Bibliography and Epitome*

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Recent Trends in Aphasic Research

This article is confined to a limited survey of contemporary literature and research on aphasia. An attempt has been made to correlate 3 different approaches to the subject in order to bring some unification to the problems involved.

These 3 approaches investigate the pathological phenomena of speech and language, labelled aphasia, from the anatomic-physiological, the psycho-mechanistic, and the structural-linguistic points of view.

Wiener's theory, which compares the human brain and nervous system to a highly complicated calculating machine or to a telephone switchboard service, was confirmed by Penfield and Rasmussen's anatomical findings on the operating table. Their findings refute the theory of previous authors that association areas utilize transcortical pathways. Penfield suggests that the mechanism responsible for the coordination of the speech centers is more probably mediated by subcortical projection pathways.

Penfield distinguishes between inborn and acquired connection patterns. With the exception of the temporal cortex, Penfield and his co-workers could not discover any positive evidence for acquired neuron connection patterns. In the temporal cortex only, electrical stimulation and epileptic discharge were able to bring to consciousness visual memories, auditory memories, and combined memories. They deduce, therefore, that "memory" is filed in the temporal cortex.

The linguistic-structural point of view is represented by the Dutch scientist Grewel. His observations in regard to aphasic patients whose linguistic faculties have suffered seem to indicate the presence of lesions in the temporal lobe of the dominant hemisphere. According to Penfield and Rasmussen it is there, as a result of a high level of neuronal integration, that memory patterns activating speech are formed.

The different phenomena of aphasic disturbances can best be explained by lesions in the dominant hemisphere that involve the destruction or disruption of acquired patterns of neuronal pathways. The symptoms may evidence injuries to acquired afferent and efferent synaptic chains of neuronal mechanisms.

(Author's Abstr.)

Effects of Chronic Barbiturate Intoxication on Motivation and Muscular Coordination

Ten male patients, addicted to barbiturates upon arrival at the Public Health Service Hospital, Lixington, Dy., who volunteered for the study were maintained on large doses of secobarbital (Seconal) for periods ranging from 35 to 90 days. Reaction times to visual stimuli and quantified measures of muscular coordination were taken (*a*) during the last week of addiction (intoxication), (*b*) after abrupt withdrawal of the drug, and (*c*) after recovery from drug effects.

Great loss of co-ordination was found during intoxication and during the first eight days of the withdrawal period, with gradual improvement continuing through the remaining 10 days. Reaction time was found to be very greatly impaired during intoxication and early in the withdrawal period; but, unlike coordination, it showed significant improvement soon after withdrawal and thereafter gradually returned to the control level.

Differences in reaction time corresponding to various foreperiods, or delay times, were evaluated as motivational differences; i.e. they were evaluated as differences in ability to develop a "set" or a "readiness to respond". Insensitivity to changes in foreperiods was found during intoxication. Sensitivity increased after withdrawal of the drug and was apparently normal after three to five months of enforced abstinence.

In view of the observed severe muscular incoordination and lack of ability to acquire and maintain readiness to respond, it was concluded that the general behavior of chronic barbiturate users is very severely impaired. They lack the ability to prepare for and react efficiently in performing manipulative tasks. It appears, moreover, that they could not anticipate emergencies and that they would be very unsafe machine operators.

(Authors' Abstr.)

Morphology of the Testes in Schizophrenia

An evaluation of testicular morphology in schizophrenia has been made through the utilization of bilateral testicular biopsies in 23 patients with typical schizophrenia. Of these, 16 were designated as non-institutionalized, since they were studied shortly after their first hospitalization, and the remaining 7, as institutionalized, since they had been hospitalized for a number of years. Eleven patients were in the paranoid subgroup. In four of these the testicular histology deviated from the normal, but in two of the four the degree of abnormality was regarded as slight. The three patients in the subgroup of simple schizophrenia and the three patients in the subgroup of hebephrenic schizophrenia had normal testes. Only in the subgroup of the catatonic type, in which the testes of five of the six patients showed significant departures from the normal, was there a suggestion of a relationship between schizophrenia and testicular structure.

The observed testicular defects were not unique for patients with schizophrenia but were similar to those that have been observed in many men whose only complaint was infertility.

The data suggest that chronicity of illness and nutritional deficiency are related to testicular atrophy. It may be hypothesized that the longer the duration of illness, the greater the chance for subclinical nutritive failure to occur, particularly in patients with catatonia, and to be reflected in the testicular morphology.

It may be concluded that specific abnormalities of testicular structure and function do not characterize schizophrenia.

(Authors' Abstr.)

Glutamine, Glutamic Acid, and γ-Aminobutyric Acid in Cerebrospinal Fluids

The glutamine concentration of cerebrospinal fluid in patients with a variety of neurological disorders was found to have a mean value of $7{\cdot}35 \pm 2{\cdot}0$ mg. per 100 cc. No relation could be established between glutamine concentration and the type of disorder. Glutamic acid was either absent or present only in traces. γ-Aminobutyric acid could not be detected in any of the fluids investigated.

(Author's Abstr.)

SEPTEMBER

Anxiety and Depressive States Treated with Isonicotinyl Hydrazide (Isoniazid)

Of 41 patients suffering from anxiety or depressions of the agitated, psychoneurotic, or manic-depressive types, 28, or $68{\cdot}3$ per cent. improved after receiving isoniazid.

Of the 21 patients who had required electric shock therapy for previous episodes, 13, or $59{\cdot}1$ per cent., improved on isoniazid alone.

Of the 13 patients considered failures, 5 failed to show improvement even after receiving subsequent electric shock therapy.

Some improvement was usually noted within three weeks if the patient was going to respond.

If oral administration of isoniazid fails to produce improvement, the parenteral route should be tried.

Isoniazid can be administered safely to diabetic patients.

Isoniazid used in conjunction with electric shock therapy may reduce the number of treatments necessary.

(Authors' Abstr.)

OCTOBER

A Quantitative Test of Theory and Diagnostic Indicators of Childhood Schizophrenia

1. Childhood schizophrenia is characterized by a disturbance in the regulation of maturation processes at both biological and psychological levels.

2. The dominance of tonic-neck-reflex motility is a particularly striking example of the maturational lag and unevenness of development.

3. The schizophrenic child has basic difficulties in boundaries and segregation of physiological and psychological subsystems.

4. The disorder is characterized by its pervading to some extent virtually all major areas of functioning, in contrast to the more specific concentration of symptoms in single areas among neurotic children and those with primary behavior problems.

5. The concept of plasticity characterizes the behavior and organization of the schizophrenic child in virtually all these areas.

(Authors' Abstr.)

Use of Electro Convulsive Therapy in Morphine, Meperidine and Related Alkaloid Addictions

Electric convulsive therapy has occasionally been mentioned in the literature as a valuable method of treating withdrawal symptoms in cases of drug addiction. In the authors' experience with this measure they have found it uniformly effective. Recently, opinions have been expressed that statistical evidence has not been presented to justify this method. They present the cases summarized in the Table in the hope that others may use a treatment they have found safe and valuable. It is their opinion that additional studies should be made until ample statistical evidence is available to evaluate electric convulsive therapy as a means of alleviating withdrawal symptoms.

(Authors' Abstr.)

Prognosis in Psychiatry

Some pertinent impressions formed from experience in evaluating psychiatric therapies may be mentioned.

1. Certain inadequacies in published reports have made it impossible to evaluate some promising new therapies. The value, in statistical terms, of psychoanalysis and such new techniques as those of Sechehaye, Rosen, Whittaker, and Fromm-Reichmann is really not known. The results of carbon dioxide and corticoid therapies and of recent modification of electric shock techniques, for example, have not been assessed.

2. The use of improvement rates has limitations in evaluating a method of therapy. It does not indicate the shortened duration of hospitalization or disability, the decreased discomfort when hospitalization must continue, or the less obvious attenuation of antisocial or self-detrimental behavior patterns.

3. A review of the literature gives one the impression that there is no room for dogmatism with regard to methods of therapy, factors making for the maintenance of remission, and essential elements in the process of therapy.

4. The type of research which studies and categorizes individual treatment methods is apt to lose sight of the multiple aspects or levels of function of the patient. Compartmentalization in study and therapy is all too common. It directs attention too singly to mind, body, or environmental, cultural, and social factors. Modern psychiatry has developed many techniques. A multiple-factor or multiple-level approach to therapy is often indicated. Simultaneous applications of such techniques as insulin therapy, psychotherapy, environmental manipulation, and expression through art might produce significantly better improvement rates than those reported with special emphasis on an individual method of treatment. In insulin therapy, for instance, 66 per cent. of patients failed to make a marked improvement. These statistics do not reveal that many of these patients later may respond to therapy of a different type.

5. Statistics reported here offer strong evidence that the process of mental illness is at times reversible and that this reversibility can be enhanced by therapeutic intervention. This points the way to an important field of future research.

