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* A number of abstracts in this section are reproduced from *Chemical Abstracts*. To the Editors of this Journal we extend our grateful thanks.

https://doi.org/10.1192/bjp.99.415.324 Published online by Cambridge University Press

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Survival Factors in American Prisoners of War of the Japanese.

The prolonged miserable circumstances of living during 3½ years of imprisonment as prisoners of war of the Japanese have been outlined. An estimated 12,000 of 30,000, or 40 per cent., survived this experience unique in the history of American people. An attempt has been made to state some of the factors that seemed to the writer to influence survival favorably. These factors in summary consisted of a strong motivation for life with persistent exertion of will, good general intelligence, good constitution, emotional insensitivity or well-controlled and balanced sensitivity, a preserved sense of humor a strong sense of obligation to others, controlled fantasy life, courage, successful active or passive resistance to the captors, luck, opportunism, and a few preceding years of military experience. (Author's abstr.)

Survey of Nine Years of Lobotomy Investigations.

The evidence is strong that bimedial lobotomy is superior in treatment of chronic mental illness to either conventional bilateral lobotomy or unilateral lobotomy. The reduction in anxiety, tension, hostility and impulsivity is dramatic; the improvement in initiative and ability to form object relationships, the increased capacity to work and to get along, the recession of psychotic symptoms—all were most significant and important. In group situations, patients who received bimedial operation were more interested in interaction, more alive to group needs, more productive and organized in their activities than patients receiving the other operations. Psychological tests suggest that they made definite gains in abstraction capacity. There was no mortality in the total series of cases. The immediate post-operative morbidity of bimedial surgery was no greater than other operations, and the incidence of untoward complications no greater than for conventional bilateral lobotomy.

For the present, at the Boston Psychopathic Hospital, bimedial lobotomy has replaced standard full bilateral operation in surgical treatment of chronic mental illness.
(Author's abstr.)

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Effect of Breath Holding on Arterial Pressure in Patients with Mental and Emotional Disorders.

The effect of breath holding on arterial pressure in patients with severe neuroses or with manic-depressive, involutional, schizophrenic or senile psychoses is the same as its effect in normal persons. The amount or nature of emotional activity of the brain does not influence the results of the breath-holding test. There is no physiologic evidence that the amount and nature of emotional activity of the brain are important in causing essential hypertension, although clinical experience indicates that emotion may influence the course of that disease. The reactivity of the vasomotor mechanisms to increased blood-carbon-dioxide concentration is normal in the mental conditions discussed here.
(Authors' abstr.)

Desoxycorticosterone Therapy in Certain Psychotic Cases.

Desoxycorticosterone acetate in sesame oil was administered to 21 psychotic patients; sesame oil in the same amounts without the steroid was administered simultaneously to controls

https://doi.org/10.1192/bjp.99.415.324 Published online by Cambridge University Press

Patients employed in this study had not responded with improvement to earlier therapy with electric shock, or insulin, or both, and psychotherapy.

Twenty-one patients were selected, all of whom were difficult to manage; their disorders were classified as manic-depressive psychoses, schizophrenia (all types), involutional psychoses, and psychoses associated with mental deficiency.

The results of treatment with the steroid were as follows:

Four patients were sent home, having had a remission of disease; a fifth is being prepared for employment; six are employed in the industrial departments of the hospital; seven assist with duties in connection with ward routine. Four (19 per cent.) are unimproved. In all, 17 (81 per cent.) are improved.

Sustained improvement occurred after from six to eight weeks of the desoxycorticosterone therapy.

Patients who served as controls presented very different results; i.e., only 1 returned home, having had a remission of the psychosis; 4 showed improvement; 2 showed moderate improvement; 19 (73 per cent.) were unimproved. In all, 7 (27 per cent.) remained improved.

The results of this study are in agreement with the results the author reported earlier. Larger-scale evaluation of therapy with desoxycorticosterone acetate is indicated.

(Author's abstr.)

Denial of Illness.

1. The incidence of denial of illness was found to be 28 per cent. on investigation of 100 consecutive cases of hemiplegia due to organic disease of the brain.

2. Denial of illness was always associated with an "organic mental syndrome" and occurred in a much higher proportion of cases of left hemiplegia. It also occurred, however, with lesions of the "dominant" hemisphere.

3. Associated phenomena, such as rationalizations, confabulations, duplications, denial of the existence of an extremity, denial of other illnesses, patterns of disorientation, and denial of the patient's illness by others were observed and described.

(Authors' abstr.)

Studies on a Proteolytic Enzyme System in Schizophrenia.

In a study of 96 physically healthy schizophrenic male patients, abnormally high rennin-inhibitor titres were encountered only in those who exhibited the following emotional reaction pattern: (1) chronically low tolerance to frustration; and (2) the rapid or immediate appearance of confusion, obnubilation, amnesia, fugue, syncope, or stupor, as dissociative symptoms, in response to the type of external stress which would be conducive to the production of intensely hostile feelings, but which in this syndrome evokes transitory, slight or no recognition of hostility.

It is concluded that these findings indicate a high correlation of immature, dissociative ego defences and an immature pattern of enzyme kinetics in schizophrenia.

(Authors' abstr.)

OCTOBER.

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Architectonic Distribution of Acetylcholinesterase in the Frontal Isocortex of Psychotic and Non-Psychotic Patients.

The quantitative cytoarchitectonic distribution of acetylcholinesterase has been determined in 17 biopsy specimens of human frontal isocortex obtained during lobotomy for mental illness or intractable pain.

The cytoarchitectonic distribution of acetylcholinesterase was essentially constant. Activity was relatively great in cytoarchitectonic Layer I, the II–IIIa junction, and the midzones of Layers III and V. The intracortical distribution of this enzyme indicates that it is primarily associated with the neuropil, and suggests its localization at the surfaces of conducting structures and synapses.

The mean acetylcholinesterase activity for a given specimen showed great variability, more so among psychotic than non-psychotic patients (persons lobotomized for psychoneurosis or intractable pain). The mean activity was increased in 7 of 12 psychotic patients, as compared with 5 non-psychotic patients. In comparable but contrasting subgroups the range of such cortical acetylcholinesterase activities was higher among five patients with chronic deteriorated schizophrenia than among four patients with psychoneurosis or intractable pain. The possible meaning of these results and their relation to clinical status, medication and anesthesia, previous convulsion therapy and various histopathological findings are discussed. (Authors' abstr.)

Titration of Central-Nervous-System Depression.

A method for the quantitative titration of depression of the central nervous system, based upon the antagonism between a central depressant and a convulsant, is described. By plotting the CD_{50}'s of a stimulant against the corresponding doses of the depressant, three straight lines are constructed for sedation, hypnosis, and general anesthesia respectively. The slopes and the intersects of the lines represent the sedative, hypnotic, and anesthetic potencies of a drug and its minimal hypnotic and anesthetic doses respectively. The depth of the three stages of depression is indicated by its anticonvulsant effect.

The relation of dose to the depressive effect of phenobarbital was determined against convulsions induced by strychnine, picrotoxin, and pentylenetetrazol (metrazol (®)). No difference was found in the quantitation of central-nervous-system depression with the three convulsants.

Metrazol (®) was used to study the depressive effect on the central nervous system of pentobarbital, phenobarbital, barbital, trimethadione, and carbromal (bromodiethylacetylurea). The results indicate the usefulness of these agents for sedation, hypnosis, or general anesthesia. The three barbiturates are more effective agents for producing hypnosis and general anesthesia, whereas trimethadione and carbromal are better drugs for sedation. (Authors' abstr.)

Blood Ketone Concentration in Patients with Mental and Emotional Disorders.

A procedure is presented for the study of the joint effect of central-nervous-system depressants. It is based upon their anticonvulsant activity against metrazol®. Barbital and pentobarbital were shown to be additive and pentobarbital and carbromal were synergystic in their combined anticonvulsant effect. (Authors' abstr.)

Role of Gelatinous Substance of Spinal Cord in Conduction of Pain.

This study on the gelatinous substance of the posterior gray columns of the spinal cord is based primarily on Golgi preparations of human infants and newborn cats. The gelatinous substance is composed mainly of small multipolar neurons whose processes are limited to that region. The pericornual cells are large multipolar neurons scattered in the posterior, lateral, and medial margins of the gelatinous substance. Their coarse, freely branching dendrites spread out in the gelatinous substance. The cells lying under the gelatinous substance constitute the nucleus proprius. The cells lying closest to the gelatinous substance are medium-sized to large multipolar neurons. Their dorsally directed dendrites extend into a rather narrow zone of the gelatinous substance. The deeper cells of this nucleus are often a little larger, and the spread of their dorsal dendrites may include the dendritic zone of several of their dorsal neighbours. The ventrally directed dendrites are lost in the adjacent gray matter. The axons of the above cells could not be followed for any great distance.

