, in contrast to changes which might be imputed to lethal seizures only, was observed in animals which had seizures over periods of more than eight days. The degree and extensiveness of the lesions in these experimental animals corresponded in general with the number and severity of the seizures observed. The type of damage to the

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brain seemed to be influenced by the length of time during which the animal had seizures.

In the brains of these animals the phosphomolybdic acid-polychrome stain showed a clear correlation with the Nissl stain. The polychrome method appeared, however, to be more sensitive, showing the changes more definitely and vividly and making it possible to detect early pathologic changes more effectively. With the polychrome stain many changes in the nerve tissues which did not appear with the Nissl stain could be noted.

The total convulsive activity experienced by the animals in this experiment was considerably less than that experienced by many patients clinically, and much less than that experienced by the monkeys in the report of Strecker and his associates. The point made by Strecker and his co-workers that perhaps the damage to the brain which they observed could be related to the prolonged total duration of convulsive activity (a much greater total convulsive period than that experienced by patients under treatment) does not apply therefore in the present experiment.

No direct relation between the degree of neuropathologic change and the total amount of metrazol administered, as noted by other observers, can be established in the present experiment. Of course, the total amount of metrazol administered bore some relation to the number of convulsions produced, but when these figures diverged the pathologic changes tended to follow the number, duration and severity of the convulsions rather than the amount of the drug.

The lesions observed in the experimental animals consistently appeared to be secondary to vascular constriction or vascular changes. This might be taken as an indication that the seizure itself is induced by vascular spasm and consequent anoxia rather than by direct influence of metrazol on the neurons.

The consistency with which lesions were produced in the experimental animals strengthens the natural suspicion that serious neuropathologic changes of some sort may occur clinically in metrazol therapy.

Many kinetic activities besides seizures were observed. Some of these were similar in various degrees to the preliminary clonic activities and torsion spasms observed in patients. Others bore little resemblance to anything seen in clinical treatment with metrazol. Persistent hypertonus was seen prior to death in every one of the animals. It is believed that persistent hypertonus is a grave sign when seen clinically.

Although the present findings tend to indicate that metrazol therapy is drastic, they should not be regarded as discrediting such treatment of conditions serious enough to warrant drastic, or even dangerous, measures. (Author's abstr.)

Temporary Arrest of the Circulation to the Central Nervous System.

1. Permanent pathologic lesions may occur in the cerebral cortex of the cat after complete arrest of the circulation for three minutes and ten seconds.

2. Frank necrosis and softening of the cortex have been observed after circulatory interruption for three minutes and twenty-five seconds.

3. Circulatory arrest for periods in the neighbourhood of seven and a-half minutes causes complete destruction and liquefaction necrosis of the cerebral cortex.

4. The motor and visual cortexes sustain the earliest and most profound damage. The olfactory, orbital and temporal regions of the cortex are the least susceptible.

5. Lamina I, and to a lesser extent lamina II, are the least vulnerable of the cortical layers, while laminas III and IV are the most vulnerable.

6. The Purkinjë cells rank next to the nerve cells of the cerebral cortex in susceptibility.

7. The lateral geniculate nucleus is the most vulnerable of the basal nuclei in the cat, and it is followed, in order of susceptibility, by the hypothalamic nuclei, the thalamic nuclei, the globus pallidus and the caudate nucleus.

8. The brain stem and spinal cord are uninjured by periods of circulatory arrest compatible with continued survival of the animal. (Authors' abstr.)

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Personality Changes Accompanying Cerebral Lesions. II. Rorschach Studies of Patients with Focal Epilepsy.

A group of 24 patients with focal epilepsy, all of whom had undergone operation for the removal of non-expanding atrophic lesions, was studied by the Rorschach method. The patients were studied postoperatively after varying intervals, and 10 were also studied preoperatively to allow a comparison of records obtained before and those obtained after the removal of cerebral abnormalities. A comparison was made of these patients and patients with large infiltrating lesions, as well as of deteriorated patients with cryptogenic epilepsy and of patients on whom craniotomy and " negative exploration " had been carried out.

The author believes that no one typical personality emerges in the cases of the patients with focal epilepsy, but that there is a wide range of personality difficulties. There was evidence in the records of this group of behaviour problems, of neurotic personality and, in one case, of possible psychosis. There were markedly introvert and extrovert personalities and all varieties of mental approach. There were three cases in which Rorschach signs peculiar to Jacksonian (focal) epilepsy appeared, and three in which the records approximated the type of personality already described in the paper on cerebral tumours.

With respect to the difference between preoperative and postoperative Rorschach records, the author has isolated certain components of the preoperative records which seemed to indicate future psychologic improvement if more favourable conditions could be given the patient. This made her hope that such studies might make a contribution to prognosis, for if improved psychologic capacity, as evidenced by the Rorschach test, is in itself an index of improved cerebral function, as is suggested by this study, this method may become a prognostic procedure for the selection of those patients who are most likely to be benefited, both mentally and physically, by operative intervention. While it is not possible to make such a claim from this study alone, it is hoped that the hypothesis may prove of value for the basis of future work. (Author's abstr.)

Neurohistopathologic Changes with Metrazol and Insulin Shock Therapy.

An experimental study of the action of insulin and metrazol in the cat has shown that when insulin produces deep shock leading to death severe damage to the neurons occurs, and that with metrazol little, if any, change in the central nervous system is discernible.

In the brains of animals which died after the administration of insulin, involvement of ganglion cells was manifested by the presence of cell shadows, intracellular neurofibrillar clumping and damage of axis-cylinders. There was also a definite increase of glia.

In the spinal cord and posterior root ganglia of the animals treated with insulin the changes in the neurons were both quantitative and qualitative, the cells often showing severe disease and in some instances actual destruction.

In the animals given metrazol there were no changes comparable with those seen in the animals given insulin. The changes with metrazol consisted essentially of pyknosis of scattered cells of a minimal degree. There were no quantitative changes. The cell pictures compared favourably with those in the control animals.

If the pathologic changes observed in the central nervous system of experimentally treated cats can be regarded as an index of the ultimate effects in the central nervous system of human beings, insulin in large doses should be used with greater caution, and metrazol may be considered the safer drug with respect to the effect on the central nervous system. (Authors' abstr.)

Cerebral Air Embolism and Vital Staining. Contribution to the Experimental Study of the Blood-Brain Barrier.

The two chief hypotheses concerned with the nature of the blood-brain barrier are presented, and reference is made to the use of vital staining in the study of this phenomenon.

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Controlled experiments with cerebral air embolization and subsequent intravenous administration of trypan blue are reported, and the gross and microscopic observations are described.

The microscopic changes were: Exquisitely focal, chiefly intracortical, areas showing varying degrees of loss of stainability in sections. The general appearance of the lesions in stained sections appeared to be due primarily to definite changes in the intercellular ground substance, with occasionally no decrease in the number of cellular elements, but with always some degree of acute ischaemic damage to the nerve cells. Blood vessels, on the other hand, appeared intact in almost every instance, showing only some endothelial hypertrophy and occasional hæmorrhages in the larger lesions. All lesions were sharply demarcated from normal adjoining tissue, and appeared to be entirely independent of cortical lamination or other regional peculiarities of the formed elements.

All lesions, apparently, stained grossly with trypan blue, regardless of the presence or absence of histologically determinable damage to the blood vessels.

Despite the extravascular presence of the toxic dye, there was neither anatomic nor neurologic evidence of any invasion of or effect on normal brain tissue adjoining areas damaged by embolization.

These observations are considered to be additional evidence that the peculiar behaviour of the nerve structures toward intravascular trypan blue is an expression, not of the special retentive powers of the cerebral capillary endothelium, but of the peculiar constitution of the intact cerebral tissues, in accordance with King's hypothesis. Moreover, it would appear that the amorphic, colloidal ground substance which constitutes the bulk of the cerebral cortex represents the essential factor in which this peculiarity resides. (Author's abstr.)

Convulsions Associated with Tumours of the Cerebellum.

While fits have been thought to be of unusual occurrence in association with cerebellar tumours, study of 158 cases of verified tumours of the cerebellum disclosed their presence to be not infrequent.

Although the tonic fit is supposed to represent the usual pattern of convulsions occurring in association with cerebellar tumours, study of the literature as well as of our own cases disclosed that every possible variety of fit may occur.

The various theories which have been offered to explain the so-called cerebellar fit are discussed. It is pointed out that although the convulsions are popularly supposed to represent decerebration, there is no evidence that this occurs. In fact, all the phenomena noted in the so-called decerebrate fit can be produced by decortication alone. Decortication may be produced through the medium of temporary cortical ischaemia resulting from transitory alterations in the intracranial pressure.

The physiologic evidence supporting this contention is reviewed. Since cerebral ischaemia may act as a temporary cortical excitant as well as a depressant, the clonic convulsions noted in a number of cases are accounted for. The changes in cerebral blood flow secondary to alternations in the intracranial pressure may account for all varieties of convulsive phenomena observed.

All types of fits may occur in patients having a tumour of the cerebellum, and the presence of focal or generalized convulsions does not exclude the diagnostic possibility of such a lesion. (Authors' abstr.)

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Gower's Tract and Spinal Border Cells.