(Authors' Abstr.)

Treatment of Epilepsy with Mysoline

In a series of 30 epileptics, Mysoline was added to other anticonvulsants in treatment of 28 patients and was the only drug employed with 2 others.

Mysoline was most effective in patients with grand mal and focal seizures, either alone or combined. In 78 per cent. of these patients the condition improved.

No effect on the number or frequency of psychomotor seizures was observed.

Mysoline appears to increase the frequency and number of petit mal seizures.

The commonest side-effects were (*a*) a feeling of drowsiness, drunkenness, and lethargy, relieved in most instances by the addition of amphetamine sulfate; (*b*) a papulovesicular eczematoid eruption, which promptly subsided with decrease in the doses and did not reappear upon the resumption of the original dose; and (*c*) an acute vestibular reaction following the ingestion of the first Mysoline tablet and characterized by intense vertigo, nausea, vomiting, severe ataxia, nystagmus, and, in one instance, vasomotor collapse. No blood dyscrasias or abnormal urinary findings were observed.

(Authors' Abstr.)

Differences Among Epileptics and Between Epileptics and Nonepileptics in Terms of Some Memory and Learning Variables

Both patients with idiopathic and patients with symptomatic epilepsy show somewhat similar impairment in performance on memory and learning tasks. Though there are differences in pattern of impairment between the two groups, each is more like the other than either is like the nonepileptic group.

Both epileptic groups showed the greatest impairment on delayed reproduction of designs.

The group with idiopathic epilepsy differed most from the group with symptomatic epilepsy on reproduction of meaningful material.

Since both new procedures (tactual learning, Procedure V; and complex auditory perceptual task, Procedure VII) differentiated epileptics and nonepileptics, they would appear to be useful and to merit further investigation.

(Author's Abstr.)

Electroshock and the Rat Adrenal Cortex

A significant increase in adrenal weight, from 20 to 40 per cent. has been observed in male albino rats after chronic electroshock administration.

During the hours immediately following a single electroshock, a depletion of adrenal ascorbic acid and cholesterol has been noted.

Twenty-four hours after the 10th, and final, electroshock in another group of animals, an increase in the total ascorbic acid content, proportionate to the increase in weight, of the hypertrophied adrenals was found. This suggests a functional hypertrophy.

Animals receiving the anticonvulsant drugs mephenesin and DEP (diethyl-propanediol) did not have a convulsion following electroshock administration, and their adrenals were enlarged. However, animals receiving the drugs alone also showed a significant adrenal hypertrophy.

Animals which were rapidly given 10 nonconvulsive electroshocks while in the tonic-extension phase of a previously administered electrogenic convulsion showed a significant adrenal hypertrophy, above that of controls receiving only one electroshock.

No adrenalectomized animals survived longer than a 12-day course of daily electroshocks, and each required continual artificial respiration after each shock, prior to death.

Adrenalectomized animals bearing intraocular transplants of newborn-rat adrenal survived a 16-day course of daily electroshocks and required no artificial respiration. A very rapid growth and maturation were noted in one of these transplants.

A discussion of these observations, as well as the possible mechanisms by which electroshock exerts its endocrine effects, is presented.

(Authors' Abstr.)

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VOL. 99 J. COMP. NEUR. AUGUST, 1953

Cerebral Cortical "Inclusions" in Psychoses

1. Thirty-four biopsies obtained at time of open pre-frontal lobotomy on psychotic human patients were selectively studied for the presence of specific granules.

2. All of the cases were studied in relation to an apparent developmental sequence. The granules were first developed in the nerve cell cytoplasm, extruded into the interstitium (free or within glial cells) and finally lodged in the perivascular cells and cells of the vessel wall and probably in the cells of the inner layers of the leptomeninges.

3. In a study of 34 biopsies, changes were found which were interpreted by the criteria described as early quiescent in three cases (9 per cent.); early active in 4 (12 per cent.); active in 12 cases (35 per cent.); advanced quiescent in 8 (23 per cent.); and in 7 (21 per cent.) the histopathologic conditions were judged as being advanced and active.

4. The quantitative variation in the several cerebral locations of these specific granules in this series is presented in tabular form.

5. The pathologic changes previously reported in the literature are confined in this series but a conservative interpretation is emphasized.

6. The possible chemical and clinical and morphologic importance of these "inclusions" is briefly discussed.

(Author's Abstr.)

Histologic Changes in the Organ of Corti with Intense Sound

The histological changes in the organ of Corti following exposure of a large number of guinea pigs and 7 dogs to higher frequencies (4 to 40 keps) at intensities of 138-165 db. for one-half to 4 minutes are described.

The sound source was a specially constructed siren capable of producing sound pressures in excess of 150 db. in the range of 400 cps. to 30 keps.

The extent of changes in the organ of Corti and in relation to the basilar membrane varied with the frequency, intensity and duration of exposure. With increase in intensity the injury became more marked and usually shifted in position closer to the region of the round window. The post-exposure life of the animals was purposely varied from zero to 132 days. No further progression of changes was found for the organ of Corti along the basilar membrane with prolonged post-exposure life. The alterations that were immediately discernible after exposure became more definite and degenerative changes more pronounced. At the high intensities used for the exposures marked injury to the organ of Corti was found to be in only fair agreement with the principles of tone localization for the cochlea.

Marked histological changes consisted of removal of the organ of Corti from the basilar membrane, loss of external hair cells with remainder of organ of Corti intact, degeneration of nucleus and cytoplasm of hair cells still in place, loss of the basal attachment of Deiter's cells with subsequent degenerative changes and collapse of tunnel rods (usually the external rod with distortion of organ of Corti). Among the additional histological changes not confined to the organ of Corti were degenerative changes in the stellate connective tissue cells of the limbus. This was usually located in regions for which the changes in the organ of Corti were not marked. The mesothelial cells on the under surface of the basilar membrane were usually lost in the same areas for which the organ of Corti had become detached. Peripheral nerve fiber and spiral ganglion cell degeneration appeared in about 10 days' post-exposure life and became marked in 20 to 30 days for those areas in which the hair cells were lacking.

(Author's Abstr.)

VOL. 46 J. COMP. PHYSIOL. PSYCHOL. AUGUST, 1953

VOL. 16 J. CONSULT. PSYCHOL. 1952

Flickered Light as a Provocative Test in Electroencephalography

1. Eighty-eight per cent. of the patients in this series exhibited photic driving.
2. The amount of driving in the slow, alpha, or fast range varied directly with the amount of slow, alpha, or fast activity, respectively, in the spontaneous record.
3. The quality of the response improved with the subject's age and with the sensitivity of his spontaneous alpha activity to eye-opening.
4. The appearance of slow activity in bursts failed to permit photic driving in the slow range.
5. All other considerations of personal characteristics or diagnosis exhibited an indirect effect only by virtue of their influence on the fundamental variables mentioned above.
6. These characteristics make the examination for photic driving a useful adjunct to the routine electroencephalographic examination.

(Author's Abstr.)

VOL. 16 J. NEUR. NEUROSURG. PSYCHIAT. AUGUST, 1953

Personality Changes after Operations on the Cingulate Gyrus in Man

Changes in personality in eight undeteriorated patients following bilateral ablations in the anterior cingulate region are described. The lesions were small, 3 cm. long and 1 cm. wide, and great care was taken to avoid damage elsewhere. Changes were slight, but consistent: they are confined chiefly to a reduction of inhibition, perseveration, and excessive self-concern.

(Authors' Abstr.)

VOL. 12 J. NEUROPATH. EX. NEUR. OCTOBER, 1953

Effects of Convulsions Induced by Various Types of Electric Stimulation Upon the Cerebrospinal Fluid

1. The effect of electrically induced convulsions upon the cerebrospinal fluid (CSF) was studied in 22 dogs; one group was submitted to sine waves, the other to brief rectangular pulses.

2. No significant changes were found in the CSFs following stimulation with rectangular pulses.

3. A statistically significant transitory increase of the specific absorption of the CSF at λ 265 mμ appeared following stimulation with sine waves, while the procedure failed to produce a definite change in the ascorbic acid and protein content of the CSF.

4. The increase of the specific absorption at λ 265 mμ not explainable by changes of the ascorbic acid or protein content probably is due to nucleic acids or their cleavage products and is regarded as a sign of injury to the central nervous system.

5. The power applied to the brain and resultant heat production are, on stimulations with sine waves, a multiple of the corresponding values encountered on stimulations with the brief rectangular pulses used. This difference may explain the different effect of the two types of currents upon the cerebrospinal fluid.

(Authors' Abstr.)