Numerous fibers leave the posterior funiculus and Lissauer's zone and enter the posterior gray columns. Many of the coarser fibers circumvent the gelatinous substance by passing on its medial or its lateral side. Many of the finer fibers terminate in the gelatinous substance. Several types of these were observed. One type passes along the lateral or the medial margin of the area and then turns dorsally into the gelatinous substance, where it is lost. Another passes directly through the area and then turns dorsally into the gelatinous substance. Some fibers bifurcate as they pass ventrally. Others divide close to the dorsal margin and send off branches. All these fibers appear to give off the majority

https://doi.org/10.1192/bjp.99.415.324 Published online by Cambridge University Press

of their terminal branches in the ventral zone of the gelatinous substance. It is in this region that the dendrites of the cells of the nucleus proprius of the dorsal horn are most numerous.

The evidence suggests that small pain-conducting fibers from Lissauer's zone, ending in the gelatinous substance, relay their impulses through one or more intercalated neurons in this substance, to the pericornual cells and to the cells of the nucleus proprius, which, in turn, give rise to the lateral spinothalamic tract. It is unlikely that any fibers of the lateral spinothalamic tract arise directly from the small neurons of the gelatinous substance.

Larger fibers that penetrate or by-pass the gelatinous substance also end in synaptic relation to neurons of the nucleus proprius. Some of these, at least, may be fast pain-conducting fibers of neurons of the first order. In this case the neurons of the nucleus proprius would be of the second order. The probability is that in fast pain conduction not only the coarser fibers but also fewer neurons are involved. (Author's abstr.)

Blood Eosinophiles in Alcoholic States.

Approximately 50 per cent. of a series of alcoholic patients exhibited a decline of 50 per cent. or more in circulating eosinophiles following the subcutaneous injection of 0·3 c.c. 1 : 1,000 epinephrine hydrochloride. This corresponds satisfactorily with the results obtained by Fisher and Fisher in a group of normal controls. The initial eosinophile counts in these alcoholic patients were chiefly in the " low-normal " range. These data do not confirm the presence of deficient adrenocortical function in alcoholic patients. (Authors' abstr.)

NOVEMBER.

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An Activating System in Brain Stem of Monkey.

Evidence is presented which indicates that there exists in the monkey, as in the cat, a centrally located area comprising the midbrain tegmentum, the subthalamus and hypothalamus, and the medial portion of the thalamus in which evoked potentials can be recorded from peripheral stimuli delivered to the somatic, visual, auditory and visceral systems. Such potentials are similar to those evoked in the lateral sensory pathways, but differ in that they attentuate when rapidly evoked from stimulation of a single sensory nerve and interact when the eliciting shocks are delivered in close approximation to two different sources.

Rapidly repetitive stimuli delivered to the cut sciatic or splanchnic nerves or to the lateral sensory pathways in the brain stem cause an increase in the normally fast background activity throughout the activating system and a simultaneous desynchronization of electrocortical activity. The same cortical desynchronization occurs on high-frequency stimulation anywhere in the reticular activating system and usually persists long after cessation of the stimulus. There is a tendency for such electrocortical activation to be frontally oriented, but it can be observed over the entire hemisphere on stimulation of the most excitable areas in the central core.

The results of these experiments indicate that this centrally situated area in the brain stem, functioning as a unit, is subject to excitation by peripheral sensory stimulation. Such excitation effects electrical activation of the cortex and behavioral arousal of the animal. The evidence suggests that this medially mediated mechanism plays an important role in such physiological reactions to sensory stimuli as awareness of sensation, arousal to wakefulness, or alerting to attention. (Authors' abstr.)

Effects of Chronic Lesions in Central Cephalic Brain Stem of Monkeys.

Electrolytic lesions were made in the central cephalic portion of the brain stem of 9 monkeys; as a control, the operation was performed, but no lesion made, in a tenth

https://doi.org/10.1192/bjp.99.415.324 Published online by Cambridge University Press

monkey. These experiments were devised to evaluate the effect on behavior and on the electroencephalogram of destruction of the reticular activating system.

Complete destruction of the area was not compatible with survival of the animals. Less extensive lesions resulted in a state of behavioral akinesis and hypersomnolence in the monkeys simulating coma in man.

The electroencephalograms were characterized by hypersynchrony, which was not responsive to sensory arousal stimuli. Animals in which lesions of comparable size were made, but which did not involve the reticular activating system, were not similarly affected.

The extent to which the reticular activating system was involved appeared to influence directly the degree to which the behavior and the electroencephalogram of the animals were disturbed. (Authors' abstr.)

Respiratory Responses to Stimulation of Temporal Pole, Insula, and Hippocampal and Limbic Gyri in Man.

Results of electrical stimulation of the temporal lobe, the hippocampal and limbic gyri, and the insula in man, with recording of respiratory responses, are reported.

From points indicated, inhibition of respiratory movements in expiration was obtained. The responsive points were located in the anterior end of the hippocampal gyrus, the ventral and medial surfaces of the temporal pole, the anterior portion of the insula, and the anterior limbic gyrus. The posterior orbital surface and the subcallosal region of the frontal lobe were not stimulated.

Arrest of breathing was recorded as the initial phenomenon in epileptic seizures induced from these areas.

Associated with the respiratory inhibition there was frequently impaired consciousness, a feeling of tiredness and sleepiness, and a tendency to close the eyes.

(Authors' abstr.)

Studies on Blood-Brain Barrier with Radioactive Phosphorus.

The concentration of P^{32} in various parts of the hypophysis and hypothalamus was determined in 12 human subjects, from six hours to three weeks after a single intravenous injection of the isotope.

A larger deposit of P^{32} was found in the pituitary gland, infundibulum and tuber cinereum than in other parts of the brain. Other hypothalamic regions did not differ significantly from the central nervous system.

There was no significant difference in the phosphate uptake of the anterior and that of the posterior lobe of the pituitary gland in the majority of cases. The intermediate lobe, if present, concentrated less P^{32}.

Time curves for P^{32} concentrations of various areas indicate a fundamental difference between the uptake of phosphates by the hypophysis (and other parenchymatous organs) and that of the brain. The tuber cinereum follows the former pattern.

The role of the tuber cinereum and that of the supraoptic and paraventricular nuclei are discussed, with special regard to the correlation between vascularity and metabolism and to the permeability of the blood-brain barrier. (Author's abstr.)

Serum Cholinesterase Activity in Mental Disease.

Serum cholinesterase activity determined by a sensitive and specific colorimetric method could not be correlated with the psychiatric diagnosis, response to therapy, or presence or absence of marked overt depression in a series of 60 hospitalized psychiatric patients. A transient rise in serum cholinesterase activity occurs in a majority of patients subjected to electroshock therapy, and appears to be largely related to transient hemoconcentration. A brief review of the nature and probable origin of the serum cholinesterase suggests that the level of the circulating enzyme could bear no direct relation to the mental state, alleged correlations in some series and pharmacologic studies notwithstanding.

(Authors' abstr.)

Effect of Series of Electric Shock Treatments on Cerebral Blood Flow and Metabolism.

Cerebral blood flow and cerebral metabolic studies were done on 21 patients before and after they had received an average of 10 electric shock treatments.

No significant changes in cerebral blood flow or oxygen consumption occurred. Cerebral oxygen consumption fell from 3·7 to 3·3 c.c. of oxygen per 100 gm. of brain ($p = > 0{\cdot}05$).

Neither clinical improvement nor mental confusion produced by electric shock therapy is associated with changes in cerebral blood flow or cerebral metabolism as measured by present techniques. (Authors' abstr.)

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The Control with Mesontoin of Convulsive Seizures due to Neurosyphilis. Clinical and Electroencephalographic Studies.

1. Eight paretics who had had previous adequate specific antileutic therapy and who had inactive spinal fluids were treated with Mesontoin for convulsive seizures.

2. The mean daily dosage for adequate control of seizures was 0·25 gm., somewhat lower than reported for other types of convulsive seizures.

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3. Clinical and electroencephalographic results were uniformly good with dramatic improvement in 2 cases.

4. Seven of the 8 patients developed a skin rash, although small initial doses (0·1 gm.) were administered and increased gradually. The drug had to be discontinued in one patient who developed a septic type of fever while on 0·4 gm. daily.

5. Mesontoin seemed to be as satisfactory as, or even superior to, dilantin sodium for the control of convulsive seizures due to neurosyphilis in the cases reported.

(Author's abstr.)

Mephenesin in the Treatment of Spasticity in Multiple Sclerosis.

1. In 20 of 26 spastic multiple sclerosis patients to whom mephenesin in elixir was administered, slight to marked temporary (30 to 60 minutes) reduction in spasticity was observed. It was shown that the effect of mephenesin on spasticity may be quickly tested in each patient by oral administration of elixir.