By methods of cord-section giving rise to chromolytic cell-changes it is shown that:

1. Certain large cells in the ventrolateral fringe of the spinal grey matter of the 12th thoracic and next succeeding six lumbosacral segments (monkey, cat) give axone fibres which, crossing the mid-line at the level of origin, ascend the lateroventral white column of the opposite side and reach the top of the cord. These cells are most numerous in the 4th and 5th lumbar segments; from their maximum there their number declines somewhat steeply in the oral direction, ceasing in the 11th thoracic segment. Their number declines still more steeply in the aboral direction, none being found in the 7th lumbosacral segment. The

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cells are all large, and some are very large; in microscopic features they are not clearly distinguishable from the motoneurones of the ventral horn. On the other hand, they are quite unlike the cells of Clarke's column. Characteristic of their topography is that they occur preponderantly in the grey matter bordering the white column. Hence they can be referred to conveniently as "border cells." Chromolysis did not detect analogous cells in other regions of the cord.

2. Clarke's column in these monkeys extended aborally to, but not beyond the 3rd lumbar segment (Mott, 1895). Although very largely uncrossed, it did not appear to be entirely so.

3. In the 2nd cervical level large cells of the median part of the ventral horn give axone fibres which cross the mid-line to descend the opposite half of the cervical cord.

4. The ventrolateral white column at the 5th cervical level contains fibres which have descended from the uncrossed Deiters' nucleus, from the crossed large cell part of the red nucleus, and from large cells of the pontine and bulbar reticular formation both uncrossed and crossed. (Authors' abstr.)

A Study of Cortical Metabolism in Relation to Cerebral Disease.

1. Potassium ions in concentrations down to 0·01 mols per litre stimulate respiration, lactic acid production and glucose consumption by slices of rabbit cerebral cortex in the presence of oxygen.

2. The rates of respiration, aerobic and anaerobic lactic acid production of human cerebral cortex were measured. It was found that deprivation of oxygen stimulates both glucose consumption and lactic acid production of human brain as had previously been found in animal tissues.

3. In former work it had been found that potassium excess combined with anaerobic conditions depress lactic acid production of rabbit cerebral cortex. The rate of glucose disappearance measured directly is also found to be depressed by excess of potassium under anaerobic conditions.

4. Cyanide inhibits respiration but stimulates lactic acid production and consumption of glucose by rabbit cerebral cortex.

5. Excess of potassium ions combined with cyanide, however, depresses metabolism to a low level.

6. Reasons are given for the belief that nervous activity is dependent on glucose consumption with liberation of lactic acid and resultant electrical depolarization at the neuronal surfaces. Conditions, such as excess of potassium ions and deprivation of oxygen, which increase glucose consumption, thus cause increase in nervous activity.

7. It is suggested that normal central reflex activity is due to local liberation of potassium ions with concomitant stimulation of carbohydrate metabolism.

8. It would also follow that pathological cerebral irritation with increased nervous discharge is due to the similar stimulation of neuronal metabolism as a result of deprivation of oxygen. Thus the signs of irritation which accompany intracranial hæmorrhage, traumatic delirium with cerebral œdema, Stokes-Adams attacks and sometimes intracranial neoplasm, are explained as due to increased neuronal metabolism consequent upon oxygen deprivation.

9. The paralysis and cessation of nervous function, which follow irritation in the above pathological conditions, are probably due to subsequent diminution in rate of metabolism. The initial nervous activity, accompanying deprivation of oxygen, causes liberation of potassium ions from the cells. The resulting excess of potassium ions outside the cells, combined with anaerobiosis, actively depresses the previously raised metabolism. Thus two of the cardinal signs of acute cerebral disease, namely, irritation followed by paralysis, are explained on a metabolic basis.

10. The pharmacological action of cyanide, in which convulsions are succeeded by cessation of nervous activity, is accounted for on similar lines as a result of the effects of cyanide on cerebral metabolism. (Author's abstr.)

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The Goodenough Test in Chronic Encephalitis.

Six children, aged 9 to 11, suffering from chronic encephalitis, were found unable to score on the Goodenough man-drawing tests as well as they did in other standardized intellectual tests. There was no evidence of technical disability or of mental defect. It is concluded that this is a specific disability, and that it probably arises from perceptual difficulties in relation to their own body rather than in optic perceptual difficulties. S. M. COLEMAN.

Suicide Among Hospitalized Drug Addicts.

An investigation was made of 28 suicidal patients with drug addiction. These were found to fall into two groups: genuine suicides (15) and theatrical suicides (13). The mental make-up, heredity and maladjustments of these two types are fully described. S. M. COLEMAN.

Study of a Case Involving Homicide.

A case involving homicide is reviewed. Post-mortem findings disclosed hypoplasia of the cerebro-vascular system and of the circle of Willis. The question is raised as to the role of the resultant anoxia in the emotional instability noted in the psychosis. S. M. COLEMAN.

Electrocardiographic Studies.

Electrocardiographic tracings taken soon after one single treatment with metrazol showed no evidence of myocardial damage in three patients. No evidence of myocardial involvement was detected in 36 patients studied electrocardiographically months after termination of both metrazol and insulin treatments. Evidence of improved function was found in 9 patients. S. M. COLEMAN.

The Haemato-Encephalic Barrier.

The usual range of permeability quotients as measured by the modified form of Walter's bromide method is from 2·0 to 4·0 and constitutes a normal "permeability spectrum." An individual's permeability quotient is not an absolutely

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fixed quantity. In the absence of specific structural alterations, exogenous infections, abnormal physiological states, etc., the chief factor to influence the amount of permeability is the psychomotor activity. S. M. COLEMAN.

Colloid (Paraphysial) Cyst.

The paraphysis exists in human embryos and may enlarge during post-natal life, producing a cystic enlargement which forces its way through the roof of the third ventricle as a pendulous mass between the foramina of Monro. "Paraphysial" cyst suggests both the origin and embryologic significance of the tumour. The histological appearance and symptoms are described. The first reported case of rupture of the cyst into the brain tissue is here described. S. M. COLEMAN.

Beri-beric Neuromyeloses.

It is concluded that beri-beri is not a mere polyneuritis; that the nerve lesions are degenerative; that clinical and anatomo-pathological manifestations are of central origin; and that the syndrome of neuromyelosis, the frequency of which is stressed in this paper, constitutes the predominant anatomo-clinical form of beri-beri. S. M. COLEMAN.

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Electric Responses Derived from the Superior Cervical Ganglion with Micro-Electrodes.

The electrical activity of the superior cervical ganglion of cats and rabbits has been studied with micro-electrodes. The recording system consisted of a capacity-coupled, push-pull amplifier and a cathode-ray oscillograph.

"Axon-like" spikes are obtained during preganglionic stimulation or as an injury discharge with micro-electrodes of 7 to 10 apertures. The spikes are post-synaptic phenomena and show an all-or-none character and a duration of 1·5 to 2 msec. They are found dispersed over the time range corresponding to the standard ganglionic record.

The brief duration, sharp localization and all-or-none character of the spikes recorded with the smallest micro-electrodes strongly suggest that they are derived from single cells.

Study of the single-spike potential during successive stimuli and with an unaltered position of the micro-electrode has shown variations of latency as great

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as 7 msec. In some cases the frequency of response is different from and largely independent of the frequency of the preganglionic stimuli.

The "axon-like" spike is followed by one negative and two positive after-potentials, the last being identical with the slow positive after-potential of the ganglionic record. (Authors' abstr.)

Effect of Cortical Lesions on Affective Pupillary Reactions.

The threshold to pain reaction was studied on suitably trained, unanaesthetized cats after varying amounts of cortex had been removed. The indicator used was the reflex dilation of the pupil caused by inhibition of the Edinger-Westphal nucleus. Cortical areas giving this reaction were also determined. The results are as follows:

1. Ablation of the sensory or sensorimotor cortex does not raise the threshold to pain reaction.

2. Massive cortical lesions lower the threshold to pain reaction.

3. Cortical areas capable of inhibiting extrapyramidal movements also cause inhibition of the Edinger-Westphal nucleus. (Authors' abstr.)

Action of Ether and Nembutal on the Nervous System.

The actions of ether and nembutal on the nerve axon, the synapse, the rhythmically active nerve cell, the spinal cord and the brain have been analysed principally in terms of the action potential changes they produce.

The amplitude and area of the axon spike potential and the negative after-potential are progressively diminished by ether and by nembutal.

The electrical threshold of the axon is raised, its conduction rate is lessened, and its absolutely refractory period is prolonged by ether and by nembutal.

Ether markedly increases accommodation in the axon; nembutal decreases it slightly.

Both ether and nembutal block conduction through a peripheral ganglion. This is interpreted as indicating that they progressively lessen excitation of the soma through the synapse.

With depression by ether or nembutal, the period of latent addition (summation interval) at the synapse is shortened and the effectiveness of temporal summation is lessened. Further, the period of recruitment is shortened by these agents in proportion as they decrease the magnitude of the cyclic variations in amplitude and area of the immediate cortical response.

Ether increases the frequency of discharge of nerve cells possessing spontaneous rhythmicity and nembutal decreases it, often without any initial increase. Both drugs first increase the magnitude of the response of nerve cells and then, with increasing anaesthesia, decrease it. The increase produced by nembutal is considered to be in part a consequence of the reduction of the response frequency.

Ether and nembutal differentially depress the immediate cortical response to saphenous nerve stimulation, the order of final extinction of its constituent waves being third, second, and first. The general cortical excitation produced by spread is eliminated as the late waves are depressed. These effects are interpreted as due to blocking of synaptic stimulation.

The action of ether on the nerve cell or cell group suggests that it first stimulates and then depresses the excitation and response mechanisms. Nembutal has a much feebler preliminary stimulating action. The duration of the cell response under ether is less than that under nembutal, and recovery of responsiveness under ether is more rapid than under nembutal. This may account for the different discharge frequencies induced by these agents.