VOL. 16 J. NEUROPHYSIOL. SEPTEMBER, 1953

Regulation of Posture in Intact and Decerebrate Cat. 1. *Cerebellum, reticular formation, vestibular nuclei*

1. Selective, unilateral ablation of the medial cortex of the anterior lobe of the cerebellum in the cat decerebrated above or below the pons (also in the intact animal) results in a posture of ipsilateral extension and contralateral flexion of the limbs. Subsequent destruction of the ipsilateral fastigial nucleus completely reverses the cortical posture. Thus cortex and its nucleus of projection exert opposite influences on postural tonus. The fastigial nucleus, in addition to relaying cortical activity, has an important extra-cortical function.

2. Unilateral destruction of Deiter's vestibular nucleus results, in the decerebrate animal, in ipsilateral flexion and in contralateral extension of the limbs, similar to that following fastigial lesion. Bilateral destruction of Deiter's nuclei in the decerebrate animal gives an appreciable reduction, but not an abolishment, of extensor rigidity. Decerebrate rigidity is not dependent on the integrity of the vestibular nuclei.

3. Decerebrate rigidity is abolished by combined destruction of fastigial and Deiter's nuclei, leaving the pontobulbar reticular formation intact. This part of the reticular formation, as far as postural tonus is concerned, is not intrinsically active, but is dependent on activation from other sources.

4. Decerebrate rigidity is not abolished by brain stem transection at least as far caudal as the rostral part of the trapezoid body, providing neither fastigial nor Deiter's nuclei is injured. The evidence cited in 3 and 4 shows conclusively that only a small part of the brain stem reticular formation is sufficient to maintain decerebrate rigidity, providing that this part is activated from certain sources. Important among these are the fastigial and vestibular nuclei.

New explanations are offered on the basis of these observations for the dual function (stimulation and rebound) of the cerebellum on postural tonus, and for the mechanism of decerebrate rigidity.

(Authors' Abstr.)

Electrical Excitability of Human Uncus

1. The electrical excitability of the uncus was investigated in six psychotic patients under general anesthesia prior to topectomy. Employing respiratory inhibition as an indication of excitation, three strength-pulse width curves with frequency constant at 100/sec. and three strength-frequency curves with pulse width constant at 5·0 m.sec. were determined in different subjects.

2. Alterations of pulse width in the strength-pulse curves and alterations of frequency in the strength-frequency curves changed the intensity requirements for producing respiratory inhibition but did not alter the nature of the response.

3. The strength-pulse width curves are essentially similar to strength-pulse width curves previously obtained for the motor cortex and they indicate that the most effective stimulus for eliciting respiratory inhibition from the uncus is one with a pulse duration of 2·5-5·0 m.sec.

4. The strength-frequency curves differ from strength-frequency curves previously obtained for the motor cortex and indicate that the most effective frequencies for eliciting respiratory inhibition from the uncus lie in the range 30-100/sec.

5. The excitability characteristics of such structurally and functionally different cortical areas as the uncus and motor cortex differ in terms of the intensity-frequency relationships for the two different regions. The uncus can be optimally excited at lower frequencies than the motor cortex.

(Authors' Abstr.)

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Five Years' Experience with Disulfiram in the Treatment of Alcoholics

From the treatment of more than 2,000 alcoholics with disulfiram over the past 5 years, the following conclusions seem justified.

1. The only contraindications for treatment with disulfiram are marked cardiac decompensation and administration of the drug without the knowledge of the patient.
2. Routine physical examinations with routine laboratory checks prior to the initiation of treatment have proved sufficient.
3. Disulfiram can be given to non-intoxicated patients on their first visit to the clinic.
4. Intoxicated patients, whether new or cases of relapse, should be given disulfiram in a reduced dosage and always in combination with an antihistaminic drug (such as Promethazine) and sodium chloride. This combination prevents nausea and vomiting while providing sufficient sedation. Furthermore, the symptoms of hangover and the craving for alcohol are considerably reduced, if not abolished, during the immediately following period. There seem to be no contraindications for the use of this method to sober up intoxicated patients.
5. The possibilities for psychological exploitation of the circumstances of a relapse should not be neglected.
6. Disulfiram should not be given in dosages larger than necessary. Patients with a "low hyperactivity limen" or "low amnesia limen" should receive lower dosages from the beginning of treatment.
7. There are no side effects so serious as to require discontinuance of treatment but the presence of unwanted side effects should be considered at each consultation with a view to adjusting the patient to a minimal effective maintenance dose.
8. With a well-adjusted maintenance dose of disulfiram and the ingestion of about 6 cc. of absolute alcohol, a slight sensation of heat, redness and acceleration of the pulse rate should be the only symptoms seen.
9. Usually the effects of disulfiram will increase during the first 3 months of continued treatment. During these months it is important not to establish any fixed maintenance dose but to follow the patient at regular intervals and make indicated adjustments of dosage.
10. Individual or group psychotherapy or both, along with club activities such as Alcoholics Anonymous provides, are successfully linked with the use of disulfiram. Relaxation therapy is also a valuable adjunct.
11. Concerning "prealcoholics", a warning is given against routinely advising such patients to become abstainers for the rest of their lives.
12. Disulfiram is a valuable and safe medication in the hands of the physician provided the outlined recommendations are followed.

(Author's Abstr.)

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1. Biochemistry, Physiology, Pathology, etc.

Induced Loss in Cerebral Tissues of Respiratory Response to Electrical Impulses, and its Partial Restoration by Additional Substrates. McIlvain, H., and Gore, Marion B. R. [*Biochem. J.* (*London*), **54**, 305 (1953).]

Cerebral tissues are the most sensitive to blood-sugar levels. Study of unresponsiveness of tissues to electric impulses involves some understanding of the normal linkage between the applied impulse and metabolic response. The latter involves substrate and labile phosphates and an ionic transport system presumably capable of maintaining a polarized membrane. At some stage of the process the substrate system apparently fails, this stage being specific to respiration as distinct from glycolysis. The ability of the cerebral cortex slices to increase respiration with glucose as substrate, on applying electric impulses, survives various adverse conditions such as exposure for several hours to 0°, passage of prolonged impulses, or metabolic activity in the absence of substrate. Application of impulses in the absence of substrate changed the tissue so that its respiration no longer increased when glucose was provided and the impulses applied. Respiratory response could be partly restored by the addition of fumaric or malic acid.

S. MORGULIS (Chem. Abstr.)

Enzymic Cleavage of the Stimulating Substance of the Sensory Nerves, its Dependence on the pH, and Inhibition by Central Stimulators. Umrath, Karl. [*Naunyn-Schmiedebergs Arch. exptl. Pathol. Pharmakol.*, **219**, 148 (1953).]

Sensory nerves of mammals contain a stimulator substance that is tested by the denervated rabbit ear in which it produces reddening. The substance and an enzyme that splits this stimulator were prepared from the posterior spinal roots of cattle by extraction with a solution of 0·65 per cent. NaCl and 0·01 per cent. $CaCl_2$. The enzymic cleavage of the excitor substance is inhibited markedly at pH 8, more at pH 9, and also below 5. Centrally stimulating substances such as santonin, atropine, and caffeine act similarly to metrazole, brucine, picrotoxin, and strychnine in that the convulsion-producing quantities *in vivo* parallel the quantities which inhibit *in vitro* the enzymic destruction of the excitor substance. Between convulsive action and cholinesterase inhibition there is less parallelism; picrotoxin is a strong convulsant but inhibits cholinesterase slightly whereas caffeine is a weak convulsant with high inhibition of the enzyme.

A. E. MEYER (Chem. Abstr.)

Correlation between Metabolisms of Carbohydrate and Nitrogen in the Brain Tissue. Kimura, Yukichi, and Ito, Kaoru. [*Sci. Papers Coll. Gen. Educ., Univ. Tokyo*, **2**, 157 (1952).]

Various forms of N were found to diffuse out from brain-cortex slices respiring in Krebs-Ringer-bicarbonate solution containing glucose. The ratio of soluble N to total N (1) and of ammonia N to soluble N under normal conditions did not exceed 15 per cent. of the total N content of the tissue. The rate of N diffusion fell off with time. However, (1) was maintained at a constant of approximately 25. Absence of glucose caused an increase in N diffusion, especially NH_3, which was not reduced by the addition of glucose. Mannose caused a sparing action on N diffusion but galactose and fructose were effective only to a slight extent. With respect to NH_3 production the effects of natural monosaccharides were of the same order. Di- and polysaccharides had no effect. The sparing action of glucose was increased by excess KCl. Grinding of brain tissue caused a marked diffusion of N into solution.

J. D. TAYLOR (Chem. Abstr.)

Glycolysis and Cytochemistry of Cerebral Cortex. Dixon, K. C. [*J. Physiol.*, **120,** 267 (1953).]