2. The administration of suitable doses of mephenesin elixir at the physical therapy hour, and of mephenesin tablets as a maintenance dose over the day, seemed to be useful for treatment of spasticity in 10 of the patients. Some case-histories are given which illustrate three types of spasticities encountered in multiple sclerosis and their response to such treatment.

3. Mephenesin elixir is more effective than mephenesin in tablets or capsules in reducing spasticity of multiple sclerosis, but its action is of shorter duration. Effective dosages of mephenesin may vary widely among different patients. Tablets alone have been useful in only a small percentage of patients.

4. Side-effects are usually tolerable, but the increased weakness produced by reduction of the spasticity in some patients may negate the usefulness of the drug for them.

5. Because of the brief action of the mephenesin elixir, its major benefit, for those multiple sclerosis patients in whom it produces usable relaxation, would seem to be in facilitating the application of physical therapy treatments. (Authors' abstr.)

Epileptic Clouded States.

1. Most of the patients were diagnosed as having "idiopathic epilepsy," and the majority were severe epileptics who had been subject to seizures (primarily of the *grand mal* type) for many years.

2. The clouded states characteristically developed shortly following one or more convulsive seizures (usually following multiple seizures), which were often precipitated by omission of anticonvulsant medication.

There was a rather high incidence of chronic alcoholism in the series (35 per cent.), and in several instances abrupt withdrawal of alcohol precipitated the seizures and subsequent clouded states.

Abrupt withdrawal of medication or alcohol in epileptic patients is dangerous because it results in a heightened susceptibility to seizures (or *status epilepticus*) and an accompanying predisposition to the development of clouded states.

3. The clinical picture of the clouded states was essentially that of a delirium with liberation of aggressive or self-destructive impulses. The chief features of the mental status were confusion, excitement, hallucinations and delusions. There was a relatively high incidence of suicidal attempts, which were primarily impulsive in nature.

4. Although many patients were uninhibited in their behaviour they were usually not considered very dangerous to others, since their mental faculties were generally so disorganized that they were unable to carry out integrated or well-planned aggressions.

5. In the majority of cases the psychosis cleared spontaneously in less than one week. However, in several cases the psychosis persisted for a more extended period and occasionally lasted a month or more.

6. In the few cases having repeat E.E.G.'s, it was observed that there was greater E.E.G. abnormality during the clouded state than after recovery. These changes are analogous to the transitory E.E.G. disturbances observed in other types of delirium.

(Author's abstr.)

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Mephenesin in Anxiety-Tension States.

1. Mephenesin acts on internuncial neurons, producing muscle relaxation without hypnotic effects. Thirty neurotic patients who were experiencing anxiety-tension symptoms (uneasiness, restlessness, muscle tension, psychic tension) received 1 to 2 gm. of the drug one to four times a day as an adjunct to brief psychotherapy.

2. In 26 patients relaxation of tense muscles, leading to a feeling of reduced muscle and psychic tension, often with a sense of well-being was produced. Consciousness, alertness and voluntary action were not effected. There was decreased need for barbiturate sedation for sleep, and of alcoholic beverages for relief of tension.

3. Four cases, all characterized by non-appreciation of increased muscle tension, obtained no benefit. Two of the four got intensification of feelings of nausea, irritability and uneasiness. These were the only side-effects observed in the entire series.

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4. Mephenesin relieves anxiety and preoccupation with its bodily manifestations which impede psychotherapy. It can help produce initial improvement, which may be a powerful impetus to further treatment.

5. Mephenesin is useful for relief of anxiety-tension symptoms without producing drowsiness in cases where there is direct awareness of increased muscle tension.

(Author's abstr.)

Frontal Lobe Surgery in the Treatment of Pain : with Consideration of Post-operative Psychological Changes.

The results in terms of the relief of pain following bilateral leukotomy, bilateral lower quadrant leukotomy, unilateral leukotomy, and orbital gyrectomy are described.

Following bilateral leukotomy in 6 patients severe psychological changes were noted which consisted largely of deterioration of the patients' behavior and impaired judgment. These were most severe immediately following operation, improving with the passage of time. Two patients followed for twenty-three and eighteen months are reported.

Following bilateral lower quadrant leukotomy in 9 patients, apathy was the predominant feature noted immediately post-operatively, and, although there was improvement with the passage of time, in the one patient followed for thirty-six months, it was still a predominant feature.

Following unilateral leukotomy in 19 patients the psychological changes noted were on the whole slight in degree and, as with the previous groups, improved with the passage of time. The changes most frequently noted were slight flattening of affect, inappropriate affect, decrease in the amount of spontaneous speech, decrease in the rate of speech in words per minute, and increase in the time interval prior to responding to the interviewer's questions.

Patients leukotomized for pain seem to suffer more mental deficit than those leukotomized for psychosis.

A theory is promulgated to explain the neurophysiological effect of leukotomy in reducing pain. (Authors' abst.)

Influence of Prefrontal Lobotomy on Social Interaction in a Monkey Group.

A colony of 6 *Macaca mulatta* monkeys was observed for 3 months before prefrontal lobotomy of 3 of its members and for 7 months after.

Before lobotomy a rigid dominance hierarchy was established on the basis of learned avoidance responses. After lobotomy the stability of the hierarchy was lost because of the marked diminution of the learned avoidance responses in operated low status animals, with an increase in upwardly directed aggression, and a tendency to upward mobility in the hierarchy. This stimulated retaliation by threatened upper status animals, with the ultimate effect of increasing downwardly directed aggression throughout the group. The social structure was not reconstituted in its original form, because of the impaired ability of low status animals after lobotomy to relearn avoidance responses appropriate to their relative position in the hierarchy. (Authors' abstr.)

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SCHW. ARCH. NEUR. PSYCHIAT.

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1. Biochemistry, Physiology, Pathology, etc.

Mode of Blocking of Axonal Activity by Curare and Inhibitors of Acetylcholinesterase. Grundfest, H., et al. [*Nature*, **169**, 190 (1952).]

Various solutions were injected, usually 0·5–5 c.mm., directly into the giant axon of the squid, *Loligo pealii*, by means of a special micropipet. Both prostigmine and eserine blocked axonal activity, as did stilbamidine and d-tubocurarine. Acetylcholine chloride also blocked activity of the axon. The relatively powerful acetylcholinesterase inhibitors, eserine and prostigmine, were required in larger amounts than the less potent inhibitors, stilbamidine and d-tubocurarine. Contrary to Grundfest (1st *Conference on Nerve Impulse*, 1951, 39 (Josiah Macy, Jr., Foundation N.Y.) the " receptor protein " is not acetylcholinesterase. Axon activity is dependent on co-ordinated functioning of " receptor protein," esterase, and acetylcholine. W. DONALD GRAHAM (Chem. Abstr.).

Pseudocholinesterase Activity in the Central Nervous System. Ord, Margery G., and Thompson, R. H. S. [*Biochem. J.*, **51**, 245–51 (1952).]

Substrates used were: acetylcholine chloride (ACh); acetyl-β-methylcholine chloride (MCh); benzoylcholine chloride (BCh); butyrylcholine chloride (BuCh). Relative cholinesterase activities of different regions of the human and mammalian brain were determined on these substrates. All areas displayed a measurable degree of hydrolysis of BCh and BuCh (but not of MCh), in addition to their true cholinesterase. The enzyme is distinct from tributyrinase, as can be seen from its sensitivity to inhibition by eserine and by diisopropyl fluophosphate. The enzyme in human nervous tissue which hydrolyzes BCh is probably a butyrocholinesterase resembling the pseudocholinesterase in human plasma, and it is found in significantly larger amounts in the white fiber tracts of the cerebrum than in the gray matter. S. MORGULIS (Chem. Abstr.).

Methodology of Total Protein Determination in Cerebrospinal Fluid. Bauer, Helmut, et al. [*Klin. Woch- schr.*, **30**, 277–9 (1952).]

The Kafka, biuret and sulfosalicylic acid methods were compared. While the first two methods showed agreement, the third did not seem reliable.
ERICH HEFTMANN (Chem. Abstr.).

Paper Electrophoresis of Cerebrospinal Fluid. Bucher, Theodor, et al. [*Klin. Wochschr.*, **30**, 325–30 (1952).]

Cerebrospinal fluid (I) is concentrated by precipitation with Me_2CO at low temperature before electrophoresis. The pherograms from normal (I) differed from serum pherograms qualitatively in having two additional bands, one before the albumin peak, the other after β-globulin. Pathological specimens of (I) showed increases or decreases in certain bands.
ERICH HEFTMANN (Chem. Abstr.).

Microchemical Investigation of Cations and Anions in Spinal Fluid. Berisso, B., and Bruno, A. [*Pubs. Inst. Invest. Microquim., Univ. Nacl. Litoral (Rosario, Arg.)*, **14**, 109–17 (1950).]