Present and past researches of this laboratory bearing on the question of excitation and inhibition of neurons are analysed. The facts suggest that excitation is an effect on the soma produced by the summation of brief electrical stimuli which arrive at the terminals of impinging nerve axons. A brief and a prolonged

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excitatory state develop in the soma following their action. Inhibition, aside from the well-known rhythmical changes in responsiveness, has not been found to be accompanied by the development of a potential. It results in a lowering or elimination of the potentials associated with activity and presumably would oppose the activation of nerve cells. (Authors' abstr.)

Degeneration and Regeneration of Sympathetic Synapses.

A series of experiments is recorded in which the progressive stages in the degeneration and regeneration of synapses in the superior cervical sympathetic ganglion were studied histologically by silver stains, and physiologically by the cathode-ray oscillograph. Transmission through the ganglion diminished with the progressive experimental degeneration of the *boutons* attached to the preganglionic fibres. Restoration of normal function in the ganglion returned when the regenerating preganglionic fibres re-established contact with the ganglion cells by means of *boutons de passage* and *boutons terminaux*. Evidence is presented which strongly suggests selective regeneration of S_1 fibres to S_1 cells, etc. No histological or electrical evidence was found which would indicate that the ganglion cells suffered in any way from the degeneration of the synaptic contacts on their surface. The experimental results confirm unequivocally the theory of structural discontinuity in the sympathetic nervous system. (Author's abstr.)

Studies of Motor Performance after Parietal Ablations in Monkeys.

1. The alterations in motor performance which follow ablations of the parietal lobe have been compared with those due to ablation of areas 4 or 6. Unilateral removal of any of these three areas produces motor disability, which in each instance is characterized by relative disuse of the operated, as compared with the normal extremity, and by the greater involvement of distal joints and movements, as compared to proximal. The motor syndrome produced by ablation of any one of these areas may, however, be clearly distinguished from that produced by either of the other two.

2. As demonstrated by placing and hopping responses, tactile deficit appears following unilateral or partial ablation of either areas 3-1-2, 1-2 or 5 and 7. Proprioception is much less affected by these parietal lesions, but complete bilateral removal of all parietal tissue permanently abolishes the hopping and the tactile and proprioceptive placing reactions.

3. Absent or diminished knee jerks, together with diminished resistance to passive manipulation, appear immediately after all parietal ablations. Later knee jerks may become hyperactive, but resistance to passive manipulation never becomes increased. (Authors' abstr.)

Somatic and Autonomic Reflexes in Spinal Monkeys.

Spinal cord lesions were made in 14 monkeys. In 9 animals transections were performed at various levels, and observations made relative to the rate and extent of return of somatic and autonomic functions below the level of the lesions. In 3 monkeys the effect of partial lesions of the spinal cord was noted. In 2 such animals observations were made relative to the effect of transverse cord lesions after bilateral lumbar sympathectomy. The term " shock " applies equally well to the autonomic as to the somatic systems following complete lesions of the cord. The return of somatic reflexes precedes the re-establishment of such autonomic functions as piloerection, sweating, and vasoconstriction. Although the autonomic functions return after spinal transection, they do not reach the same degree of efficiency that they exhibit in the normal animal. Cooling of one lower extremity in ice-water normally produces a drop in temperature in the non-immersed lower extremity, but fails to do so during the period of " shock " following spinal

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transection, or for a short period of time following lumbar (preganglionic) sympathectomy. This indirect cooling response is temporarily depressed after partial lesions of the cord. (Authors' abstr.)

Nerve Activity Accompanying Fasciculation Produced by Prostigmin.

The fascicular twitching observed in animals following the administration of prostigmin is associated with antidromic nerve impulses which may be recorded from the anterior (motor) roots.

Both the fascicular twitching and the nerve impulses are abolished by small doses of curare.

Similar impulses are observed when a muscle is caused to contract by the intra-arterial injection of acetylcholine.

It is suggested that these experiments provide evidence that acetylcholine has a stimulatory effect not only on striated muscle, but on the terminal portions of the motor nerve as well. (Authors' abstr.)

Effects on Respiration, Blood Pressure and Gastric Motility of Stimulation of Orbital Surface of Frontal Lobe.

From the orbital surface of the frontal lobe in both cats and monkeys an area in the gyrus orbitalis near the olfactory tract was found to give rise upon stimuli of 1-6 V to inhibition of respiration, rise of blood pressure and decrease in the tonus of the gastric musculature. The respiratory effect was obtained nearly always in the cat and always in the monkey; the elevations of arterial pressure were higher and more consistently present in the monkey; the inhibition of tonus in the gastric muscles occurred only infrequently in the cat, but in the great majority of instances in the monkey. (Authors' abstr.)

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Studies on a Group of Children with Psychiatric Disorders. I. Electroencephalographic Studies.

There was a high percentage (68 per cent.) of abnormal electroencephalograms indicating a physiological disturbance. Apart from a large number presenting diffuse cortical dysrhythmia, 16 per cent. were found to present evidence of focal dysrhythmia.

One-third of the cases with an abnormal E.E.G. had an I.Q. below 80. The average I.Q. of the group of 7 cases with a focal dysrhythmia was 81·7

Of the group of 44 children investigated, 35 showed what the author calls an

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epileptoid personality; of these, 25 showed abnormal E.E.G.'s. The writer divides his epileptoids into three groups:

1. Idiopathic epileptoids with a possible biological relationship to epilepsy as indicated by the presence of diffuse cerebral dysrhythmia.

2. Symptomatic epileptoids in which the epileptoid behaviour originates from an organic pathology of the brain indicated by focal cerebral dysrhythmia.

3. Pseudo-epileptoids in which there is a close resemblance in the behaviour to that of epileptics, but in which no abnormal E.E.G.'s was found.

G. W. T. H. FLEMING.

Disorders of Mental Functioning Produced by Varying the Oxygen Tension of the Atmosphere. I. Effects of Low Oxygen Atmospheres on Normal Individuals and Patients with Psychoneurotic Disease.

Variations in the oxygen concentration of the inspired air, beyond that to which the individual is accustomed, result in marked changes in mental functioning. This disturbance in mental functioning takes place in normal and psychoneurotic subjects exposed to inhalation of low oxygen atmospheres, and also in patients with previously existing anoxia exposed to high oxygen atmospheres. In the present study, observation of 17 medical students who breathed an atmosphere of 13 per cent. oxygen (corresponding to an altitude of 12,400 ft.) for three hours revealed marked changes in affective behaviour, with impairment of emotional control, in 59 per cent. elation and flightiness, terminating in lethargy, and in 41 per cent. mental dullness from the beginning. The " retention and recall " test in 15 of the 17 students showed a larger incidence of errors and impaired memory after exposure to 13 per cent. oxygen for 3 hours.

The patients, after inhalation of the low oxygen mixture, revealed an even more marked lack of emotional restraint, with feelings of exaggerated self-esteem and sexual preoccupations. Their mood ultimately changed from that resembling a hypomanic state to dullness and lethargy. Those patients (4 of 9) who did not show elation at the start were dull and lethargic at the beginning. The number of errors in the " retention and recall " test showed considerable variation before and after exposure to inhalation of 13 per cent. oxygen, in 5 of 9 patients being better in the low oxygen atmosphere. The greater degree of relaxation which the low oxygen atmosphere induced appeared to free them from their usual preoccupations, and make for a superficially better intellectual performance. However, in respect to insight, judgment and control of emotions, more marked impairment was uniformly present than in the student group.

The results of inhalation of 13 per cent. oxygen revealed especially that an emotional release, with diminished reason, memory and judgment, follows exposure to moderate oxygen deficiency for a three-hour period, both in psychoneurotic patients and in normal individuals.

The inhalation of high oxygen atmospheres by patients with previously existing chronic anoxia may also produce a profound disturbance in mental functioning. Irrationality, stupor and delirium may take place within three hours' exposure to 50 per cent. oxygen. When these patients become acclimatized to their increased oxygen tension, the mental disturbance disappears, frequently with the appearance of a cheerful and optimistic mental state. (Authors' abstr.)

APRIL.

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*Dyschromia Cutaneopilaris of Nervous Origin. *Mari, A.* . . . 90
A Statistical and Medico-legal Consideration of Suicides in Genoa. *Franchini, A.* 125
*Hypoglycaemia Causing Convulsive Attacks Caused by Adenoma of the Insula of the Pancreas. *Bergonzi, M.* 161
Forced Grasping and Allied Phenomena. *Kalinowski, L.* . . . 197

Deviation of Gait in Cases of Hemianopia.

The author alludes to the symptom of a lesion of the frontal lobe reported by Stenvers and others, the only symptom of which consists of a deviation to the opposite side to that of the lesion when walking with eyes open. He claims to have been able to demonstrate a similar deviation away from the cerebral focus in cases of homonymous hemianopia.

Dyschromia Cutaneopilaris of Nervous Origin.

Following an account of our knowledge of cutaneous and hair pigmentation the author describes a case of dyschromia cutaneopilaris occurring whilst the patient was suffering from a depressive state. A particularly interesting item of the discussion is the reference made to a number of well-authenticated cases of immediate blanching of the hair after shock or acute anxiety.

Hypoglycaemia Causing Convulsive Attacks Caused by Adenoma of the Insula of the Pancreas.

The pathological account of a case of spontaneous hypoglycaemia due to adenoma of the pancreatic insulae. Changes in the cerebral cortex are described concerning particularly the third and fifth strata of the area precentralis giganto-pyramidalis, Broca's area, and the area frontalis granularis.

JUNE, 1939.

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*Glycaemia, the Takata-Ara Reaction and the Weltmann Reaction in Insulin Therapy. *Terron, C., and Malesani, S.* 409
*The " Cerebro-stimulin " of Pope. *Ganfini, G.* 423

On the Biology of Hysteria.