The superficial layer of the rabbit cerebral cortex (1) showed greater anaerobic glycolysis than deeper layers. Sections of the upper layer of rabbit (1) stained intensely by the tetrazo method of Danielli (*Symposium Soc. Exptl. Biol.* (1), 101-13 (1953)) showed a large concentration of dendrites and fibers of the pyramidal cells (11) and relatively few nerve cells, in contrast to highly cellular deeper layers. It is concluded that the dendritic processes of the (11) possess a high glycolytic rate and that dendritic metabolism probably accounts for much of the glycolytic activity of the (1) as a whole. From the staining reaction by the tetrazo method, a large part of the protein appears to be present in the ground substance which consists of ramifying neuronal processes. MORRIS ROCKSTEIN (Chem. Abstr.)

Biochemical Changes in Protoplasm in Conditions of Excitement and under Narcosis. Bubanović, Fran. [*Bull. soc. chim. Belgrade, No. Jubilaire* 1897-1947, 49-63 (Pub. 1951).]
NIKOLA PLAVŠIĆ (Chem. Abstr.)

Changes in Sorptive Properties of Nerve Cells of Rat Brain under the Influence of Conditioned Reflex Stimulant. Romanov, S. N. [*Doklady Akad. Nauk. S.S.S.R.*, **90,** 117-20 (1953).]

White rats in which a conditioned reflex of running away from a charged electrode system was developed (in conjunction with an electric light bulb operated with a loud-sounding switch) were examined as to sorption of neutral red by their brain tissue. Considerable changes were observed in this respect in the nerve cells of the brain and the spinal ganglia; the sorption is super-normal at first but gradually declines to nearly normal level in the brain and to some 80 per cent. of normal in the spinal ganglia in the course of 6-7 days. The changes are not associated with any actual movements of the animals, for these can be excluded with suitable modification of the environment. G. M. KOSOLAPOFF (Chem. Abstr.)

Content of Creatine Phosphate in the Brain Tissue during Dying and after Subsequent Revivification. Shuster, M. I. [*Arkh. Patol.*, **15,** *No.* 2, 55 (1953).]

In dog brain frozen *in situ* after Et_2O narcosis the content of creatine phosphate P is 5·3-10·2 mg. per cent. In the course of dying from blood loss, creatine phosphate is decomposed and at the time of the terminal pause it is totally absent; the rise of inorganic P is caused by this decomposition. Near death, the rise of inorganic P is caused by decomposition of adenosine triphosphate and from other unknown sources. During revivification of the animal (injection of heparinized blood and artificial respiration) up to restoration of breathing there occurs resynthesis of creatine phosphate and adenosine triphosphate with corresponding decline of inorganic P in the brain tissue. G. M. KOSOLAPOFF (Chem. Abstr.)

Excitation and Conduction in the Nervous System. Larrabee, Martin G., and Edwards, Charles. [*Ann. Rev. Physiol.*, **15,** 283 (1953).]

Among other aspects of the conduction of impulses in nerve fibers the role of ions is fully reviewed. RACHEL BROWN (Chem. Abstr.)

Paper Electrophoresis of Cerebrospinal Fluid. Peters, H. J. [*Chem. Weekblad.*, **49,** 248 (1953).]

In order to obtain suitably differentiated paper electrophoresis diagrams it is necessary to have samples with a protein content of about 40 g./1. Since a normal cerebrospinal fluid has a protein concentration of only 250 to 400 mg./1, the problem is resolved into one of concentrating the sample 100 to 200-fold without damaging or altering it. Because of the high NaCl content (7 g./1) in cerebrospinal fluid, concentration to the extent required is not possible by ordinary vacuum evaporation techniques. A method was developed for concentrating such samples by utilizing a combination of centrifuging and ultrafiltration. The fluid is centrifuged for 4 hours in contact with small collodion bags which are supported by a perforated ebonite tube suspended in a 25 ml. centrifuge tube containing the fluid to be concentrated; a 20- to 60-fold concentration results, the exact amount of concentration depending on the thickness of the membrane. A further factor of 4 is realized by applying 4 times the normal amount of sample (0·08 ml. instead of 0·02 ml.) to the paper strip to be used for the electrophoresis experiment by the method of van Os. The accuracy of this method for concentrating samples is checked by running experiments on blood serum that has been diluted 100-fold with 0·9 per cent. NaCl solution, reconcentrated by this method and compared with results from experiments made on a sample of the original undiluted serum. Results of several such checks are tabulated, and e.g. in one experiment the serum albumin content was found to be 38·3 per cent. when the serum was analyzed directly, but 37·5 per cent. from analysis of the diluted and reconcentrated sample. F. C. SNOWDEN (Chem. Abstr.)

The Formation of Ammonia in Brain Extracts. Muntz, John A. [*J. Biol. Chem.*, **201,** 221 (1953).]

An enzyme system present in an Me_2CO-powder extract of dog brain deaminates muscle adenylic acid to inosinic acid. Adenosine triphosphate (ATP) is required for the reaction, but there is no loss of adenyl pyrophosphate or apparent deamination of the polyphosphate. It is active over a broad pH range, with an optimum at pH 7. In these respects the system differs

from Schmidt's deaminase and is distinct from enzymes previously described which deaminate adenosine or its phosphorylated derivatives. Because of the myokinase, which is also present, ATP alone can serve as a source of NH_3 when a suitable phosphate acceptor such as fructose 6-phosphate is added to the system. FELIX SAUNDERS (Chem. Abstr.)

Essentiality of Acetylcholinesterase in Conduction. Wilson, Irwin B., and Cohen, Max. [*Biochim. et Biophys. Acta*, **11**, 147 (1953).]

A method is described for assaying acetylcholinesterase in the intact nerve, and thus for testing conduction in relation to enzymic activity at any time without grinding the nerve. The use of acetylcholine (1) which does not penetrate readily into the axoplasm of the fiber, results in the assay of only a portion of the enzyme, the "external" enzyme, whereas the use of $Me_3NCH_2CH_2$-OAc (2), which penetrates barriers impermeable to (1) allows the assay of "internal" enzyme. There is probably about 3 times as much internal as external enzyme. Inhibitors which do not produce conduction block, such as prostigmine, tetraethyl-pyrophosphate, and decamethonium, almost completely inhibit the external enzyme, but inhibit hydrolysis of (2) by only about 50 per cent. Inhibitors which block conduction, such as diisopropyl fluophosphate (DFP) and eserine, inhibit both enzymes. DFP blocks conduction when total enzyme inhibition reaches about 80 per cent. Internal enzyme activity increases and external enzyme activity decreases under the influence of x-irradiation, which does not impair conduction. MORTON PADER (Chem. Abstr.)

Ability of Some Carboxylic Acids to Maintain Phosphate Levels and Support Electrical Stimulation in Cerebral Tissues. Kratzing, C. C. [*Biochem. J.* (*London*), **54**, 312 (1953).]

Normally the energy requirements of the mammalian brain are provided by glucose, which is metabolized to CO_2 and H_2O or partially to lactate and pyruvate. The glucose also aids in maintaining the creatine phosphate. Slices respiring in pyruvate exhibit respiratory response to electric impulses so that glycolytic breakdown of glucose is not essential to response. Other carboxylic acids do not call forth respiratory responses to impulses nor do they support high levels of energy-rich phosphates. Respiration in glucose or pyruvate depends on the Ca-ion concentration of the medium. Respiration of slices metabolizing 0·02M succinate, α-ketoglutarate, citrate, or fumarate is not increased by passage of electric impulses. In slices respiring in glucose, citrate, or succinate, during passage of electric impulses, there is a significant fall in energy-rich phosphate. S. MORGULIS (Chem. Abstr.)

Neutral Steroid Excretion by Normal and by Schizophrenic Men. Mittelman, Arnold, et al. [*J. Clin. Endocrinol. and Metabolism*, **12**, 831 (1952).]

Schizophrenic men excreted a larger amount of β-ketosteroids but less nonketonic steroids than the group of normal men. Basal urinary nonketonic neutral steroids determined as $SbCl_3$ chromogens were lower in the schizophrenic subjects than in the normal controls. The administration of 25 I.U. of corticotropin (ACTH) increased all types of ketosteroid output in all of the subjects. The increase shown by the schizophrenics tended to be less than that of the control group of similar age, but the β-ketosteroid output of the schizophrenics was still significantly higher than that of the controls. The output of $SbCl_3$ chromogens in young normal males was significantly higher than in the schizophrenic patients. After ACTH, the nonketonic neutral steroid excretion was reduced in the control subjects, but was elevated slightly in the schizophrenics. However, the output of the latter group was still much less than that of the control subjects. The significance of these findings is discussed.
N. R. STEPHENSON (Chem. Abstr.)

The Relation of the Blood-Protein Values of the Epileptic to the Incidence of Attacks. Grodzicki, Wolf D. [*Psychiatrie, Neurol. med. Psychol.*, **2**, 166 (1950); *Chem. Zentr.* (1950), (11), 2458).]