Previously the determination of the number of anions and cations in a specimen of spinal fluid required from 0·5 to 5 ml. of sample per ion. The microchemical tests here suggested for Na, K, Ca and Mg ions require one drop for each ion to be identified. For Na a modified K pyroantimonate method is recommended. Ten grammes of very finely pulverized K pyroantimonate is placed in an amber-colored bottle containing 100 ml. of water and shaken vigorously for several minutes. On standing, a clear layer separates. To perform a Na test, transfer 1 drop spinal fluid to a slide and add 1 drop pyroantimonate reagent. Heat gently over an alcohol lamp and cover with cover-glass when cool. Na is indicated by the formation of typical cigar-shaped crystals, singly and in rosettes (sensitivity, 1 γ). To detect K, which normally varies between 0·10 and 0·14 parts per 1000, Berisso and Bruno modified the chloroplatinic acid test with a 5 per cent. aqueous solution of the hexahydrate. Add 1 drop of 1:2 HNO_3 to a drop of spinal fluid on a slide. Cau-

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tiously heat over an alcohol lamp to remove excess acid and then, by means of a Pt wire or fine glass needle, apply 1 drop reagent to the edge of the preparation. In the zone of contact the presence of K causes formation of a series of lemon-yellow microcrystals, usually octahedra. The test will detect 0·01 γ. If the fluid tested has been concentrated this procedure is not recommended because the resulting microcrystallized powder is difficult to characterize. Behrens' triple nitrite can also be applied to spinal fluid. For this, Berisso and Bruno prepared a reagent by dissolving $NaNO_2$ 20, $(AcO)_2Cu$ 9·1, and $(AcO)_2Pb$ 16·2 gm. in 150 ml. of water and 2 ml. AcOH. Since NH_4, Rb, Cs and Tl ions are never present in spinal fluid, both of these tests are specific for K. The most desirable method for detecting Ca is one devised by Martini. The slide must be thoroughly cleaned in concentrated NaOH solution, well washed with water, rinsed with alcohol, and dried with a cloth. Then place a drop of spinal fluid on the slide and, after evaporation, add a droplet of collodion by means of a glass rod 2 mm. in diameter. Let the solvent evaporate and then place a drop of H_2SO_4 or concentrated Na_2SO_4 solution on the collodion film. Within a few seconds examine microscopically. Ca should result in formation of colorless prisms (sensitivity, 0·04 γ). Mg can be detected by treating an evaporated test drop of fluid with a drop of 20 per cent. CsCl and a few minute particles of Na phosphate. Drop a cover-glass on the preparation and observe under the microscope. Mg is revealed by the appearance of characteristic colorless tetrahedra (sensitivity, 0·01 γ).

HAROLD F. SCHAEFFER (Chem. Abstr.).

The Quantity of Pyruvic Acid in the Cerebrospinal Fluid. Fujii, Michio (Mie Med. Coll., Tsu). [J. Mie Med. Coll. (Japan), 2, No. 1, 27–42 (1951); cf. Rinsho Nai-ka Shonika (Clinic for Internal Med. and Pediatrics), 4, 100 (1949).]

The pryuvic acid content (I) of the cerebrospinal fluid of patients with brain syphilis, encephalitis, cerebrospinal meningitis, nephritis, epilepsy and focal infections is above normal (1 mgm./dl.). The increase is correlated with the positive urine reaction of Sawada (II) (cf. *Sogo Igaku (Synthetic Med. Sci.)*, **4**, 271; or *Igaku No Azumi*, **2**, 85 (1947)). Vitamin B_1, 15 mgm., injected into the carotid or subarachnoid cavity of these patients on alternate days for varying periods (1–8 injections), produced no decrease in (I) and was almost completely excreted in 2 hours. Subcutaneous administration of vitamins B_2, B_6 and C simultaneously had no effect on either (I) or (II). Intravenous injection of 20 ml. EtOH had no effect on (II).

WALTER FRAJOLA (Chem. Abstr.).

Alkaline and Acid Phosphatase in Cerebrospinal Fluid. Data for Normal Fluids and Fluids from Patients with Meningitis, Poliomyelitis, or Syphilis. Colling, K. G., et al. [Can. J. Research, 28E, 56–68 (1950).]

Alkaline and acid phosphatases were significantly increased in the spinal fluids from patients with meningitis or poliomyelitis, but not in the fluids from patients with syphilis. The alkaline phosphatase activity was correlated with both the concentration of protein in the spinal fluid and with the white cell count, whereas the acid phosphatase was correlated with neither. Phosphatase was measured by a modification of the method of King and Armstrong. Carbonate-bicarbonate buffer pH 9·8 was used for the determination of alkaline phosphatase, and citrate buffer pH 4·9 was used for acid phosphatase. To a 15 ml. centrifuge tube was added 2 ml. buffer (either pH 9·8 or 4·9), 2 ml. 0·01 M disodium phenyl phosphate, 0·5 ml. 0·01 M magnesium chloride, 0·2 ml. cerebrospinal fluid, 0·3 ml. distilled water. After incubation for 18 hours at 37°, 1·8 ml. Folin and Ciocalteu reagent (diluted 1:3) was added and the tube was centrifuged. The phenol in 4 ml. of the supernatant was determined as described by King and Armstrong. For a blank, the substrate, buffer and $MgCl_2$ were incubated alone and the cerebrospinal fluid was added just before the phenol reagent. Results were recorded as γ of phenol liberated by 100 ml. cerebrospinal fluid in 1 hour. For the alkaline phosphatase the mean activities for normal, meningitis, poliomyelitis, syphilis (— C.S.F. Wassermann), syphilis (+ C.S.F. Wassermann) cerebrospinal fluids were: 38, 608, 98, 33, 73. For acid phosphatase the values in the same order were 5·5, 476, 71, 12·9, 12·5.

IRVING SERLIN (Chem. Abstr.).

Determination of Cerebrospinal-fluid Protein with the Folin Phenol Reagent. Daughaday, William H., et al. [J. Lab. Clin. Med., 39, 663–5 (1952).]

The Folin phenol reagent used with Cu has been adapted to the determination of protein in 0·2 ml. of cerebrospinal fluid. The method is more reproducible and is less liable to error than the sulfosalicylic turbidimetric method.

EDWARD J. VAN LOON (Chem. Abstr.).

Sodium and Potassium Concentration in Human Cerebrospinal Fluid. (I). Normal Values. Shaw, Carleton W., et al. [J. Lab. Clin. Med., 38, 574–6 (1951).]

The Na and K concentration in normal human cerebrospinal fluid was determined by using flame photometry and standard chemical methods. Agreement was good between the two procedures and with the literature.

CARTER D. JOHNSTON (Chem. Abstr.).

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Cerebrospinal Fluid Pressure and Cerebral Circulation as Related to Headache and Vomiting: I. Relations between the Cerebrospinal Fluid Pressure and Cerebral Circulation. Saisho, Atsushi. [*Folia Pharmacol. Japon.*, **48**, 100–8 (1952).]

Adrenaline at first increased the pressure as well as the blood flow in the brain and later caused a decrease. The extent and duration differed with the dosage. Inhalation of Et_2O increased the cerebral blood flow and the cerebrospinal pressure. $BaCl_2$ caused a transient increase of the pressure and blood flow, but later it decreased markedly the blood flow, while the pressure was decreased slightly. Acetylcholine also increased both the pressure and the blood flow. Generally the extent of a rise of the pressure was proportional to the increase of the blood flow, but the latter decreased out of proportion to the pressure. S. KITAOKA (Chem. Abstr.).

Cerebrospinal Fluid Pressure and Cerebral Circulation as Related to Headache and Vomiting: II. Saisho, Atsushi. [*Folia Pharmacol. Japon.*, **48**, 133–40; *Breviaria*, 7 (1952).]

Histamine, antipyrine, sulpyrine and apomorphine increased the cerebral blood flow and raised the fluid pressure. Agroclavine (an alkaloid from cultivated ergot) increased both slightly, but soon caused a marked decrease. An intravenous injection of caffeine (10 mgm.) increased both, but a subcutaneous injection of the same size caused a decrease. There was no relation between vomiting and the blood flow and cerebrospinal fluid pressure. S. KITAOKA (Chem. Abstr.).

Effect of Procaine on the Colloidal Gold Test in Cerebrospinal Fluid. Kercher, Grace. [*Am. J. Clin. Path.*, **22**, 812–13 (1952).]

Procaine may cause some precipitation of the Au, but the reaction is almost immediate rather than during the course of 24 hours as when caused by pathological spinal fluids. JOHN T. MYERS (Chem. Abstr.).

Iontophoresis and the Calcium Fractions of Serum and Cerebrospinal Fluid. Baggio, G. C. [*Acta paediat. latina* (*Parma*), **3**, 231–41 (1950).]