A clinical, experimental and psychological investigation of a patient with an extrapyramidal post-encephalitic syndrome, together with many neurovegetative disturbances due to a hypothalamic lesion. The patient has frequent attacks of lethargy, of catalepsy and of somnambulism with dissociation of memory, consciousness and personality. The attacks of typical psychogenic nature are bound to a hysterical mentality characterized by hypersuggestibility. The author examines the relations between the organic and the functional symptoms. He considers the subcortical theories of hysteria and formulates the following hypothesis. Hysteria and particularly the major syndromes of mental dissociation are conditioned by a congenital or acquired hyperexcitability of the hypothalamus.

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A Contribution to Our Knowledge of the Relations between Epilepsy and Heart Disease.

The author, as a result of anatomical and pathological investigations on 171 epileptic patients, fails to find any relation between epilepsy and heart disease.

The Ide Colour Reaction for the Diagnosis of Syphilis.

A comparison of the Ide reaction with the Wassermann shows that it is a little less sensitive but equally specific.

Disturbances of Eye Movements in Chronic Epidemic Encephalitis.

The eye movements were examined in 41 cases of chronic epidemic encephalitis. Twenty-four of the cases showed Parkinson symptoms and 17 suffered from mental disorders without Parkinsonism. Disturbance of ocular movement occurred in both classes.

The Action of Mescalin on the Mental Processes.

Thirty cgr. of mescalin sulphate were administered to each of six subjects. Four showed euphoria, improvement of recent memory and the power of integration with some improvement of attention. In one case the drug caused depression, and in the sixth depersonalization. The author considers the drug is useless for the purpose of eliciting confessions.

Glycaemia, the Takata-Ara Reaction and the Weltmann Reaction in Insulin Therapy.

The authors studied the blood-sugar content during convulsive therapy by insulin. They cite cases in which, when coma persists in spite of sugar injection, further sugar administration fails to awake the patient, although the blood sugar is raised above normal.

The "Cerebro-stimulin" of Pope.

Pope claims to have discovered a specific substance stimulating the cerebral cortex of the frog in cerebrospinal fluid. The author does not consider the technique followed by Pope to be capable of establishing the existence of the alleged specific substance.

SCHWEIZ. ARCH. NEUROL. PSYCHIAT.

VOL. XLIV. 1939.

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Freud's "Interminable" Analysis. *Bilring, E.* . . . . .
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Observations on the Creations of the Mentally Ill. *Takesaki, S.* . . .
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Z. ANGEW. PSYCHOL.

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Z. KINDERPSYCHIAT.

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1. Biochemistry, Physiology and Pathology.

Changes in the Brain Resulting from Depletion of Extra-cellular Electrolytes. *Yannet, Herman.* [*Am. J. Physiol.*, **128**, 683–9 (1940).]

Analyses of the serum and brains of animals whose extra-cellular electrolyte were depleted to varying levels are presented. The data indicate that the brain cells adjust to this depletion by releasing intracellular K in amounts proportional to the decrease in the concentration of extracellular Na. The data are consistent with the view that all the Na and probably all the Cl in the brain is diffusible.

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

Physiology and Pathology of the Hypophysis. II. The Temperature-regulatory Function. *Nisi, Naoto.* [*J. Chosen Med. Assoc.*, **30**, 1–21 (*German abstr.*, 1–2) (1940).]

In rabbits, completely hypophysectomized, or with only anterior lobe removed (A), body temperature rises much higher than in the normal animal on exposure to heat, and goes much lower on exposure to cold. In A, central pyrogenic stimulants

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do not act, but peripheral stimulants like tetrahydro-β-naphthylamine or adrenaline are effective, although the response to the last drugs becomes less as time goes on. The facts that picrotoxin, so-called cold-centre stimulant, and warm-water perfusion over the heat centre, cause a marked decrease in the body temperature in A, and that heat-centre stimulant causes a drop in body temperature, may mean that the cold-centre of Meyer may be stimulated by removal of the anterior pituitary. These abnormal responses to various agents in A will return to normal if the anterior lobe is implanted or its extract is injected.

S. TASHIRO (Chem. Abstr.).

Chronaximetric Analysis of the Vasoconstrictor Effects of the Splanchnic Nerve. Chauchard, A., Chauchard, B., and Chauchard, Paul. [*Ann. physiol. physicochim. biol.*, **15**, 799–804 (1939); *cf. C.A.*, **31**, 5869[9], 6336[1].]

Stimulation of the splanchnic nerve in the dog causes a diphasic rise in blood pressure in the normal state but a lower monophasic rise after adrenalectomy. The vasoconstrictor fibres involved in the first rise in blood pressure normally have a chronaxie of 1–1·5 msec. or more and a summation time of 6 seconds. The summation time is decreased by adrenaline (I) and atropine (II), and increased by acetylcholine (III) and yohimbine (IV). The adrenalino-secretory fibres, responsible for the second rise in blood pressure, have a chronaxie of about 0·5 msec. and a summation time of 4 sec., if the adrenal has not been injured. Their summation time is decreased by I, III and IV, and increased by II; if the concentration of II is sufficiently high, the nerve may become incapable of excitation. The fact that only I affects adrenal secretion and vasoconstriction in the same direction offers new proof of the existence of two different phenomena. I, III and IV, by their action on the cells of the adrenal medulla, favour I secretion, while II inhibits it. The analogy between the salivary and adrenal secretion is pointed out.

RUTH BERGGREN (Chem. Abstr.)

Relation of Potassium to Periodic Family Paralysis. Gammon, G. D., Austin, J. H., Blithe, M. D., and Reid, C. G. [*Am. J. Med. Sci.*, **197**, 326–32 (1939).]

A rapid loss through the urine of K absorbed from the gastro-intestinal tract was found in a patient with periodic family paralysis. Water diuresis rapidly removed K from the patient, with a fall in serum K and the development of a seizure. Attacks of weakness were associated with a falling serum-K and recovery with rising values. K salts were of use in preventing as well as curing seizures.

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

Histidine Detection and Estimation in Urine. Racker, E. [*Biochem. J.*, **34**, 89–96 (1940).]

Histidine (I) was determined in urine by a method based on Knoop's bromine reaction with I (*Beitr. chem. Physiol. Path.*, **11**, 396 [1908]). The urine was treated with Ba(OH) to remove interfering phosphates, and then with H_2SO_4 to remove Ba. The filtrate was mixed with a 5 per cent. Na urate suspension and then with Br until an excess was present. After 10 minutes the Br was destroyed with As_2O_3 and the solution was heated with Na_2CO_3 to develop the colour. Na urate which sensitizes the test was added in excess to make all the samples uniform. Normal urines contained 2·80 mgm. 1/100 ml. with an average of 20. Higher values were not observed in the urines of melancholic patients. Pregnancy urines usually were high in I.

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

Nervous Humoral Regulation. Chernigovskii, V. N. [*Uspekhi Sovremenoi Biol.*, **9**, *No.* 3, 387–433 (1938); *Khim. Referat. Zhur.*, 1939, *No.* 5, 51.]

Sympathin, which is excreted into the blood during excitation of the sympathetic nervous system, is related to, or is identical with, adrenaline. During excitation of the parasympathetic nerves acetylcholine is formed. Acetylcholine

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acts only for a short time because it is split by cholinesterase. The tissues contain a supply of mediators (acetylcholine and sympathin) in the form of inactive promediators. The chemical nature of the promediators has not yet been determined.
W. R. HENN (Chem. Abstr.).

Existence of a Respiratory Neurohormone. Koppanyi, Theodore, and Linegar, Charles R. [*Science*, **91**, 297–8 (1940).]

In addition to acetylcholine, other choline derivatives, muscarine, mecholyl and doryl were assayed for their respiratory stimulating actions in atropinized animals. Muscarine and doryl (0·15–0·5 mgm./kgm. body weight) produced pressor effects and marked stimulation of respiration. Doryl (0·25 mgm. or more per kgm.) produced after a brief stimulation a secondary depression of respiration. The pressor effect of acetylcholine is not abolished by doryl. Mecholyl, except in very large doses (2·0 mgm. or more), does not produce respiratory stimulation. Atropine does not completely block the vasodilator effect of mecholyl. Only choline derivatives with a nicotine-like action stimulate respiration. The choline group in itself is not the causative agent. If effective doses of acetylcholine (0·3–1·0 mgm./kgm.) are injected into atropinized animals via the common carotid artery there occurs (*a*) a slight acceleration of respiration about 5 sec. after injection, and (*b*) the usual panting response about 15 sec. later. Conclusion: There exists a neurohumoral mechanism involving the excitation of the chemoreceptors in the carotid sinus region, which, in turn, causes reflex stimulation of respiration.
FELIX SAUNDERS (Chem. Abstr.).

The Effect of Malonic Acid on the Respiration of Nerve Tissue. Huszak, Istvan. [*Biochem. Z.*, **303**, 349–53 (1940).]

The respiration of muscle tissue is inhibited by malonate (of a given concentration) to the same extent as by 0·001 M KCN while that of nerve tissue is affected very much less or not at all. The effect of KCN on both muscle and nerve is the same. Lactic or pyruvic acid inhibits or even completely counteracts the action of the malonic acid on the nerve tissue. S. MORGULIS (Chem. Abstr.).

Arsenical Encephalopathy. II. Pathogenic Study. Tzanck, A., and Lewi, S. [*Ann. dermatol. syphilig.*, **10**, 893–906 (1939–40); *cf. C.A.*, **34**, 1742$_4$.]