Determinations of the blood-protein level made on 65 true epileptics gave total protein values higher than normal. The albumin was always essentially higher than the globulin. The appreciable periodic fluctuations in all the serum-protein values corresponded to the rhythm of the attacks and to fluctuations in electrolytes, in the acid-base balance, etc. Shortly before an attack the albumins reached their highest value while the globulins reached their lowest. Refractometric methods did not prove useful for this investigation.
M. G. MOORE (Chem. Abstr.)

Thymol-turbidity Test in Schizophrenia. Nandi, D. N. [*Indian J. Med. Research*, **40**, 295-302 (1952).]

The thymol-turbidity test as described by Maclaglan is an indirect measure of liver dysfunction. Turbidity is due to the formation of a lipo-thymo-protein (β- and γ-globulins) complex and a change in this test indicates some metabolic disorder in connection with lipides and proteins. This test was applied to 55 schizophrenics, 20 normal subjects, and in 10 cases of confirmed liver damage. Serum (0·15 cc.) was mixed with 9 cc. of thymol-barbital buffer (pH 7·8). Transmission was observed after 30 minutes in a photoelectric colorimeter at 640 mμ and the test units were calculated from a standard transmission curve prepared from $BaSO_4$

standards. The following average results were obtained: normal subjects, 2·7 units; liver-damage subjects, 9·2 units; simple schizophrenics, 3·7 units; hebephrenic schizophrenics, 5·4 units; paranoid schizophrenics, 5·4 units; catatonic schizophrenics, 9·5 units. Five cases of catatonic schizophrenia were tested in different clinical states. Each case, when improved or cured, showed a marked drop in the thymol-turbidity test units. Unquestionably the severity of the disorder in protein and lipide metabolism is directly related to that of the clinical state. PRISCILLA B. HORTON (Chem. Abstr.)

Studies in the Schizophrenic Metabolism: a Study of Liver Function by the Benzoic Acid Test of Quick, et al. (1938). *Nandi, D. N.* [*Indian J. Med. Research*, **40**, 303 (1952).]

Quick's benzoic acid test of liver function based on the ability of the liver to conjugate injected benzoic acid with glycine as measured by the urinary excretion of hippuric acid, was applied to 7 normal subjects, 50 schizophrenics, and 9 subjects with definite hepatic damage. Average results obtained for excretion of hippuric acid after injection of 1·77 g. of Na benzoate were as follows: normal subjects, 0·83 g.; subjects with hepatic damage, 0·50 g.; catatonic schizophrenics 0·41 g.; hebephrenic schizophrenics, 0·70 g.; paranoid schizophrenics, 0·60 g.; simple schizophrenics, 0·80 g. Five catatonic schizophrenics were studied at intervals in different mental states. In each case the excretion of hippuric acid increased when the patient improved or was cured. Since this test measures certain aspects of protein metabolism, it is concluded that there is an alteration in protein metabolism in schizophrenia varying with the severity of mental symptoms. PRISCILLA B. HORTON (Chem. Abstr.)

Distribution of Substance P in the Central and Peripheral Nervous System. Pernow, B. [*Nature*, **171**, 746 (1953).]

Substance P (1), a polypeptide capable of producing a transient fall in blood pressure, was found in the highest concentration in the gray matter of the dog brain. Activities of the different parts of the central nervous system (c.n.s.) run almost parallel with acetylcholine content except in extracts of the hypothalamus. The amounts found in the peripheral nervous system were generally lower than in the c.n.s. The dorsal roots, the preganglionic sympathetic fibers, and the vagus especially were rich in (1), whereas motor nerves such as phrenic had low content. J. D. TAYLOR (Chem. Abstr.)

Clinical Study of Adrenochrome. Cauwenberge, H. van, and Lecomte, J. [*Lancet*, **264**, 98 (1953).]

The urinary excretion of reducing steroids and 17-ketosteroids was established in patients who had had an intravenous injection of 1 mg. of adrenochrome twice daily for 5-10 days and in other patients who had had 9 mg. of adrenoxyl (the semicarbazone of adrenochrome) in 3 doses every 24 hours for 3 successive days. No significant change was found in the urinary excretion of the steroids although there was a significant and regular decrease in the circulating eosinophils. BARBARA R. MURRAY (Chem. Abstr.)

Methyl Alcohol Poisoning with Particularly Pronounced Changes in the Brain. Pathology of the Permeability of Brain. Orthner, H. [*Virchow's Arch. pathol. Anat. u. Physiol.*, **323**, 442 (1953).]

Description and discussion of a case characterized by loss of eyesight and the usual circulatory collapse on the 3rd day, but death only after 16 days.
ERICH HIRSCHBERG (Chem. Abstr.)

Cerebral Chemotopography. (1) Distribution in Various Zones of the Brain of Dogs of Monamine and Diamine Oxidase. Buscaino, G. A., and Pasolini, F. [*Boll. soc. ital. biol. sper.*, **28**, 300 (1952).]

Amine oxidase was found in the cortex of 32 per cent. of the animals just after death and in 46·6 per cent. an hour later; similarly in white cerebral substance 32 per cent. and 43 per cent.; in nuclei of the base 40 per cent. and 16·6 per cent.; in cerebellum 32 per cent. and 28 per cent.

(2) *Cerebral Amine Oxidases and Predisposition to Reflex Epilepsy.* [*Ibid.* 1365.]

Monamine oxidase was found most frequently in dogs in the nuclei of the base, then in the cerebellum, white cerebral substance, cortex, and thalamus. Diamine oxidase was found in descending order in thalamus, nuclei of the base, cerebellum, cortex, and white cerebral substance. No difference was found between the motor and occipital cortex nor between caudate nuclei alone and nuclei of the base *in toto*. Amine oxidase was found in only 1 of 15 dogs predisposed to reflex epilepsy (Amantea test) and in 7 of 12 not predisposed.
M. ELLIOTT (Chem. Abstr.)

Cerebrospinal Fluid Inorganic Phosphorus in Normal Individuals and in those with Viral Involvement of the Central Nervous System. Odessky, Louis, et al. [*J. Lab. Clin. Med.*, **41**, 745 (1953).]

The average normal value of inorganic P in cerebrospinal fluid is 1·4 mg. per cent.; the value is considered elevated if above 2 mg. per cent. The statistically significant levels found in virus diseases are pathognomonic of central nervous system involvement.
EDWARD J. VAN LOON (Chem. Abstr.)

Amine Oxidase in Normal Subjects and Those with Diseases of the Nervous System. Buscaino, G. A. [*Boll. soc. ital. biol. sper.*, **27**, 1617 (1951).]

Monamine oxidase was tested against β-indoleëthylamine-HCl, β-phenylisopropylamine-H_2SO_4, and tyramine-HCl, and diamine oxidase against histamine-2HCl. Defibrinated blood of healthy subjects showed no amine oxidase activity. Neurologic patients showed slight monamine oxidase activity. The enzyme was present in 55 per cent. of schizophrenics and in 80 per cent. of patients in the confused state. M. ELLIOTT (Chem. Abstr.)

The Cholinesterases of the Central Nervous System after the Administration of Organo-Phosphorus Compounds. Davison, A. N. [*Brit. J. Pharmacol.*, **8**, 212-16 (1953); *cf. C. A.* **47**, 2889*b*.]

The effect of injecting diisopropyl fluophosphonate (I), tri-o-tolyl phosphate (II), bis-(isopropylamino) fluorophosphine oxide, pyrophosphoric acid tetraisopropylamide, O, O-diisopropyl O-p-nitrophenyl phosphate or tetraisopropyl pyrophosphate on the true cholinesterase and pseudocholinesterase (III) of brain, spinal cord, and sciatic nerves of chickens was described. (I) and (II) produced demyelination. All but (II) showed no essential differences in the degree of duration of inhibition of true cholinesterase and (III). (II) produced very prolonged inhibition of (III). (I) reduced (III) of rat brain and spinal cord but did not produce demyelination. Prolonged depression of (III) is not an essential prerequisite of demyelination in fowls. RICHARD F. RILEY (Chem. Abstr.)

Influence of Excitation of the Central Nervous System on Some Metabolic Processes of Adrenaline in the Walls of Blood Vessels and in the Adrenals. Utevskii, A. M., and Butom, M. L. [*Biokhimiya*, **18**, 195-200 (1953).]

Rabbits were given 0·05 g. caffeine per kg. weight, and 25 minutes later were sacrificed. The adrenaline (I) content in the walls of the large blood vessels (where (I) exerts its effect) increased in some cases, whereas in others no effect was observed; dehydroadrenaline (II) was absent. Caffeine brought about an increase in the (I) content of the adrenals (where (I) is formed). In another series of experiments a group of rabbits received caffeine and 6 γ (I) per kg. weight. No changes were observed in the (I) content of the blood vessel walls. But rabbits which had received caffeine and (II) showed a decreased (I) content in the blood vessel walls, as compared to the animals which had received only caffeine, or caffeine and (I). A decrease of (I), instead of an increase, was noted in the adrenals of rabbits which had been given caffeine and (I), or caffeine and (II). H. PRIESTLEY (Chem. Abstr.)