In 14 children subjected to Ca transcerebral iontophoresis (controls with Na iontophoresis) the total Ca and proteins of serum and all Ca fractions of cerebrospinal fluid were unchanged, but the active Ca of serum increased from average 3·86 to 4·70 mgm. per cent. and the inactive ultrafiltrable Ca decreased correspondingly. Sleep was also induced, nearly proportionally, to the active Ca increase. C. SCANDURA (Chem. Abstr.).

The Passage of Streptomycin from Blood to Cerebrospinal Fluid. Interim Results of Treatment of Tuberculous Meningitis with Streptomycin. Lassen, H. C. A., et al.. [*Ugeskrift Laeger*, **110**, 1069 (1948) (*in Danish*); *Abstracts World Med.*, **5**, 760 (1949).]

The human blood-brain barrier is not impermeable to streptomycin. Curves obtained in 4 cases show that with streptomycin in the blood it is also present in cerebrospinal fluid (C.S.F.), although in lower concentrations. With intramuscular injections of 100 mgm./kgm./day, concentrations in the C.S.F. were 10–30 times those lethal to tubercle bacilli *in vitro*. W. C. TOBIE (Chem. Abstr.).

Active Calcium of Cerebrospinal Fluid (C.S.F.) in Spasmophilia. Gaburro, D. [*Acta paediat. latina* (*Parma*), **3**, 223 (1950).]

The active Ca fraction of C.S.F. in 16 cases of spasmophilia, with or without tetanic symptoms, was normal; the ratio of active Ca of C.S.F. to active Ca of blood was nearly doubled. A criticism of the ultrafiltration origin of C.S.F. is given. C. SCANDURA (Chem. Abstr.).

d-Lysergic Acid Diethylamide and the Mental Disturbances of Ergotism. Delay, J., et al. [*Compt. rend. soc. biol.*, **145**, 1609–10 (1951).]

Although it has not been shown to be present in ergot, the compound in extremely small doses produces in human subjects the same mental disturbances as seen in ergot poisoning. L. E. GILSON (Chem. Abstr.).

Symposium on Fate and Mechanism of Action of the Barbiturates. Distribution and Fate of Dialkylbarbiturates (in the Body). Maynert, E. W. [*Federation Proc.*, **11**, 625–31 (1952).]

A discussion with 26 references.

Physiological disposition and Chemical Fate of Thiobarbiturates in the Body. Brodie, Bernard B. [*Federation Proc.*, **11**, 632–9 (1952).]

The distribution of thiopental (I) in the tissues of the dog after administration of rather large doses showed concentrations 3–4 times as high in the fat as in liver and brain. After intravenous injection of up to 4 gm. in man, (I) disappears rapidly from the plasma for 2–3 hours, then more slowly. (I) is almost completely metabolized in man; only

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about 0·3 per cent. of the dose is found unchanged in the urine. From 10 to 25 per cent. is excreted as an unidentified metabolic product with an ultraviolet absorption curve identical with that of (I), but with an acidity like that of a carboxylic acid. Probably a side chain C is oxidized to COOH, leaving the ring intact.

In vitro Metabolism of Barbiturates. Shideman, F. E. [*Federation Proc.*, **11**, 640–6 (1952).]

A review with 26 references.

Relations between Clinical Effects of Barbiturates and their Neurophysiological Mechanisms of Action. Wilker, Abraham. [*Federation Proc.*, **11**, 647–52 (1952).]

A discussion with 28 references.

Enzymic Aspects of Barbiturate Action. Bain, J. A. [*Federation Proc.*, **11**, 653–8 (1952).]

The possible action of barbiturates on energy-transferring systems in cells is discussed.
L. E. GILSON (Chem. Abstr.).

Renal Function during Emotional Diuresis. Miles, B. E., et al. [*Am. J. Med.*, **12**, 659–66 (1952).]

A marked H_2O, Na and Cl diuresis occurred in a hypertensive woman in response to emotion. Also, glomerular filtration increased and reabsorption of H_2O and salt decreased.
BARBARA R. MURRAY (Chem. Abstr.).

Further Studies of Blood Cholesterol in Schizophrenia. Nadeau, Guy, et al. [*Can. Med. Assoc. J.*, **66**, 320–3 (1952); *cf. ibid.*, **62**, 581 (1950).].

Blood cholesterol levels of 10 schizophrenic patients dropped markedly during a 10-week period of increased physical activity and remained low for some weeks afterward. Variability of cholesterol levels was greater than in the pre-experimental period.
W. DONALD GRAHAM (Chem. Abstr.).

Glucose Metabolism in Anxiety States. Cera, L. J., et al. [*Can. Med. Assoc. J.*, **66**, 366–71 (1952).]

A group of psychoneurotic patients showed greater than normal tolerance for glucose administered orally or parentally. Their blood-sugar levels dropped in the normal manner after insulin, but the subsequent hyperglycemic response to oral glucose was subnormal.
W. DONALD GRAHAM (Chem. Abstr.).

Glucose, Glutamate, and Succinate Oxidation in Brain. Harris, H., et al. [*Nature*, **168**, 914–15 (1951).]

Minced guinea-pig brain tissue respiring alone in a Krebs phosphate-Ringer solution (I) loses its ability to oxidize glucose (II) rapidly, but suffers only a slight impairment in its ability to oxidize glutamate (III) or succinate (IV). The increase in O uptake of the system respiring in (I) following (II) addition bears a relationship to the prevailing rate of respiration at the time of (II) addition, but the increase following addition of either (III) or (IV) seems to be independent of the prevailing rate. The increase in O uptake following the addition of (III) to a preparation respiring in (IV) indicates that the mechanisms involved in the oxidation of (III) to α-ketoglutarate and (IV) are not inhibited by the concentration of (IV) used. That (II) is not oxidized in the presence of either (III) or (IV) (these findings are incompatible with those of Weil-Malherbe, *C.A.*, **30**, 7190[3]) indicates that this phenomenon may represent a mechanism by which the rate of (II) oxidation in brain is regulated. L. R. (Chem Abstr.).

Phosphoamidase Activity of Rat Brain. Tseĭtlin, L. A. [*Biokhimiya*, **17**, 208–13 (1952).]

Phospholysine is more rapidly decomposed enzymically by rat-brain extracts than by extracts from other tissues. The optimum pH is 7·2–7·4. The structural proteins extracted from brain tissue with Edsall's solution also possess pronounced phosphoamidase activity. Two separate enzymes are probably involved. One of the enzymes is easily extracted by H_2O, is activated by Mg, and inhibited by Ca. The other is firmly attached to the structural proteins and is activated by Ca. H. PRIESTLEY (Chem. Abstr.).

Somatic Characteristics of Manic-depressive Psychosis. Protopopov, V. P. [*Nevropatol. i Psikhiat.*, **17**, 57–64 (1948); *Abstracts World Med.*, **5**, 622 (1949).]

Physiological and pathological aspects are discussed. Injection of adrenaline (I) raises the blood histamine in normal subjects. In mania and melancholia this test is negative, capillary resistance is increased, and dermographism cannot be obtained. Blood pressure falls only briefly. In catatonia, injected (I) causes a prolonged decrease in capillary resistance and blood pressure. In both mania and melancholia, the average blood sugar (II) is 80–100 mgm. per cent. Injection of 1 mgm. (I) into normal subjects

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raises (II) to 130–150 mgm. per cent., falling to normal after 2 hours. In manic-depressive psychosis (II) increases to 160–214 mgm. per cent., with a slow fall over 3–4 hours. The rise is somewhat less in the depressive phase. Response to (I) is greater than to insulin. After intake of 150 gm. glucose (II) is higher by 20–40 mgm. per cent. than in normal subjects. Response to insulin varies greatly from the normal, the arteriovenous difference in (II) is greater than normal, being highest in the manic phase. Lactic acid and protein (especially albumin) in the blood are diminished; urea reaches high normal values. Fat and carbohydrate metabolism are increased. W. C. TOBIE (Chem. Abstr.).

Substrate and Enzyme Distribution in Cells and Cell Fractions of the Nervous System. Abood, L. G., et al. [*Am. J. Physiol.*, **168**, 728 (1952).]

Grey matter of cortex and white matter of cord of the rat were separated mechanically, homogenized, and cell parts centrifuged into nuclear, mitochondrial, supernatant, and lipide fractions. The cord white fractions represent glial cells; the cortex gray, perhaps 90 per cent. glia and 10 per cent. neurones. Tissues of total homogenates are alike in total N, nucleic acids, and phosphorylated intermediates. White matter is 2 to 4 times richer than gray in inorganic P, triose phosphate, creatine P, and lipide P; gray matter is somewhat richer in hexose 2-phosphate. Enzyme activity, per unit fat-free dry weight, is generally 50 per cent. greater in gray matter than in white, but the distribution in fractions is again similar for both. E. D. WALTER (Chem. Abstr.).

Oxidative Esterification of Phosphate by Neural Tissue. Abood, L. G., et al. [*Am. J. Physiol.*, **168**, 739 (1952).