A theoretical discussion of the nature of arsenical encephalopathy. Tzanck and Lewi believe the phenomenon is due to an individual intolerance of the body to the arsenical, rather than to ordinary As poisoning or to reactivation of the syphilitic process. Susceptibility is apparently related to the endocrine system, e.g. the reaction occurs especially frequently in pregnant women.
M. HORN (Chem. Abstr.).

The Cause of Reduction of the Sugar Content of the Cerebrospinal Fluid in Meningitis. Hendry, Esther. [*Arch. Disease Childhood*, **14**, 307–16 (1939).]

Three possibilities were investigated: (1) That no decrease occurs in the permeability to glucose of the blood barrier was concluded from the fact that increases in cerebrospinal fluid glucose (I) after intravenous glucose injection in non-meningitic disease were no greater than those found in tuberculous meningitis. (2) That bacterial consumption of glucose does not usually cause reduction in I was shown by incubation of normal fluid with *Staphylococcus albus* and *aureus*, meningococcus, pneumococcus, and *B. tuberculosis*, without significant drop in I. With *B. coli*, however, all I disappeared (3) That polymorphonuclear leucocytes do cause lowering of I was shown by its marked drop after incubation of normal cerebrospinal fluid and white blood cells with and without added glucose and with adequate controls, while with lymphocytes only practically no change occurred. The course taken by I in various meningitides is discussed in relation to these findings. KATHRYN KNOWLTON (Chem. Abstr.).

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Cerebrospinal Fluid in Typhus. D'Ignazio, C., Lombardi, A., and D'Arcangelo, D. [*Minerva med.*, **1**, 76–81 (1940).]

The cerebrospinal fluid of 23 patients with exanthematic typhus was frequently examined. There was always hypertension. In 20 to 30 per cent. the fluid contained blood. The albumin content was about normal, from 0·20 to 0·4 per cent.; in those patients with severe disease it was increased to 0·9 and 1 per cent. There was a parallelism between increased protein concentration and positive globulin reaction.

E. S. G. BARRON (Chem. Abstr.).

Colloid Reaction in the Diagnosis of Cerebrospinal Fluid. Herrmann, Werner. [*Kolloid-Z.*, **89**, 297–301 (1939).]

The preparation of Au sol according to the Fowweather method (*cf. C.A.*, **23**, 405) is described. This sol is more easily prepared than other sols and more sensitive to pathological protein. The collargol reaction of Riebeling (*C.A.*, **32**, 5488[5]) is a valuable contribution to the research methods of colloid chemistry. The Au sol and collargol reactions have different chemical bases. They can be used to determine different pathological constituents of the cerebrospinal fluid. Both methods should be used for complete diagnosis of the cerebrospinal fluid.

FELIX SAUNDERS (Chem. Abstr.).

A Modification of the Mastic Reaction of the Cerebrospinal Fluid. Acél, Dezső. [*Orvosi Hetilap*, **84**, 115–17 (1940).]

In each of 10 small Wassermann tubes is placed 2·6 c.c. of AcOH, varying in concentration from a solution made from 88 parts N/80 AcOH and 12 parts water to a solution made from 34 parts N/80 AcOH and 66 parts water. To each tube is added 0·3 c.c. mastic solution prepared by dissolving 10 gm. mastic in 100 c.c. absolute alcohol, filtering after 48 hours, treating 1 c.c. of the filtrate with 8·5 c.c. absolute alcohol and 0·5 c.c. concentrated Sudan III solution, and adding 10 c.c. of this solution to 40 c.c. twice-distilled water. On addition of cerebrospinal fluid to the ten tubes, sedimentation occurs. The result may be read after 2–3 hours. With normal fluids, complete precipitation can be seen in each tube. The reaction is suitable for the determination of meningitis and progressive paralysis.

S. S. DE FINALY (Chem. Abstr.).

Bisulphite-binding Substances in the Blood and Cerebrospinal Fluid. Wortis, Herman, Bueding, Ernest, and Wilson, Wm. E. [*Proc. Soc. Exptl. Biol. Med.*, **43**, 279–82 (1940).]

Methods are described. The normal range of bisulphite-binding substances for human spinal fluid is 0·42–3·07, and for blood 2·0–5·7 mgm. per cent. (calculated as pyruvic acid). The determination cannot be used as an indicator of vitamin B_1 deficiency; it is often normal in various psychiatric disorders, and it is not an accurate measure of the pyruvic acid level. It is elevated after administration of paraldehyde because deproteinization of the fluids with CCl_3–CO_2H partially hydrolyses paraldehyde to AcH, which binds bisulphite in the determination.

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

Central Action of Gonadal Hormones Tested by Means of the Galvanic Current. Kollensperger, Friedrich K. [*Biochem. Z.*, **304**, 90–104 (1940).]

A galvanic current of a given strength passed along the length of the central nervous system of the frog causes reversible phenomena: with head toward the anode, a true narcosis; while with head toward the cathode, a generalized tonic muscle cramp. Narcotics, hypnotics and sedatives which act centrally have a synergistic effect on the former; and the stronger the drug the smaller is the strength of current required to release this reaction. On the contrary, drugs which stimulate centrally raise the galvanic narcosis and lower it for the galvanic cramp. This method has been applied to the study of gonadal hormones. After the injection of

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2 or 5 mgm. per kgm. there is a temporary central sedative effect (at most 2 hours), which manifests itself by a transitory lowering of the galvanic narcosis threshold. The effect is independent of the hormone injected or the sex of the frogs used. Similar effects can be produced by cholesterol. But the gonadal hormones, as well as cholesterol, produce only a lowering of the threshold for the galvanic narcosis without altering the threshold for the galvanic muscle cramp, whereas drugs produce reciprocal effects upon these thresholds.

S. MORGULIS (Chem. Abstr.).

The Parasympathicotropic Action of Corpus Luteum Hormone and Testosterone in the Female Organism. Effkemann, G. [*Arch. Gynäkol.*, **169**, 307–16 (1939).]

Pupillary diameters of the eyes of 12 female cats (3 kgm.) were measured photographically for 3 hours following injections of morphine (0·8 mgm. per kgm.), d-pseudo-ephedrine (40 mgm. per kgm.) and atropine (0·14 mgm. per kgm.). The measurements were repeated 21 hours after intramuscular injection of either 30 mgm. progesterone or 40 mgm. testosterone. The dilatory action of the test was decreased by both hormones in the order: morphine, atropine, d-pseudoephedrine. Because of this order, the parasympathicotropic action of the hormones was thought to be working through the hypothalamic vegetative centres in the brain. Follicular hormone, on the other hand, has a sympathicotropic action.

H. P. G. SECKEL (Chem. Abstr.).

Pyruvate Oxidation in the Brain. VII. Some Dialysable Components of the Pyruvate Oxidation System. Banga, Ilonga, Ochoa, Severo, and Peters, Rudolph A. [*Biochem. J.*, **33**, 1980–96 (1939); *cf. C.A.*, **33**, 8726[8].]

The dialysis of pigeon brain dispersions for short periods greatly reduced their power to oxidize pyruvate (I). Full reactivation was obtained by the addition of inorganic phosphate plus a C dicarboxylic acid plus adenine nucleotide (II). The same was true for dispersions of mammalian brain. In the presence of the other components of the system, II not only increased the oxidative removal of I, but also made the oxidation more complete. Cozymase could replace II and in the pigeon brain was even more active. This effect of cozymase was probably due to enzymic splitting of co-phosphorylase. In rabbit brain dispersions, cozymase could replace II only when the period of dialysis had not exceeded 1·5 hours. Phosphoglycerate was oxidized by pigeon brain almost as readily as I because of its rapid conversion into I and H_3PO_4. Citrate and α-ketoglutarate were much less active than any of the C_4 dicarboxylic acids in catalysing the oxidation of I by brain dispersions. The necessity of fumarate and II for the oxidation of I by kidney cortex dispersions was shown in preliminary experiments.

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

The Estimation of Vitamin B in Cerebrospinal Fluid. Sinclair, Hugh M. [*Biochem. J.*, **33**, 1816–21 (1939); *cf. C.A.*, **33**, 4625[8].]

The method previously described for blood has been applied to the assay of 1–4 ml. of cerebrospinal fluid. The vitamin in normal spinal fluid was present in the unphosphorylated form. The values for vitamin B_1 in 272 samples ranged from 0·0 to 1·3 γ/100 ml., with a mean of 0·5. Pathological samples tended to give higher values, which showed a positive correlation with the white cell count. Estimation of the vitamin in the spinal fluid has no clinical value.

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

Experimental Avitaminosis of the B_2-complex Group and Pellagra of Man. Efremov, V. V. [*Acta Med. U.R.S.S.*, **2**, 622 (1939).]

The greatest resemblance between avitaminosis in rats, dogs and monkeys and in man occurred in the nervous lesions. In all the experimental animals there was

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an ataxic paresis resembling the symptoms found in pellagra in man. In these animals there was a picture resembling that of subacute combined degeneration. In man and in higher animals (dog and monkey) there was also an affection of the cells of the cerebellar cortex and in the medulla. G. W. T. H. FLEMING.

Actual Vitamin C Content of Cerebrospinal Fluid of Young Infants. Bezssonoff, N., Vertruyen, H., Dietz, E., and Mehl, R. [*Compt. rend. soc. biol.*, **132**, 540–4 (1939).]

Spinal fluid from normal infants 1–12 months old contained 4–18 mgm./1 of vitamin C as determined by the methylene blue method and 3–12 mgm./1 as determined with the Bezssonoff reagent (*cf. C.A.*, **30**, 2221[7]). Dichlorophenolindophenol also gave higher values than did the Bezssonoff reagent.