Neurohumoral Regulation of Activity of the Posterior Section of the Hypophysis. Gavrilova, L. N. [*Fiziol. Zhur. S.S.S.R.*, **39**, 352-6 (1953).]

Spinal fluid (0·5 ml.) taken from cats under mild chloral narcosis shows no action on isolated guinea-pig uterus. The fluid taken after intraarterial introduction of 2-3 mg. adrenaline or acetylcholine causes uterine contractions. The substance that activates the uterus appears in 2 phases, the 1st appearing in 15-20 minutes and lasting 5-20 minutes, the 2nd appearing in 4-6 hours and lasting 7-8 hours. Hypophysectomized cats do not show this effect. The action is directed on the posterior part of the hypophysis.

G. M. KOSOLAPOFF (Chem. Abstr.)

Stability of Restored Reflex Functions. Dmitriev, V. D. [*Fiziol. Zhur. S.S.S.R.*, **39**, 293 (1953).]

Transverse section of the spinal cord at the mid-body region in reptiles and amphibia leads to paralysis of the affected hind limbs, with resulting awkward crawling. Gradually the motor function becomes compensated or restored, but this effect is readily destroyed by narcotics, such as EtOH, Et_2O, chloral hydrate, or urethan.

G. M. KOSOLAPOFF (Chem. Abstr.)

Comparative Study of the Epileptogenic Limit Value of Photometrazole Stimulation in Two Cases ot Tetany. Alajouanine, Th., et al. [*Bull. mém. soc. méd. hôp., Paris*, **69**, 234 (1953).]

The photo-metrazole limit value (I) is the amount of metrazole solution, 50 mg./ml. (concentration not given in the paper), which, followed by an intermittent light stimulation of 5 cycles/sec., provokes bilateral synchronic discharges with myoclonuses. In hypoparathyroid tetany (I) is diminished to about 8 ml., but in a tetanic patient having a normal blood Ca, even 17 ml. of the metrazole solution was devoid of epileptogenic effect.

GEO SAG (Chem. Abstr.)

Metabolism and Muscle Tone in Psychotics. Eiff, A. W. v., et al. [*Deut. Arch. klin. Med.*, **199**, 581-99 (1952).]

No characteristic behaviour of basal metabolism or muscle tone distinguishes schizophrenics from cyclic depressives; in the former the basal metabolic rate was increased by 13 per cent. = 3·3 per cent.; in the latter by 12 per cent. = 2·8 per cent. Muscle tone results were likewise closely similar. The catatonic stiffness observed in hypnosis is of tetanic origin, characterized by a large increase in muscle tone and energy metabolism.

P. Y. JACKSON (Chem. Abstr.)

The Influence of the Concentrations of Potassium, Calcium and Magnesium in the Cerebrospinal Fluid on Respiration. Verstraeten, Jean Marie. [*Rev. belge pathol. et méd. exptl.*, **20**, 1 (1950).]

An increase in Ca in the cerebrospinal fluid produced respiratory depression, while a decrease caused acceleration. An increase in K accelerated, while an increase in Mg inhibited respiration. Decreases in K and Mg had no effect. Accelerating and depressing effects can be mutually compensating.

The Influence of the Concentrations of Potassium, Calcium, and Magnesium in the Cerebrospinal Fluid on the Consumption of Oxygen. Ibid. 22-32.

The above described effects were reflected in the O consumption of the animals. These effects were not modified by thyroidectomy or parathyroidectomy or by denervation of the adrenal gland. Therefore, they were not of humoral origin. However, the effects were prevented by curarization of the animals, although the parallel vasomotor effects remained. The changes produced in O consumption must, therefore, depend upon nervous effects on the muscular activity. M. G. Moore (Chem. Abstr.)

Central Transmission of Afferent Impulses. III. Occurrence and Significance of the Substance P in the Dorsal Spinal Roots. Lembeck, F. [*Naunyn-Schmiedebergs Arch. exptl. Pathol. Pharmakol.*, **219**, 197 (1953).]

Posterior spinal roots, spinal cords and intestines from cattle were extracted with diluted H_2SO_4 of pH 4-5 by boiling, and the extract was neutralized with NaOH. The posterior dorsal root extract produced in the isolated guinea-pig intestine contractions which could be differentiated from those elicited by acetylcholine, histamine and adenosine triphosphate. Extracts from the ventral roots have this action either not at all or very faintly. The substance was compared with substance P from intestines. There was agreement in solubility, dialyzability, stability at various pH values, action on the perfused rabbit ear, and in the Rf values in paper chromatography. Blood pressure tests showed the presence of a 2nd hypotensor substance which is not specific for the dorsal roots. Substance P was destroyed by an enzyme contained in the dorsal roots. The similarity with the "stimulating substance of sensory nerves" suggest the function of substance P as a transmittor in the 1st sensory neurons.

IV. Distribution of the Substance P in the Central Nervous System. Kopera, H., and Lazarini, W. [*Ibid.* 214-22.]

The distribution of substance P in the tissues of the central nervous system of cattle and cats was evaluated on the isolated guinea-pig ileum treated with atropine and antihistaminics. The various parts of the brain differ considerably. A. E. Meyer (Chem. Abstr.)

Characteristics of the Excitor Substance of Sensory Nerves. Hallauer, H. F. [*Naunyn-Schmiedebergs Arch. exptl. Pathol. Pharmakol.*, **219**, 234 (1953).]

Extracts of the dorsal roots of the spinal column contain a substance that has in the isolated rabbit ear a capillary-dilator action, which effect is not found with extracts of ventral roots prepared by the same method. The substance is sensitive to O_3, alkali, and heat; stable only at weak acidity; soluble in H_2O; insoluble in Et_2O; not precipitated with colloidal Fe_2O_3; adsorbable on Al_2O_3, active charcoal and silica gel; dialyzable, and ultrafiltrable. Substance P is resistant to alkali; equally resistant is the substance from posterior roots responsible for the contraction of the isolated guinea-pig ileum. Adenosine triphosphate is stable to alkali and shows the capillary-dilator and intestine-contracting effect only at the high concentration of 0·4 mg./ml. A. E. Meyer (Chem. Abstr.)

Neurological Aspects of the Hunger Winter in Holland. Posthumus, Meyjes, F. E. [*Folia Psychiat. Neurol. Neurochirurg.* (*Amsterdam*), **51**, 257 (1948); *Excerpta Med., Sect. VIII*, 2,831 (1949).]

No major neuropathies were observed, probably because the food had a fairly high vitamin B_1 content, although scarce and low in calories. Low temperature, low basal metabolism, and habituation to a limited vitamin B_1 intake were also factors.
W. C. Tobie (Chem. Abstr.)

Paper Chromatographic Spinal-fluid Determinations. (I) The Paper Chromatographic Preparation of Amino Acids of Cerebrospinal Fluid Before and After Hydrolysis. Schonenberg, Hans. [*Z. Kinderheilk.*, **73**, 8 (1953).]

Before hydrolysis of normal fluid, lysine, alanine, and leucine may be found, while after hydrolysis glutamic acid, glycine, serine, cystine, and valine were isolated.
Dorit L. Noether (Chem. Abstr.)

Localization of Glycolytic and Respiratory Enzyme Systems on Isolated Mouse-brain Mitochondria. Hesselbach, M. L., and DuBuy, H. G. [*Proc. Soc. Exptl. Biol. Med.*, **83**, 62 (1953).]

Washed mouse-brain mitochondria carried out the complete enzymic conversion of, exogenous glucose to CO_2 and H_2O. Glucolysis took place anaerobically and aerobically, with

production of lactic acid. Under aerobic conditions glucose was oxidized through a malonate-sensitive cycle, and the accumulation of lactic acid was correspondingly decreased. In contrast, the clear supernatant carried out anaerobic and aerobic glucolysis, but not oxidation of glucose. The submicroscopic particle fraction did not carry out the reactions of either system.
L. E. GILSON (Chem. Abstr.)

Application of Countercurrent Methods to the Fractionation of Lipide Material from Brain. Cole, P. G., et al. [*Biochem. J.*, **54**, 449 (1953).]

Homogenized adult human brain was dehydrated at room temperature by 3 consecutive 24-hour extractions with acetone (1 l. per kg. wet tissue) and the residue was extracted 3 times with a solvent consisting of 2 vols. MeOH and 1 vol. $CHCl_3$ (2·51 per kg. wet tissue). Both extractions were condensed separately under vacuum at below 50° and then combined. To avoid troublesome emulsification the following solvent system was devised: 62 vols. CCl_4 + 35 vols. MeOH + 3·15 vols. H_2O for the countercurrent fractionation of brain lipides. This mixture was modified for fractionation of more polar lipides and for the separation of cholesterol and neutral fats.
S. MORGULIS (Chem. Abstr.)