Cord white and cortex gray, especially their mitochondrial fractions, are able to esterify P to adenosine diphosphate and adenosine triphosphate and to glucose 6-phosphate with the aid of oxidative energy. P/O ratios are about 2 uncorrected, 3 corrected for losses due to apyrase, with a variety of substrates. Only succinate gives a corrected ratio of 2. The highest average ratio, nearly 4 corrected, is obtained with glutamate oxidation by cord. These findings are related to the ability of substrates to support neural function.
E. D. WALTER (Chem. Abstr.).

Effects of Various Concentrations of Adrenocorticotropic Hormone on Electrical Activity of Brain and on Sensitivity to Convulsion-inducing Agents. Torda, C., et al. [*Am. J. Physiol.*, **168**, 406 (1952).]

Prolonged administration of adrenocorticotropic hormone (ACTH) induced a decrease of sensitivity of rats to pentamethylene-tetrazole. Single injections of ACTH and repeated injections of ACTH given within a few minutes induced an increased electrical activity of brain, causing an increase of voltage, occasional spiking, paroxysmal runs of low-frequency high-voltage waves, and lowering of convulsion threshold of pentamethylenetetrazole. ACTH induced similar effects in non-operated, hypophysectomized, adrenalectomized, and Na-injected nonoperated animals. Prolonged administration of ACTH in relatively large concentrations induces a decrease in electrical activity due mainly to shift in electrolytes; ACTH in either a single injection or injections repeated within a short period of time induces an increased activity and hyperexcitability of the brain by a mechanism that is not dependent on the presence of the adrenal cortex.
E. D. WALTER (Chem. Abstr.).

Creatine Phosphate in the Brain. Alekseeva, A. M. [*Biokhimiya*, **17**, 119 (1952).]

Creatine phosphate (I) in the brain of rabbits and rats was determined by the new method. About 50 mgm. per cent. of creatine in the brain is combined with P. (I) of the brain is more labile than that of muscle. (I) begins to disappear from the brain immediately after death, and 15 minutes later it is completely absent. In analysis the rats, while under narcosis, were pushed heads forward into liquid air, and the heads then chopped off. H. PRIESTLEY (Chem. Abstr.).

Histochemical Studies on the Changes of Tissue Phosphatase Caused by the Electrical Stimulation of Autonomic Centers. Kurotsu, T., et al. [*Med. J. Oska Univ.*, **2**, 163–76 (1951) (*in English*).]

The acid and alkaline phosphatase activities as demonstrated histochemically in duodenal intestine, liver, and kidney of adult male rabbits were greater than normal 5, 20 and 40 minutes after electrical stimulation of the sympathetic center of the hypothalamus. No change or slight decreases in enzymic activity were produced by stimulation of the parasympathetic center. WALTER FRAJOLA (Chem. Abstr.).

Responses of Different Nerve-fiber Types to a Deficiency of Sodium. Crescitelli, Frederick, et al. [*Am. J. Physiol.*, **169**, 1–10 (1952); *cf. C. A.*, **43**, 2329*f*.]

In contrast to nerves with intact sheaths in the bullfrog, desheathed nerves in contact with solutions lacking NaCl lost excitability and the ability to conduct impulses in a matter of minutes. Rapid recovery took place when such excitable nerves were treated with

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Ringer solution. The B fibers were most sensitive to a lack of Na, blocking before most of the A fibers and before many of the C fibers. With solutions containing 0·011 M NaCl and B fiber activity disappeared with little loss of A fiber action and with only partial loss of the C responses. Li was the only substance able to substitute for Na in these reactions. The tetraethylammonium ion was incapable of maintaining or of restoring activity in the absence of Na ions. E. D. WALTER (Chem. Abstr.).

Experimental Hormonal Changes in the Cerebral Circulation. Baruk, H., et al. [*Rev. Neurol.*, **80**, 497–516 (1948); *Abstracts World Med.*, **5**, 742 (1949).]

Hormones were applied directly to the exposed cortex of the brains of animals, and also were injected intravenously. Folliculin injected intravenously caused slight vasodilation. Testosterone caused slight vasodilation in male animals. Acetylcholine produced extensive dilation, and was fatal in large doses. An anterior pituitary hormone preparation (prolan) first constricted the cerebral vessels, then produced a cataleptic condition. The use of hormones in treating psychoses is discussed.
W. C. TOBIE (Chem. Abstr.).

Biochemical Changes in Functional Activity of the Brain. Richter, D., and Dawson, R. M. C. [*Abstracts Communs., 1st Intern. Congr. Biochem. (Cambridge, Engl.)*, 602 (1949); *cf. C. A.*, **43**, 745*h*; **44**, 1185*h*.]

By use of radioactive P^{32} emotional excitement in the rat was shown to decrease the rate of synthesis of phospholipide by 25 per cent. W. C. TOBIE (Chem. Abstr.).

Tetanic Intoxication and Metabolism of Central Nervous Tissue. Seki, T., et al. [*Med. J. Osaka Univ.*, **2**, No. 2, 55–63 (1951).]

Injection of tetanus toxin (250–30,000 mouse MLD) into rabbits resulted in slight increases in the concentrations of glucose, β-hydroxybutyric acid, acetoacetic acid (I), pyruvic acid, and α-ketoglutaric acid in the blood. More pronounced increases were observed in the spinal fluid. The (I) concentration was five times normal in some animals. No change in acetone concentration was noted in either the blood or spinal fluid. When paralysis decreased, normal values were noted. W. F. (Chem. Abstr.).

Protein-bound Phosphorus Compounds in Peripheral Nerve during Wallerian Degeneration. Logan, J. E. [*Rev. Can. Biol.*, **11**, 70 (1952).]

The concentration of total nucleic acid in the sciatic nerve of the cat increased after either nerve section (neurotmesis) or nerve crush (axonotmesis). After either type of operation the total nucleic acid reached a maximum in 16 days and then fell gradually. Pentose nucleic acid (PNA) increased more rapidly than desoxyribonucleic acid (DNA), so that there was an increase in the PNA:DNA ratio. The concentration of "phosphoprotein" (orthophosphate liberated by hydrolysis with N KOH at 37° for 18 hours) fell throughout the course of the degeneration in the sectioned nerves, but in the crushed nerves it had commenced to rise by 96 days, and by 250 days it was almost equal to the concentration in the control nerves. The "inositide" P followed a course similar to that previously outlined for the phospholipide. After either type of operation there was little change during the first 8 days, followed by a rapid fall during the period 8–32 days. In the sectioned nerves the "inositide P" fell still further, whereas in the crushed nerves it had commenced to increase by 96 days and continued to rise during the entire period of study. Even 600 days after nerve crush the concentration of nucleic acid was still greater and the concentration of lipide P and "inositide P" was still less than in the control nerves. A. PAPINEAU-COUTURE (Chem. Abstr.).

Neurogenic Hypoglycemia. Brage, Diego. [**1**, 616–31 (1952).]

A theoretical discussion supplemented by a few case-reports and 84 references.
A. E. MEYER (Chem. Abstr.).

The Pathology and Biochemistry of Gargoylism. Henderson, J. L., et al. [*Arch. Disease Childhood*, **27**, 230–53 (1952).]

Three cases are reported, with differential lipide analyses of liver and spleen for one. Values were in the normal range. KATHRYN KNOWLTON (Chem Abstr.).

The Uptake and Turnover of Phosphate by the Brain. Lindberg, O. H. [*Abstracts Communs., 1st Intern. Congr. Biochem. (Cambridge, Engl.)*, 282–3 (1949).]

Phosphate (labelled with P^{32}) injected intravenously into rats is taken up only slightly by the brain (owing to the brain barrier), but injected subarachnoidally it is distributed throughout the brain in 2 minutes and remains in nearly constant amount for several hours. Orthophosphate entering the brain in this fashion is very quickly converted into organic compounds (which contain 70 per cent. of the radioactivity after 8 hours). The speed of turnover of adenosine triphosphate, creatine phosphate and adenylic acid was determined to be 40 γ P/min./gm. of brain tissue.
W. C. TOBIE (Chem. Abstr.).

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Neurosecretion and Occurrence of Hormones in the Human Midbrain. Hild, Walther, et al. Klin. Wochschr., **30**, 433–9 (1952).]

Vasopressin, adiuretin and oxytocin occur not only in the hypophysis, but also in the hypothalamus. The amount of neurosecretion observed histologically parallels the amount of hormone determined pharmacologically. ERICH HEFTMANN (Chem. Abstr.).

Physiology of Neuromuscular Transmission and Neuromuscular Block. Feldberg, W. [*Brit. Med. J.*, **1**, 967–76 (1951).]

MARSHALL E. DEUTSCH (Chem. Abstr.).