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

Effect of Ascorbic Acid on Oxidation Processes in the Central Nervous System. I. Effect of Ascorbic Acid Reduction on Oxidation Processes in Guinea-pig Brain. Lakhno, Yu. V. [*Biochem. J. (Ukraine)*, **13**, 461–71 (*in Russian*, 471–2; *in English*, 473–4) (1939).]

The greatest intensity of oxidation processes and also of the catalase activity in the brain of the normal guinea-pig was found in the cerebellum, and less in the hemisphere and medulla. Brain oxidation processes and catalase activity in the separate brain sections of avitaminous guinea-pigs did not change by comparison with those of the central nervous system of normal animals.

B. GUTOFF (Chem. Abstr.).

Calcium and Phosphorus Contents of the Blood of Normal and Mentally Diseased Men. Satterfield, G. Howard, McKimmon, W. S., Holmes, Arthur D., and Tripp, Francis. [*J. Am. Dietet. Assoc.*, **16**, 117–23 (1940).]

The amounts of Ca and P in the blood serum of (1) 20 healthy male college honour students, of (2) 17 mentally deficient, psychotic patients, of (3) 11 mentally deficient patients without psychosis, of (4) 57 patients with dementia praecox, and of (5) 12 patients with miscellaneous mental diseases were determined. Average values for Ca and P (mgm./100 c.c.) and for Ca × P were, respectively: (1) 10·65, 3·93, and 41·85; (2) 10·02, 3·55 and 35·57; (3) 10·65, 3·93, and 41·85; (4) 10·22, 3·67, and 37·51; and (5) 9·55–11·20, 2·46–5·43, and 24·82–59·73. Conclusion: The Ca and P contents of the blood of nearly all of the patients with mental diseases were within normal limits. E. CURZON (Chem. Abstr.).

Lipoids of Human Brains during Development. Schuwirth, K. [*Z. Physiol. Chem.*, **263**, 25–36 (1940).]

Analyses of human brain lipoids by the methods of Klenk (*C.A.*, **34**, 2060[4]) are presented. These include foetal, newborn, child and aged. The water and water-soluble extractives diminish with age, while the fat plus cholesterol and ether-soluble glycerophosphatides and cerebrosides increase (*cf.* MacArthur and Doisy, *C.A.*, **14**, 1706). Foetal and newborn brains contain no sphingomyelin, but do contain ether-insoluble glycerophosphatides. The latter are absent from aged brain. In the children's brains these two fractions could not be separated.

MILTON LEVEY (Chem. Abstr.).

Acid-soluble Phosphates in Rabbit Brain. Omura, S. [*Fukuoka Acta Med.*, **32**, 55–8 (1939).]

The cerebral hemispheres contain the following amounts of phosphate: Inorganic PO_4---, 0·0432 per cent.; creatine phosphoric acid, 0·0040 per cent.; $H_4P_2O_7$, 0·0066 per cent.; residual P, 0·0336 per cent. After injections of Na phenobarbital for 3–6 days, the inorganic PO_4--- and creatine phosphoric acid are decreased, and

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the $H_4P_2O_7$ and residual P are increased. After daily injections of sulphonal for 5–8 days the changes are similar, save that the inorganic PO_4 – – – retains its normal value. After injections of insulin and glucose, the inorganic PO_4 – – – increases, the other substances showing no change. After insulin alone, the inorganic PO_4 – – – increases, and $H_4P_2O_7$ decreases. B. C. P. A. (Chem. Abstr.).

The Behaviour of the Blood-liquor Barrier in Experimental Poliomyelitis. Kasahara, Mitio, Kakusui, Tosio, and Nan, S. S. [*S. Kinderheilk*, **60**, *No.* 4, 3 pp. (1938); *Collected Papers Faculty, Med., Osaka Imp. Univ.*, 1938, 31–3 (*Pub.* 1939).]

Fuchsin S solution (1·0 to 3·3 c.c. of a 2 to 10 per cent. solution per kgm. body weight) was intravenously, and in part intramuscularly, injected into monkeys. Forty to 80 minutes later the cerebrospinal fluid was withdrawn suboccipitally, acidified with AcOH, and then analysed colorimetrically for the concentration of dye present. After several weeks, 0·5 c.c. of a spinal cord emulsion containing poliomyelitis virus was intracerebrally injected, and in the preparalytic and paralytic stages experiments on dye concentration were conducted as before. In the controls, the range of concentration was from 0·00002 to 0·0003 per cent., and after infection, from 0·00020 to 0·002 per cent. The passage of the dye into the cerebrospinal fluid was about 3 to 20 times more pronounced in the paralytic stage, and 1·7 to 3 times more pronounced in the preparalytic stage, as compared to normal monkeys. Conclusion: The permeability of the meninges in experimental poliomyelitis is increased even in the early stages. MAURICE M. RATH (Chem. Abstr.).

The Plasma Proteins in Epilepsy. Eef-Olofsson, R. [*Acta Med. Scand.*, **103**, 111–17 (1940) (*in German*).]

The total plasma protein content in epileptic patients is, on the average, somewhat higher than in normal persons—6·40 as compared to 6·19 per cent., with a shift of the mean toward a higher value. There is no difference in fibrin (0·26 and 0·24 per cent.) or albumin (4·09 and 4·08 per cent.), but the globulin content is greater (2·04 and 1·88 per cent.) in the epileptic patients. The albumin/globulin ratio is, therefore, somewhat lower in epileptic patients.

S. MORGULIS (Chem. Abstr.).

2. Pharmacology and Treatment.

The Distribution of Barbital in the Brain in a Case of Acute Barbital Poisoning. Zwikker, J. J. L., and Steenhauer, A. J. [*Pharm. Weekblad*, **77**, 2–5 (1940).]

Analysis of the various organs of the body of a woman whose death was attributed to barbital (I) indicated 66 mgm. I in 150 gm. of the contents of the stomach, 46·4 gm. I in 227 gm. liver (20·4 mgm. per cent.), 31·2 gm. I in 100 gm. kidney (31·2 mgm. per cent.), 12·8 mgm. I in 67 gm. blood (19·0 mgm. per cent.), 15·2 mgm. I in 79 gm. prosencephalon (19·7 mgm. per cent.), 20·2 mgm. I in 109 gm. mesencephalon (18·5 mgm. per cent.), and 28·4 mgm. I in 137 gm. rhombencephalon (20·8 mgm. per cent.). Since the distribution of I in the various parts of the brain was quite uniform, this finding supports the view of Koppanyi (*C.A.*, **29**, 228[4], 7496[4]) that the action of barbital is not restricted to the mesencephalon, and is opposed to the view of Keeser (*C.A.*, **30**, 3078[1]; **32**, 7120[4]).

W. GORDON ROSE (Chem. Abstr.).

Barbiturates. XXIV. Pharmacology of 5-sec-Amyl-5-β-Bromoallylbarbituric Acid. Hazleton, Lloyd W., Koppanyi, Theodore, and Linegar, Charles R. [*J. Am. Pharm. Assoc.*, **29**, 49–56 (1940).]

The 50 per cent. fatal dose of sigmodal sodium (I) for rabbits is 40 mgm. (intravenous) and 90 mgm. (rectal), and for dogs it is about 35 mgm. (intravenous). It is a

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depressant of the central nervous system producing, in appropriate doses in rabbits, loss of righting reflexes, motor paralysis, muscular relaxation, and a deep sleep from which the animals cannot be aroused; in the dog it produces true surgical anaesthesia. The onset of action of I after intravenous injection is immediate in all animals, and after rectal administration it occurs within a few minutes in rabbits. The rate of essential elimination of I was found to be 37–47 per cent. of the average fatal dose (15–19 mgm.) per hour as determined by two different methods, the following one of which is new: The maximum dose which permits rabbits to maintain normal posture unsupported and to retain approximate normal motor activity is determined; after ascertaining the average sleeping time of all animals that survived the average fatal dose (i.e. until they regained the stage in which normal body posture was again maintained), the essential elimination of the compound is calculated by the following formula: (50 per cent. fatal dose — maximum dose of hypnotic permitting normal motor activity) /(sleeping time in hours) = essential elimination in mgm. (per kgm.) per hour. A method for estimating sleeping time after rectal, oral and other routes of administration applying the data derived from the intravenous essential elimination determination is described. I given intravenously is a circulatory and respiratory depressant comparable to other short-acting barbiturates. The blood pressure and respiratory rate in animals anaesthetized with I are similar to those obtained under other anaesthetic agents. Even in fatal doses, I does not abolish the cardiac slowing from faradic stimulation of the vagus; the cardiac and vasomotor responses to autonomic drugs are unchanged. I has definite anticonvulsant properties, and, conversely, a central stimulant such as metrazole antagonizes its depressant effects. Large doses of antipyrine do not deepen I narcosis or alter the recovery time. About one-fifth of the dose of I (or its end products) is excreted in the urine within 48 hours following administration.

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

The Estimation of Barbiturates in Blood. Levvy, G. A. [*Biochem. J.*, **34**, 73–7 (1940).]

The blood (20 ml.) was mixed with 2 gm. of NaH_2PO_4 and then stirred with 40 gm. of anhydrous Na_2SO_4. When the mixture was dry it was ground and extracted with a mixture of ether and petroleum ether (1 : 1) in a Soxhlet for 2·5–3 hours. The extract was then shaken with a charcoal–MgO mixture (Merck's ultracarbon 3, MgO 1) to remove phospholipins. The extract was then filtered and evaporated. The residue was taken up in 2–10 ml. of $CHCl_3$. To 2 ml. of this solution were added 0·1 ml. of 1 per cent. Cobalt acetate in absolute MeOH and 0·6 ml. of 5 per cent. isopropylamine in absolute MeOH and the colour was compared with a standard prepared similarly. Recoveries of added barbituric acids ranged from 83 to 124 per cent.