Hypertension and Tachycardia Due to Concussion of the Brain. Raab, W. [*Am. Heart J.*, **37**, 237-48 (1949); *mainly Pathol.*]

The similarity of the symptoms of cerebral concussion to those of encephalitis, poliomyelitis of the upper medulla, and brain tumors near the third ventricle suggests that they may be due to excess of the sympathetic amines adrenaline, encephalin, and sympathin.
W. C. TOBIE (Chem. Abstr.)

Prothrombin Time in Schizophrenia. Cacopardo, Antonino. [*Boll. soc. med. chir. Catania*, **19**, 107 (1951).]

In 100 patients a 66 per cent. increase of the prothrombin time, especially in acute and relapsing cases, was observed. This is ascribed to liver and intestine alterations.
C. SCANDURA (Chem. Abstr.)

Nicotinic Acid Content of Blood, Cerebrospinal Fluid, and Urine in Hydrocephalus. Corda, R. [*Ann. ital. pediat.*, **6**, 47-53 (1953).]

In 5 patients the nicotinic acid (1) content was 260-380 γ per cent. in blood, 26-29 (3 cases) and 36-40 (2 cases) in cerebrospinal fluid, and 498-1,600 γ/24-hour specimen of urine. The ratio between the (1) concentration of blood and that of cerebrospinal fluid tended to increase.
C. SCANDURA (Chem. Abstr.)

The Potassium and Sodium Level of the Cerebrospinal Fluid in Tuberculous Meningitis. Urban, N. [*Monatsschr. Kinderheilk.*, **98**, 145 (1950).]

The K and Na ion concentration usually remained within the normal range in tuberculous meningitis. A high K value was usually accompanied by a low Na value and conversely. During the course of the disease there was a tendency for the Na concentration to decrease and the K concentration to increase. In chronic cases the Na level was constantly low and the K level constantly high.
M. G. MOORE (Chem. Abstr.)

Effects of Aging, Arteriosclerosis, and Hypertension Upon the Cerebral Circulation. Shenkin, Henry A., et al. [*J. Clin. Invest.*, **32**, 459 (1953).]

Aging and arteriosclerosis unaccompanied by hypertension did not significantly reduce the cerebral blood flow or metabolism. The occurrence of hypertension and arteriosclerosis together was accompanied by reduction in cerebral blood flow and O consumption.
JOHN T. MYERS (Chem. Abstr.)

Chemical Factors of Nervous Excitation in Experimental Hypertonia. Kakushkina, E. A., and Mentova, V. N. [*Fixiol. Zhur., S.S.S.R.* **39**, 324 (1953).]

Experiments with dogs in which an experimental hypertonic state was achieved either by moving the kidneys to under the skin with ligation of the arteries, or by concussion trauma of the head, showed that cholinesterase activity of the blood serum during the hypertonic state rises. A direct connection exists between the cholinesterase activity and the actual level of arterial pressure. Addition of an anticholinesterase agent (Fosfakol) lowered the cholinesterase activity and reduced the arterial pressure. If the enzyme activity drops below 50 per cent. of normal level, however, the arterial pressure rises once again.
G. M. KOSOLAPOFF (Chem. Abstr.)

The Hemato-encephalic Barrier in the Horse. I. The Sodium Chloride Content of the Cerebrospinal Fluid and of the Blood Serum. Behrens, H. [*Deut. tierdrztl. Wochschr.*, **57**, 103 (1950); *Chem. Zentr.* (1950), *II*, 2335.]

The cerebrospinal fluid was drawn by occipital puncture from 31 neurologically healthy horses under chloral hydrate narcosis. The NaCl content was determined by the Brause modification of the Van Slyke method. Values of 552·26-656·70 mg. per cent. are reported for

the NaCl content of the serum, with a mean of 591·27 mg. per cent. Corresponding values for the cerebrospinal fluid were 671·58-780·57 mg. per cent. with a mean of 728·90 mg. per cent. The quotients thus were 0·77-0·85, with a mean of 0·81. Protein determinations carried out simultaneously on the cerebrospinal fluid showed only a limited relationship between the NaCl content and the protein content of the fluid. Accordingly, the Donnan equil. can be assumed only with limitations. M. G. MOORE (Chem. Abstr.)

Action of Hormones of the Suprarenals on the Content of Ascorbic Acid in the Brain. Kudryavtseva, N. G. [*Fiziol. Zhur. S.S.S.R.*, **39**, 357 (1953).]

Removal of one suprarenal in a rabbit leads to a drop of ascorbic acid in the brain. Administration of adrenaline also lowers brain ascorbic acid. Cortin causes a distinct rise of ascorbic acid, most shown in the cerebrum. Water content is not altered by removal of one suprarenal or long administration of adrenaline. Introduction of cortin causes a slight rise of the content of dry matter, i.e. slight dehydration of the brain tissue.

G. M. KOSOLAPOFF (Chem. Abstr.)

Cerebral Metabolism. Gordan, Gilbert S., et al. [*Calif. Med.*, **78**, 87 (1953).]

A review of the influence of steroids on cerebral metabolism. Twenty-seven references.

F. FROMM (Chem. Abstr.)

Blood-pyruvate Levels in Subacute Combined Degeneration of Cord. Effect of Vitamin B_{12} Therapy. Earl, C. J., et al. [*Lancet*, **264**, 115 (1953).]

Increased blood-pyruvate levels were found in 3 untreated persons having subacute combined degeneration of the cord. Parenteral administration of crystallized vitamin B_{12} returned these levels to normal. Values for a-ketoglutaric acid were not raised and were unaffected by B_{12} therapy. BARBARA R. MURRAY (Chem. Abstr.)

Genesis of Sleep (Magnesemia and Vitamin B_6). Buscaino, V. M., and Balbi, R. [*Boll. soc. ital. biol. sper.*, **28**, 113 (1952).]

Nightly increase in blood Mg was noted in most cases; the increase was accentuated by treatment with vitamin B_6. Low blood-Mg values were frequent in cases of insomnia.

M. ELLIOTT (Chem. Abstr.)

2. Pharmacology and Treatment

Determination of Barbiturates. Ultraviolet Spectrophotometric Method with Differentiation of Several Barbiturates. Goldbaum, Leo R. [*Anal. Chem.*, **24**, 1604 (1952).]

A simple, specific, and rapid ultraviolet spectrophotometric method for determination, identification, and differentiation of various barbiturates is described. Amobarbital, pentobarbital, secobarbital, butallylonal, phenobarbital, and cyclopal can be differentiated by characteristic ratios obtained from differences in absorption spectra of the barbiturates in strong alkali and pH 10·5 solution at various wave lengths with that at 260 mμ. The procedure has been applied to blood, urine, and tissues. M. BLITZ (Chem. Abstr.)

Cholinesterase of Serum in Relation to Electronarcosis. Franchini, Carlo. [*Giorn. psichiat. e neuropatol.*, **79**, 321 (1951).]

In 14 patients with various mental diseases the average cholinesterase activities of serum (in mg. acetylcholine freed by 1 cc. serum diluted 1 : 10) were 6·22, 7·39, 5·97, and 6·20 respectively before, during, 1 hour after, and 2 hours after electronarcosis.

C. SCANDURA (Chem. Abstr.)

Effects of Ethyl Alcohol on Cerebral Blood Flow and Metabolism. Battey, Louis L., et al. [*J. Am. Med. Assoc.*, **152**, 6 (1953).]

The cerebral blood flow, cerebral metabolism and cerebral vascular resistance were measured in 15 subjects before and during intravenous administration of EtOH and in 12 patients during and after severe self-induced alcohol intoxication. The administration of EtOH in doses sufficient to produce facial vasodilatation and the mental changes of mild inebriation produced no changes in cerebral blood flow, cerebral metabolism, or cerebral vascular resistance. During acute, severe alcohol intoxication, there was a pronounced increase in mean cerebral blood flow, an equally significant reduction in cerebral O uptake, and a reduction in cerebral vascular resistance, as compared with the values obtained after recovery. Low concentrations of alcohol in the blood (averaging 68 mg. per 100 cc.) had little or no measurable effect on cerebral circulation, while high levels (averaging 320 mg. per 100 cc.) produced a pronounced depression in cerebral O consumption, despite an increase in blood flow. There appears to be no rational basis for the use of EtOH as a vasodilator in patients with cerebral vascular disease. EDWARD J. VAN LOON (Chem. Abstr.)

Pharmacological Properties of Dihydro-1, 4-benzothiazine—Depressant Action on Interneuronic Conduction at the Level of the Central Nervous System. Longo, V. G. [*Arch. intern. pharmacodynamie*, **89**, 55 (1952).]