Lipides and Total Nitrogen in Central Nervous Tissues of the Human Fetus. Mihara, T. [*J. Biochem.* (*Japan*), **39**, 155–61 (1952).]

In the course of fetal growth from the 2nd to 10th month the contents of lipide fractions and total N were determined. Total N (mgm./100 mgm. dry weight) decreases considerably in cerebrum, spinal cord, and slightly in cerebellum. Total lipide increases markedly except in cerebellum. The increases in lipide fractions are as follows: in cerebrum, cholesterol (I) > cerebroside (II) > phospholipide (III), and among (III)-fractions, sphingomyelin (IV) > cephalin (V), lecithin (VI); in cerebellum only (IV) increases, and (VI) rather decreases; in medulla oblongata (II) > (I) > (III), and of (III), (VI) increases; in spinal cord (II) >> (I) > (III), and (VI) > (IV) > (V).

F. K. ANAN (Chem. Abstr.).

Various Types of Movements Induced from the Chemical Stimulation to the Cortex and other Gray Matters in Central Nervous System. Ito, S. [*J. Physiol. Soc. Japan*, **14**, 12 (1952).]

The injection of a small dose of various chemicals into the gray matter caused the following types of limb movements in dogs: Cortex: tonic convulsion was observed by the application of Na aspartate, clonic convulsion (I) by nicotine, picrotoxin, and Na glutamate, locomotive convulsion (II) by Na citrate. Thalamus: (I) by nicotine and $BaCl_2$, rigidity (III) by KCl and $BaCl_2$. Midbrain: (I) by Na oxalate, (II) by Na citrate and Na glutamate, (III) by Na glutamate and KCN. ITIRO TYUMA (Chem. Abstr.).

The Effect of Intermittent Anoxia on the Brain. Lucas, B. G. B., et al. [*J. Path. Bact.*, **64**, 265 (1952).]

Two "anoxic" abnormalities, enlarged pericellular and perivascular spaces, and chronic nerve-cell changes, were found to a greater or lesser extent in 48 normal guinea-pig brains. The chronic nerve-cell change could be associated with post-mortem mechanical injury to the brain, the cells of the cerebral cortex being most vulnerable, and often showing changes when the injury was some distance away. In 40 guinea-pigs subjected to the anoxia changes were detected in 2 animals only. In these there was an acute edematous cell change which was not present in animals allowed to survive for 10 days after the anoxic bouts. In another experiment in which 10 animals received 60 immersions in N within 8 hours no pronounced histological changes were found, although 3 animals showed subjective neurological disturbances for a short time.

JOHN T. MYERS (Chem. Abstr.).

Influence of Steroids on Cerebral Metabolism. Gordan, G. S., et al. [*Ann. N.Y. Acad. Sci.*, **54**, 575 (1951).]

The data demonstrate hormonal, and specifically steroidal control of cerebral metabolism in man and the rat. Measurements were made, by using differences in the composition of the cerebral arterio-venous circulating blood, of cerebral metabolic rates, cerebral utilization of glucose, and the response to desoxycorticosterone glucoside. Human subjects included healthy controls, patients with nonendocrine cerebral diseases, and others with hypopituitarism. W. H. FISHMAN (Chem. Abstr.).

Change in the Composition of the Adrenal Medullary Hormones by Hypothalamic Stimulation. Brucke, F., et al. [*Arch. intern. pharmacodynamie*, **88**, 407 (1952).]

Stimulation of the hypothalamus in cats increases the secretion of adrenaline but not of noradrenaline. Stimulation of the carotid sinus does not increase either.

M. L. C. BERNHEIM (Chem. Abstr.).

Chemistry of Phosphatides and Cerebrosides. Calmer, W. D., et al. [*Physiol. Rev.*, **32**, 168 (1952).]

The following compounds are discussed: Glycerophosphatides (phosphatidyl choline, phosphatidyl ethanclamine, phosphatidyl serine, acetal phospholipide and cardiolipin); inositol lipides (diphosphoinositides from brain, soybean, and corn oil); sphingolipins (sphingomyelins, cerebrosides, gangliosides, hematoside, straindin, cerebrin). Sphingo-

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lipides, discovered originally as components of nerve tissue, appear to be present in a wide variety of living organisms, and may have an important position in metabolism and function. An interesting substance, extracted from brain by $CHCl_3$-CH_3OH, is a new type of proteolipide which is soluble in organic solvents but not in H_2O. It is found in many tissues but it forms a large component of brain white matter. The compound is easily broken into constituent moieties, the protein no longer being extractable by the $CHCl_3$-CH_3OH mixture. S. MORGULIS (Chem. Abstr.).

Pathological Lesions in the Nervous System of the Duck Fed a Ration Deficient in Vitamin A. Rigdon, R. H. [*Arch. Path.*, **53**, 239 (1952).]

The primary lesion of vitamin A deficiency in young ducks appears to be degenerative change within the nerve cells themselves, and is not the result of compression of the cord by osseous tissue. M. L. C. BERNHEIM (Chem. Abstr.).

Activity of Acetylcholine System in Cerebral Cortex of Various Unanaesthetized Mammals. Tower, Donald B., et al. [*Amer. J. Physiol.*, **168**, 747 (1952).]

The activity of the acetylcholine (I) system per unit weight was measured in sample of cerebral cortex from normal, unanesthetized adult mice, rats, guinea-pigs, rabbits, cats, dogs, monkeys and beef and from human patients. No differences between different cortical areas in the same species were observed. The total (I) content of pieces of cerebral cortex decreased with time after excision. The rate of decrease was the same function of time for all species studied. The decrease depended on the condition of the tissue since excision, and did not occur if the animal had been eserinized or if the excised pieces were kept under an increased O tension. All the components of the (I) system measured decreased fairly regularly with ascending order on the phylogenetic scale. This decrease was related to the average total brain weight of each species and was the same function of the brain weight for all types of activity measured. A decrease in the average number of neurones per unit volume of cortex with increasing brain weight ran parallel to the decrease in activities of the (I) system. E. D. WALTER (Chem. Abstr.).

Action of Acetylcholine on the Central Motor System. Ito, S. [*J. Physiol. Soc. Japan*, **14**, 60 (1952).]

Convulsive effects of acetylcholine (I) on the central nervous systems of dogs were investigated. Application of (I) (concentration above 10 per cent.) to the motor area could induce clonic convulsion, but to any other parts of cortex except motor area (I) showed no effect. Injection of (I) (4 c.c. of 10 per cent. solution) into the carotid artery could not induce any reactions. ITIRO TYUMA (Chem. Abstr.).

Formation and Transformation of Phosphorylcholine in the Synthesis of Acetylcholine in Brain Extracts. Kometiani, P. A. [*Biokhimiya*, **17**, 108 (1952).]

During the synthesis of acetylcholine (I) from choline by an acetone extract of brain tissue, a difficulty soluble P compound accumulates, which has been identified as phosphorylcholine (II). (I) is obtained in very small yield from (II) by the action of brain extract. (II) in common with adenosine triphosphate, hexose phosphate and thiamine phosphate sensitizes the muscles toward (I). H. PRIESTLEY (Chem. Abstr.).

Effects of Choline, Acetate, and Citrate on the Activity of the Choline Acetylating System of Mammalian Brain. Balfour, W. E., et al. [*Nature*, **167**, 991–2 (1951); *cf. C. A.*, **43**, 9092*e*.]

Results from chemical determination of acetylcholine were higher than from bio-assay. Addition of citrate to the enzyme derived from a 16–25 per cent. $(NH_4)_2SO_4$ fraction was much more activating than addition of acetate; whereas acetate and citrate have nearly equal effects when a 16–36 per cent. fraction is used. This suggests the existence of two enzyme systems. KATHRYN D. KUCK (Chem. Abstr.).

Effect of Pituitary Hormones, Cortisone and Adrenalectomy on Some Aspects of Neuromuscular Function and Acetylcholine Synthesis. Torda, Clara, and Wolff, Harold G. [*Am. J. Physiol.*, **169**, 140–9 (1952); *cf. C. A.*, **44**, 9547*d*.]

Hypophysectomized animals showed a marked decrease of the ability of muscle to maintain the amplitude of action potential unaltered during repetitive indirect stimulation of the nerve, and a decrease of the ability of nerve tissue to synthesize acetylcholine. Administration of adrenocorticotropic hormone (ACTH) restored the ability of the neuromuscular system of hypophysectomized animals to maintain the action potential unaltered during repetitive stimulation. ACTH increased the ability of the brain of non-operated and hypophysectomized animals to synthesize acetylcholine. Cortisone acetate induced qualitatively similar but quantitatively less effect than did ACTH. The ability of the muscle to maintain the amplitude of action potential unaltered during both repetitive indirect and direct stimulation and the ability of the brain to synthesize acetylcholine was not significantly modified by pitocin and pitressin in both non-operated and hypophysec-

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tomized rats. Administration of thyrotropic hormone of the pituitary gland (TSH), thyroxine and growth hormone induced an additional impairment of the maintenance of action potential. A parallelism seems to exist between acetylcholine synthesis and neuromuscular function. The parallelism between neuromuscular function and K content is not complete. It is suggested that the pituitary glands maintain both the ability to maintain the amplitude of action potential unaltered for a period of time during repetitive stimulation and an optimal acetylcholine synthesis through the release of ACTH.