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

The Effect of Barbiturates on Digestive Secretion. Coffey, Robert J., Koppanyi, Theodore, and Linegar, Charles R. [*Am. J. Digestive Diseases Nutrition*, **7**, 21–3 (1940).]

Barbiturates in large hypnotic and anaesthetic doses in dogs produce a reduction of the gastric and pancreatic secretions, with a prompt return to normal flow after hypnotic doses, and a delayed return after anaesthetic doses. Barbiturates are excreted in the pancreatic juices in very small amounts, and the maximum postcibal excretion in the gastric juice is approximately 5 per cent.

EDWARD EAGLE (Chem. Abstr.).

The Comparative Mental Efficiency of a Drug Addict Group. Partington, J. Edwin. [*J. App. Psych.*, **24**, 48–57 (*February*, 1940).]

The average mental efficiency of 156 drug addicts, measured with the Babcock test, was — 2·28. The group was significantly below normal in learning and motor

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tests, but not in repetition tests. Also, old addicts were significantly poorer than young addicts on learning and motor tests, but not on repetition tests. There was only a small and insignificant negative correlation between efficiency and duration of addiction. M. B. BRODY.

Pulmonary and Urinary Excretion of Paraldehyde in Dogs. Defandorf, James H. [*Am. J. Med. Sci.*, **197**, 834–41 (1939).]

Following rectal injection of 1·8 gm. /kgm., excretion rose to a maximum within 3 hours and fell rapidly after 7 hours. During 7 hours, only 2·8 per cent. of the amount administered was excreted by the lungs and 1·3 per cent. in the urine. The amount in the urine was proportional to urine volume ; its elimination by this route can therefore be increased by diuresis. Paraldehyde forms the increment in the increase of non-fermentable reducing substances previously observed in the urine. FERRIN B. MORELAND (Chem. Abstr.).

Pharmacology of the Extrapyramidal System. I. Action of Harmine in Cats with an Intact Nervous System. Beer, A. G. [*Arch. exptl. Path. Pharmakol.*, **193**, 377–92 (1939).]

The motor changes from harmine poisoning appear to be due to direct stimulation of the extrapyramidal system.

II. Action of Harmine in Cats Minus Neocortex. Ibid. 393–407 (1939).

Harmine acts the same in the decerebrate as in the intact animal ; this substantiates the direct extrapyramidal point of attack.

J. PINCHACK (Chem. Abstr.).

Effects of Drugs on Vegetative Centres. III. Haas, H. T. A. [*Arch. exptl. Path. Pharmakol.*, **192**, 350–60 (1939) ; *cf. C.A.*, **34**, 2931[6].]

Paraldehyde reduces the fall in temperature and the rise of blood-sugar level that occurs after intracisternal injection of picrotoxin in rabbits. Paraldehyde has similar effects on the response to pilocarpine, but not on that to acetylcholine, ergotamine or ergometrine. Paraldehyde counteracts the effects of adrenaline (intracisternal or intravenous application) on blood sugar and leucocyte count.

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

Vitamin E in the Treatment of Muscular Dystrophies and Nervous Diseases. Bicknell, Franklin. [*Lancet*, **1**, 10–13 (1940).]

Patients, chiefly children, with muscular dystrophies and amyotrophic lateral sclerosis showed improvement after treatment with 0·5 oz. fresh, dried whole-wheat germ twice daily for 6 weeks or more. The diseases appear to be caused by vitamin E deficiency. Normal human diets may be poor in vitamin E.

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

Passage of Prontosil from the Blood into the Cerebrospinal Fluid. Kasahar, Mitio, and Tarumi, Masayasu. [*Klin. Wochenschr.*, **17**, 354–5 (1938) ; *Collected Papers Faculty Med., Osaka Imp. Univ.*, 1938, 21–2 (Pub. 1939).]

Acute and chronic meningitis were experimentally produced in rabbits. After prontosil (2 c.c. of 2·5 per cent. solution per kgm. body weight) was intravenously injected it was determined colorimetrically in the cerebrospinal fluid. Whereas in normal rabbits there was only a very minute trace of prontosil in the fluid, the concentration in rabbits with meningitis varied from 0·374 to 1·140 mgm. per cent.

MAURICE M. RATH (Chem. Abstr.).

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Chemotherapeutic Studies in the Treatment of Meningococcal and Pneumococcal Meningitis. Chopra, R. N., de Monte, A. J. H., Chatterji, B. C., and Gupta, S. K. [*Indian Med. Gaz.*, **75**, 1–7 (1940).]

The mortality rate in 12 cases of meningococcal meningitis treated orally with diaminodiphenyl sulphone glucoside was 41·7 per cent. In 12 cases treated with anti-meningococcal serum the mortality was 75 per cent. In 22 cases treated with serum and drug the mortality was 27·3 per cent., while the mortality in the corresponding control series (serum alone) was 60 per cent. in 20 cases. In 7 cases of pneumococcal meningitis the mortality after treatment with the drug was 100 per cent. When septicide (sulphanilamide) was given orally to 10 meningococcic meningitis cases the mortality was 40 per cent. Two of 3 cases of pneumococcic meningitis given septicide died. C. RIEGEL (Chem. Abstr.).

Antinarcotic Substance in the Normal Serum of Rabbits. Komao, Ito. [*J. Chosen Med. Assoc.*, **29**, 2639–63 (*German abstr.*, 160–1) (1939).]

The serum of the normal rabbit contains antichloral hydrate (A) and anti-Mg (B) substances as tested with mice, but no antiluminal (C). Normal serum plus anterior pituitary hormone (hypophorin) produces C effect. In serum of pregnant rabbits, A is still present, but not B, while C appears. The serum of the animals freed from sex, pituitary or thyroid glands loses all. If pinealectomized, the serum loses B, but C appears. Parathyroidectomy causes a loss of only B. When the reticulo-endothelial system is stimulated, the rabbit loses both A and B, but produces C, while with blockade of the system, all antinarcotic substances are lost.

S. TASHIRO (Chem. Abstr.).

Pervitin as a Means of Increasing Efficiency. Lehmann, G., Straub, H., and Szakall A. [*Arbeitsphysiol.*, **10**, 680–91 (1939).]

With three men, 21–26 years old, observations were made during rest and work (bicycle ergometer) of body temperature, pulse rate, blood pressure, ventilation rate, O_2 consumption, and R.Q., with and without 5–15 mgm. pervitin (1-phenyl-2-methylaminopropane). In some experiments the subjects worked with constant load and speed, in others with automatically increasing load, until exhausted. No changes in metabolism were observed after pervitin administration either during rest or work. At times considerably more work was performed with, than without, pervitin. After work continued to exhaustion, the efficiency was lowered considerably more when the subjects had received pervitin than when they worked without it. The subject without pervitin discontinued work shortly before reaching the limit of maximum O_2 absorption, whereas the subject with pervitin could work to the limit of maximum efficiency. For workmen and sportsmen working to the limit of capacity, pervitin is dangerous because it suppresses the subjective limits of exhaustion, and leads to consumption of reserves of strength normally retained by the organism as protection against too great exhaustion.

T. M. CARPENTER (Chem. Abstr.).

Influence of Pervitin on Some Psychic and Psychomotor Functions. Graf, O. [*Arbeitsphysiol.*, **10**, 692–705 (1939).]

With four men (two of them blind) a study was made of psychic and psychomotor functions during mental arithmetic, stringing of pearls, and riding a bicycle ergometer, with and without doses of 9–15 mgm. of pervitin (1-phenyl-2-methyl-aminopropane). For comparative purposes, the observations with and without pervitin were made on the same day. The pervitin eliminated the feeling of fatigue and inhibitions and led to increased activity and feeling of efficiency. It lessened the ability to concentrate, but acted favourably on efficiency because it lowered the too high tension of attentiveness which, with fine work, leads to disturbance in bodily movements. Marked euphoria was lacking. The effect of

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pervitin is variable and seems to depend considerably on the initial condition under which it is given. Pervitin combined with caffeine has a potent effect in increasing the stimulus to an unpleasant degree. Graf cautions against the use of pervitin except when specially indicated.

T. M. CARPENTER (Chem. Abstr.).

Axon Reflex Responses to Acetylcholine in the Skin. Rothman, Stephen, and Coon, Julius M. [*J. Investigative Dermatol.*, **3**, 79–97 (1940).]

The goose-flesh elicited by acetylcholine (I) occurs by virtue of its nicotine-like action. By eliciting sweat secretion with intradermal injection of I two effects can be distinguished: (*a*) a direct action on the sweat glands (muscarine-like effect), and (*b*) an indirect action through an axon reflex mechanism (nicotine-like effect). Drugs with nicotine-like action elicit a cutaneous vasoconstriction which may be the result of an independent axon reflex or may be associated with the pilomotor action of these drugs. PHILIP D. ADAMS (Chem. Abstr.).

Nature of the Pilomotor Response to Acetylcholine; Some Observations on the Pharmacodynamics of the Skin. Coon, Julius M., and Rothman, Stephen. [*J. Pharmacol.*, **68**, 301–11 (1940); *cf. C.A.*, **34**, 519⁷.]