Administered orally or intraperitoneally this drug produces muscular relaxation, ataxia, and paralysis, with death from respiratory failure. In mice, the LD_{50} is 800 mg./kg. by the former route and 200 mg./kg. by the latter, while 200 mg./kg. and 100 mg./kg., respectively cause paralysis in 50 per cent. of the animals. Small nonparalytic doses inhibit the polyneuronic reflex of the medulla, while even large amounts have no effect on neuromuscular conduction. Since it is also antagonistic to convulsant drugs like strychnine, it may be classified as an interneuronic blocking agent similar in action to myanesin and benzimidazole.

C. S. PRICKETT (Chem. Abstr.)

The Antagonism Between a Barbiturate and Thiamine, and its Physiological Significance. Alibrandi, G., et al. [*Arch. intern. pharmacodynamie*, **92**, 173 (1952).]

In rats 100 mg. of thiamine/kg. antagonizes the hypnotic action of 30-45 mg. of pentothal/kg., while 50γ of prostigmine/kg. prevents sleep from 50 mg. but not from 60 mg. of pentothal/kg. Since prostigmine and the barbiturates have been shown to have a typical selective action, but in opposite directions, on the phenomenon of central nervous after-discharge, it is probable that the ability of thiamine to antagonize pentothal in this case depends on the known relation between this vitamin and acetylcholine. C. S. PRICKETT (Chem. Abstr.)

Pharmacology of the Vestibulo-ocular Reflex. (1) Action of Analgesics, Barbiturates, Convulsive Drugs, and Drugs of the Vegetative Nervous System on Post-rotatory Nystagmus in the Rabbit. Longo, V. G., and Napolitano, L. [*Arch. intern. pharmacodynamie*, **92**, 177 (1952).]

The action of the drugs below on the vestibulo-ocular reflex of the rabbit was studied by rotating the animal on a turntable at the rate of 360°/sec., and registering nystagmus during and after rotation by means of 2 needle electrodes fixed at the outer canthi and connected to a Grass EEG apparatus. Morphine, meperidine, and methadone inhibited the nystagmic response. Barbital, phenobarbital, numal, and evipal diminished the amplitude but increased the duration of the response. Strychnine, picrotoxin, and metrazole inhibited the reaction only at doses that caused tremors or convulsions. The inhibitory action of bulbocapnine was not confirmed. Physostigmine caused a lengthened response with increased amplitude of the nystagmic movements. Dramamine had only a weak and inconsistent inhibitory effect, while parsidol reduced the frequency of the nystagmus. The results are discussed in relation to the mechanism of action of these drugs on central nervous system reflexes.

C. S. PRICKETT (Chem. Abstr.)

The Sites of Action of Narcotics, Hypnotics, and Analgesics on Somatic Afferent Pathway. (1) Yasuhara, Motohiro. [*Folia Pharmacol. Japon.*, **49**, No. 1, 22 (1953); *Breviaria* 2 (*in English*).]

The sites of actions of various drugs on the somatic afferent pathway were studied by examining their effects on electric response (the primary, secondary, and third response described by Dempsey and Morison (*Am. J. Physiol.*, **138**, 283 (1943))) in the central nervous system produced by stimulation of the somatic nerves in rabbits and rats. Ether, chloral hydrate, urethan, and myanesin paralyzed the central nervous system extensively; barbiturates such as amytal, dial, luminal, evipan, and pentothal-Na affected the reticular structure of the mid-brain; and morphine, bromide, and aminopyrine, the medial thalamic nuclei.

SHOZABURO KITAOKA (Chem. Abstr.)

The Behavior of the Outer Ocular Muscles after Curare, Decamethonium (C-10), and Succinylcholine (M115). Hofmann, H., and Lembeck, F. [*Naunyn-Schmiedebergs Arch. exptl. Pathol. Pharmakol.*, **216**, 552 (1952).]

The intravenous injection of succinylcholine (M*115*) (1) caused a rise in ocular pressure due to a contraction of the outer eye muscles. Administration of decamethonium (C-10) had similar but less marked action. All muscles especially sensitive to acetylcholine will contract after administration of (1) and similar substances. H. I. CHINN (Chem. Abstr.)

Action of Isonicotinyl Hydrazide on the Nervous System. II. Limits and Possibility of Subarachnoid Administration. Longo, V. G., et al. [*Boll. soc. ital. biol. sper.*, **28**, 1361 (1952).]

Above 6 mg./kg. isonicotinyl hydrazide (1) administered intracisternally was lethal in dogs. In 3 of 8 dogs partial epilepsy resulted at dosage of less than 2 mg./kg. Encouraging results were obtained clinically with 0·1-0·5 mg./kg.

III. Local and Regional Application in the Cerebral Cortex. [*Ibid.*, 1363.]

Only dogs predisposed to epilepsy, as shown by Amantea's test, were adversely affected by cortical application of (1). M. ELLIOTT (Chem. Abstr.)

Anticonvulsants on Electrically Stimulated Metabolism of Separated Mammalian Cerebral Cortex. Forda, Olga and McIlwain, H. [*Brit. J. Pharmacol.*, **8**, 225 (1953).]

Respiration of cerebral tissue slices was increased by stimulation by sine wave ac. at 500 or 2,000 cycles/sec. and became sensitive to anticonvulsant drugs. Trimethadione, diphenylhydantoin, and phenobarbitone were effective at 10^{-4} M and bromide at 3 X 10^{-2} M in depressing the increased respiration. These substances in the indicated concentrations, 10^{-3} M trimethadione, and diphenylhydantoin and phenobarbitone to 10^{-3} M were without a comparable effect on respiration in the absence of applied impulses. They were largely ineffective when respiratory stimulation was induced by sine wave currents of 50 cycles/sec. or brief condenser pulses of 100/sec. All types of stimuli made the respiration more sensitive to buto-barbitone, urethan, and chloral hydrate. RICHARD F. RILEY (Chem. Abstr.)

The Evaluation of Mysoline—a New Anticonvulsant Drug. Bogue, J. Yule, and Carrington, H. C. [*Brit. J. Pharmacol.*, **8**, 230 (1953).]

Mysoline, 5-ethyl-5-phenylhexahydropyrimidine-4, 6-dione (1), was an effective anticonvulsant against electro-shock and leptazol seizures in rats when compared with phenobarbital, 5, 5-diphenylhydantoin, mesantoin, tridione, and phenylacetylurea. A single oral dose of 5 mg./kg. of (1) abolished the tonic extensor component of electrically induced seizure in 60 per cent. of rats and 20 mg./kg. prevented maximal leptazol seizures in over 50 per cent. of rats. (1) had low acute and chronic toxicity in terms of either the LD_{50} or doses producing neurological symptoms or morphological change. RICHARD F. RILEY (Chem. Abstr.)

Action of Sympatholytin on the Development of Post-decerebrational Leucocytary Reaction. Stroikov, Yu. N. [*Fiziol. Zhur. S.S.S.R.*, **39**, 359 (1953).]

Decerebration of cats causes a high level of leucocytosis with increased blood production in the bone marrow. Introduction of sympatholytin (6-10 mg./kg.) sharply reduces the leucocyte count in peripheral blood and prevents the development of post-operative leucocytosis. Blocking of the adrenoreactive centres by sympatholytin does not prevent the generation of new blood in bone marrow, but even appears to aid it. Continuous administration of the drug to rabbits leads to leucocytosis. G. M. KOSOLAPOFF (Chem. Abstr.)

Paralyzing Agents for the Autonomic Nervous System and Emetic Poisons. Cheymol, Jean, and Quinquaud, Alfred. [*J. Physiol.* (*Paris*), **44**, 240 (1952).]

Yohimbine prevented vomiting in dogs when the following substances were given intravenously: aconitine, veratrine (I), nicotine (II), picrotoxin (III), pilocarpine (IV), apomorphine (V), emetine (VI), acetylcholine, tartar emetic (VII), $NiSO_4$, quinone (VIII), Na salicylate (IX). It prevented also vomiting after morphine given subcutaneously and ipecac (X), and mustard (XI) by mouth. It did not prevent vomiting after methylene blue (XII), ouabain (XIII), digitalis (XIV), strophanthin (XV) intravenously, (V) subcutaneously or $CuSO_4$ (XVI), $ZnSO_4$ (XVII) or $SnCl_2$ by mouth. Chloralose protected against (V), (VI), and (VII) intravenously, against (V) subcutaneously and against (X) and (XI) by mouth. It was ineffective against (XII), (XIII), (XIV), $CuSO_4$, and $ZnSO_4$. The barbiturate somnifen prevented vomiting after (II), (III), (IV), (V), (VI), (VII), (VIII), (IX), (X) and (XI) but not after (XII), (XIII), (XIV), or $CuSO_4$. Ergotamine protected against (I), (IV), (V), (X), (XII), (XIII), (XIV), (XV), but not $CuSO_4$ or $ZnSO_4$. Procaine protected only against (IV). It failed to protect against (V), (VI), (IX), (X), (XII), (XIII), or (XVI). H. I. CHINN (Chem. Abstr.)