Intracutaneous injection of very diluted solutions of acetylcholine and other drugs with a nicotine-like action caused a strong, transient pilomotor activity in the vicinity of the injection. In human skin and in the tail of the cat this response was abolished by sympathetic nerve degeneration, remained active in areas anaesthetized by nerve block and could be elicited in extirpated pieces of skin. Local anaesthetics, in dilutions as high as 1 : 200,000, inhibited the reaction. Pitressin and histamine had no inhibitory action. The pilo-erection is apparently effected through an axon reflex involving the terminal ramifications of the post-ganglionic sympathetic fibres supplying the pilomotor muscles. Preliminary observations indicate an accompanying axon reflex involving similarly the terminal branches of the nerves supplying the sweat glands.

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

Effect of Testosterone on Serum Lipides in Schizophrenia. Randall, Lowell O. [*J. Biol. Chem.*, **133**, 137–40 (1940); *cf. C.A.*, **33**, 7901³.]

The injection of testosterone propionate during a period of 3 weeks into 9 schizophrenic subjects produced a continuous rise in serum lipides followed by a return toward the initial level after medication. Sesame oil injections had no significant effect in 10 subjects. It is possible that the male sex hormone affects the low lipide metabolism of schizophrenic individuals by an indirect action on other glands of internal secretion. A. P. LOTHROP (Chem. Abstr.).

Biochemical Studies of Insulin Shock. III. Behaviour of Some Soluble Phosphorus Fractions in Muscular Tissues. Romeo, Filippo. [*Riv. patol. sper.*, **22**, 423–36 (1939); *cf. C.A.*, **34**, 1381⁵.]

In rabbits, after large intravenous injections of insulin, there was a diminution of pyrophosphates, moderate increase of total P and a definite increase of inorganic P and phosphocreatine. HELEN LEE GRUEHL (Chem. Abstr.).

Availability of Various Substrates for Human Brain Metabolism during Therapeutic Insulin Shock. Wortis, Joseph, and Goldfarb, Walter. [*Science*, **91**, 270–1 (1940).]

The relative availability of various substrates for brain metabolism was determined by administering them intravenously during therapeutic insulin shock. The effect of the various substrates on the clinical state of the patient was observed.

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Simultaneously, the O, glucose and lactic acid uptake of the brain was estimated from analyses of the arterial and jugular blood. In schizophrenics glucose is readily available to the human brain, lactic acid is not metabolized to any significant degree, and pyruvic acid and alcohol are not metabolized at all.

FELIX SAUNDERS (Chem. Abstr.).

Pharmacologic Modification of the Metrazole Convulsion. Rosen, Samuel R., Ziegler, John B., and Cominole, Bruce. [*J. Am. Pharm. Assoc.*, **29**, 164–6 (1940).]

A standard dosage of β-erythroidin-HCl, about 4 mgm. per kgm., markedly reduced the intensity of the metrazole seizure in dogs. The duration of the convulsion was variable, but in the more prolonged instances there were pauses between brief clonic seizures; in general, the duration appeared to be decreased. Data are presented proving that β-erythroidin has a paralytic action on animals that have received an otherwise convulsant dose of metrazole. No untoward side reactions, such as faecal vomiting or defaecation, were observed.

A PAPINEAU-COUTURE (Chem. Abstr.).

Pharmacologic and Pathologic Effects of Repeated Convulsant Doses of Metrazole. Whitehead, Richard W., Neuburger, Karl T., Rutledge, Enid K., and Silcott, Wm. L. [*Am. J. Med. Sci.*, **199**, 352–9 (1940).]

Contrary to findings of certain other investigators, it is found that convulsant doses of metrazole may lead in dogs and rabbits to organic pathological changes, especially in the cerebral cortex. More or less complete necrosis of the nervous parenchyma is observed in small circumscribed areas. Other changes include mild tubular degeneration in the kidneys, scattered haemorrhages in the lungs and generalized visceral congestion. The cerebral changes are attributed to the anoxia produced by vascular spasm and by the anoxaemia resulting from the convulsions. Human cases are cited showing correlative changes.

FERRIN B. MORELAND (Chem. Abstr.).

Failure of Hypnotic and Convulsive Agents to Alter the Course of Experimental Poliomyelitis. Jungeblut, Claus W. [*Proc. Soc. Exptl. Biol. Med.*, **43**, 464–8 (1940).]

Neither narcotic doses of phenobarbital nor production of systemic shock by insulin or metrazole influenced the course of experimental poliomyelitis in monkeys.

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

The Action of Enterally and Perlingually Administered Metrazole. Kuschel, H. [*Arch. exptl. Path. Pharmakol.*, **193**, 330–1 (1939).]

The detoxicating action of metrazole on Na evipan was studied in cats with various routes of administration. Metrazole is absorbed much the same when repeated doses are given under the tongue, swallowed or injected intravenously. The oral mucosa is more permeable to it than the gastro-intestinal.

J. PINCHACK (Chem. Abstr.).

Elimination of Parenterally Administered Metrazole from the Organism. Hinsberg, K. [*Arch. exptl. Path. Pharmakol.*, **192**, 90–5 (1939); *cf. Esser and Kuhn, C.A.*, **27**, 5815.]

An improved method of extracting metrazole from organs is based on precipitating the $CHCl_3$-extracted material with phosphotungstic acid in the presence of 12·5 per cent. HCl. The difficultly soluble product of constant weight obtained is decomposed and the metrazole in the filtrate precipitated by sublimate and its

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m.p. determined; experimental error was about 2 per cent. With this method no more than 5·2 per cent. of the injected metrazole could be recovered from the organs of guinea pigs. The drug was found in the intestine and faeces, but was too firmly combined in the latter to be detectable.

J. PINCHACK (Chem. Abstr.).

Detoxication and Excretion of Benzedrine. Beyer, Karl H., and Skinner, J. T. [*J. Pharmacol.*, **68**, 419–32 (1940).]

A new method for the determination of benzedrine in urine is described. The benzedrine is coupled with diazotized p-nitrobenzene and a colour developed by adding NaOH. Benzedrine seems to be completely absorbed from the digestive tract, but only about 50 per cent. of it appears in human urine in the 48 hours after ingestion. Experiments with dogs indicate that part of it is detoxicated in an unknown manner in the liver. L. E. GILSON (Chem. Abstr.).

Benzedrine Sulphate and the Duration of the Resistance to Acute Anoxaemia. Binet, Le, and Strumza, M. V. [*Bull. mém. soc. méd. hôp. Paris*, **55**, 1264–7 (1939); *cf. C.A.*, **32**, 3822[9]; **33**, 236[1], 737[7].]

The period of resistance of chloralosed dogs to anoxaemia when breathing an artificial gas mixture of normal pressure but containing only 2·4 per cent. O was markedly increased by intravenous injections of 0·025–18 mgm. benzedrine sulphate (I)/kgm.; the optimum dose, 0·25–4 mgm. I/kgm., could double or treble this period of resistance. In non-anaesthetized guinea-pigs in low-pressure chambers, in which the O did not exceed 3·4–4 per cent., the interval before respiration failed was perceptibly prolonged by intraperitoneal injections of 0·2–0·4 mgm. I/100 gm. body weight. After treatment with I the marked asthenia and other symptoms, ordinarily observed in guinea pigs at a barometric pressure of 230 mm. Hg, did not appear until the pressure fell to 142–5 mm. Hg. Intravenous injections of 0·3–5 mgm. I/kgm. into dogs resulted in the rapid disappearance of the deep coma following revival from the syncope produced by living in an atmosphere of 4 per cent. O in the low-pressure chamber. The injurious effects of 10 mgm. morphine-HCl or 0·5 mgm. scopolamine on the respiration were suppressed by 0·05 mgm. I.

RUTH BERGGREN (Chem. Abstr.).

The Reciprocal Pharmacologic Effects of Amphetamine (Benzedrine) Sulphate and the Barbiturates. Meyerson, Abraham. [*New Eng. J. Med.*, **221**, 561–4 (1939).]

The undesirable effects arising from the use of large doses of barbiturates in treatment of epilepsy, depressions and other disturbances can be in part or wholly counteracted by small doses of amphetamine sulphate (I). Similarly, the effects of large doses of I can be mitigated by small doses of barbiturates.

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

The Effect of Amphetamine (Benzedrine) Sulphate and Paredrine Hydrobromide on Sodium Amytal Narcosis. Myerson, Abraham, Loman, Julius, Rinkel, Max, and Lesses, Mark F. [*New Eng. J. Med.*, **221**, 1015–19 (1939).]

The narcosis produced by intravenous administration of Na amytal is prevented or counteracted by amphetamine sulphate, but is unaffected by paredrine p-hydroxy-α-methylphenylethylamine). E. R. MAIN (Chem. Abstr.).

Pharmacological Action on the Vegetative Centres. II. Haas, Hans T. A. [*Arch. exptl. Path. Pharmakol.*, **192**, 117–30 (1939); *cf. C.A.*, **33**, 8787[3].]

The influence of pilocarpine (I), adrenaline (II) and ergotamine (III) on the vegetative centres was demonstrated by their ability to decrease the acetylcholine

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(IV) content of the brain stem and cortex of eserinized leeches. This decrease was apparent with large doses of I and II and small doses of III given intracisternally ; IV, itself, was inactive. Neither I nor III was active intravenously, as was II.

III. Ibid., 350–60.

The study was continued with intracisternal or intravenous injections of I, II, IV and picrotoxin (V), and intravenous injections of III or ergometrine (VI) in rabbits previously subcutaneously injected with paraldehyde (VII) or intravenously with atropine. The direct central action of I, II and V and the highly improbable one of III, IV and VI were indicated by the fact that VII reduced the fall in temperature and rise in blood sugar after I and V, but not after III, IV and VI, and that it counteracted the effect of II on blood sugar and leucocytes.

J. PINCHACK (Chem. Abstr.).

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