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

Effects of Adrenocorticotropic Hormone, Cortisone Acetate and 17-Hydroxycorticosterone-21-acetate on Acetylcholine Metabolism. Torda, Clara, and Wolff, Harold G. [*Am. J. Physiol.*, **169**, 150–8 (1952); *cf. C. A.*, **44**, 9547*d*.]

Prolonged administration of ACTH *in vivo* increased the ability of the brain to synthesize acetylcholine. This increase averaged 60 per cent. in hypophysectomized and non-operated rats, and 20 per cent, in adrenalectomized rats on forced salt intake. Addition of ACTH to choline acetylase *in vitro* failed to increase the activity of the enzyme, suggesting that ACTH increases the synthesis of acetylcholine mainly through an increased relative concentration of enzyme potentiators. The effect of ACTH in increasing acetylcholine synthesis depends on both an adrenal and an extra-adrenal factor. Cortisone and compound F did not fully duplicate the effects of ACTH on acetylcholine synthesis. Hypophysectomy resulted in an average decrease of 50 per cent. of the ability of the brain to synthesize acetylcholine. Adrenalectomy did not significantly impair the ability of brain to synthesize acetylcholine in rats with restricted activity. The activity of acetylcholine esterase was slightly increased after prolonged administration of ACTH and cortisone, and hypophysectomy. The increase was questionable after a single injection of ACTH, cortisone, and compond F. ACTH *in vitro* did not significantly modify the sensitivity of effector cells to chemical stimuli. Cortisone increased the sensitivity of effector cells to chemical stimuli.

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

Effect of Intraventricular (Cerebral) Acetylcholine, Choline Esterase, and Related compounds in Normal and "Catatonic" Cats. Sherwood, Stephen L., et al. [***Nature*, 169**, 157 (1952).]

Normal cats exhibit agitation and hallicinatory behaviour; they salivate profusely and defecate within a few minutes after injection of 0·5–2 mgm. acetylcholine (I); they become normal within 1 hour. Mecholy (II) and carbachol (III) have a more marked and longer effect. When cats with syndromes identical with human catatonia are repeatedly injected with partially purified cholinesterase (activity: 2 pH units/hr./ml.) they improve after transient remission. (I) produces recruitment in cats paralyzed by erythroidine; antagonists of (I) diminish this effect.

I. Z. ROBERTS (Chem. Abstr.).

Action of Snake Venom on Acetylcholine Synthesis in Brain. Braganca, B. M., et al. [*Nature*, **169**, 695 (1952).].

Cobra venom, heated to inactivate all the enzymes present except lecithinase, still retained its toxicity to the animal. The heated venom (I) caused a rapid breakdown of bound acetylcholine (II) into the free ester. (I) also caused a pronounced increase in the rate of synthesis of (II) by brain homogenate, the increase being stimulated by the presence of excess K ions. (I) had no inhibitory effect on the acetylation of choline or of sulfanilamide in tissue extracts in the presence of adenosine triphosphate (ATP). It was concluded that a lecithinase in (I) initially affects (II) synthesis in respiring brain homogenates, either by accelerating the rate-limiting step involved in the formation of free from bound (II), or by changing the permeability of the mitochondria for ATP. A decrease in (II) synthesis occurs when, ultimately, the lecithinase brings about a marked diminution in respiratory activity and hence in the rate of formation of ATP.

J. D. TAYLOR (Chem. Abstr.).

Effect of Choline on Neuromuscular Transmission in the Cat. Hutter, O. F. [*J. Physiol.*, **117**, 241 (1952).]

Intravenous injection of 7 mgm. of choline chloride (I)/kgm. into decerebrate or chloralose-anaesthetized cats resulted in a brief potentiation of tibialis contractions resulting from single supramaximal nerve volleys applied by the method of Brown and Burns (*Proc. Roy. Soc.*, **B136**, 182 (1949); 14 mgm. doses increased the potentiation and produced a 30-second fibrillation, followed by a transient depression of twitches. Further increases in doses resulted in a prolonged depression after an only momentary potentiation. Close arterial injection of (I) had similar effects, but muscle contraction also resulted. Intravenous injections of (I) restored neuro-muscular transmission in preparations blocked by d-tubocurarine, completely decurarizing in doses of 20 mgm./kgm.; higher doses not only decurarized but also caused neuromuscular block. Close arterial injections produced similar decurarizing effects. End-plate potential records from the gracilis by the method of Brown and Burns (*J. Physiol.* (*London*), **108**, 54P (1949)) indicated that this decurarization was accompanied by an increase in the peak voltage and a lowering in the threshold voltage for initiation of propagation response. Effects of intravenous injection of 7 or

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15 mgm./kgm. of (I) were greatly potentiated by 0·2 mg. physostigmine sulfate (II), itself having little effect *per se*. Doses of (II) large enough to potentiate responses to single nerve volleys were reduced, however, by 1 mgm./kgm. of (I), with 3 mgm./kgm. doses producing block. (I) may be considered the prototype of quaternary NH_4 compounds, causing neuro-muscular block by depolarization at the motor end-plate. The increase in end-plate potential by (I) may be due to the increased output of acetylcholine from motor nerve-endings. MORRIS ROCKSTEIN (Chem. Abstr.).

2. Pharmacology and Treatment.

The Effect of Methonium compounds on Nicotine Convulsions. Laurence, D. R., et al. [*Brit. J. Pharmacol.*, **7**, 80–4 (1952).]

Pentahexa- and heptamethonium antagonized nicotine convulsions in mice and rats, while tri- and tetramethonium and Et_4N+ showed no such antagonism. Hexamethonium did not antagonize convulsions caused by lobeline, leptazol, cocaine, strychnine or picrotoxin. RICHARD F. RILEY (Chem. Abstr.).

Mysoline: A New Drug in the Treatment of Epilepsy. Handley, R., et al. [*Lancet*, **262**, 742–4 (1952).]

5-Phenyl-5-ethylhexahydro-4,6-pyrimidinedione was given to 40 patients who were continuing to have major epilepsy despite other forms of treatment. Daily doses of up to 1·6 gm. produced no serious side effects or sleepiness. Attacks were reduced in 80 per cent. and abolished in 30 per cent. BARBARA R. MURRAY (Chem. Abstr.).

The Changes in Plasma Potassium Level after Adrenaline in Normal Human Beings and in Persons with Epilepsy. Drury, Abraham, et al. [*J. Clin. Invest.*, **31**, 440–4 (1952).]

The changes in plasma levels of K, Na and glucose, at 4, 20, 60, and 120 minutes after intramuscular injection of 0·4 mgm. of adrenaline were determined in a group of normal human subjects and in a group with idiopathic epilepsy. After the adrenaline there was a significant fall in plasma K between 4 and 20 minutes in the epileptic but not in the normal group. The plasma Na was not affected in either group.
JOHN T. MYERS (Chem. Abstr.).

Experimental and Clinical Study of the Action of Paraldehyde on the Central Nervous System, and Especially of its Anticonvulsant Effect. De Elío, F. J., et al. [*Rev. Clin. Espan.*, **30**, 289–95 (1948); *J. Neurol. Neurosurg. Psychiat.*, **12**, 19 *et seq.* (1949); *Abstracts World Med.*, **5**, 528–9 (1949); *Arch. Inst. Farmacol. Exptl. Med.* [*Madrid*), **1**, 5–23 (1949).] W. C. TOBIE (Chem. Abstr.).

Action of Metrazole on the Central Nervous System in Embryonic and Postnatal Periods of Growth. Tsobkallo, G. I. [*Fiziol. Zhur. S.S.S.R.*, **37**, 727–31 (1951).]

Metrazole causes a stimulating effect on the central nervous system of rabbits. The magnitude of the effect is directly related to the degree of development of function of the nervous system in ontogenesis. The adult reaction is attained at about 50 days of age.
G. M. KOSOLAPOFF (Chem. Abstr.).

The Behaviour of Certain Substances in the Treatment of Convulsions Produced by Picrotoxin and in Cryoepilepsy. Pereira, Nuno Alvares, et al. [*Rev. brasil, farm.*, **32**, 185–92 (1951).]

A suspension of phenylacetylurea in 2 per cent. gum arabic, given orally, protected white rats against convulsions from subsequently administered picrotoxin and against cryoepilepsy induced by cooling of the isolated medulla. Various other synthetic hydantoin derivatives given by injection were not as effective in these cases, but gave satisfactory protection against convulsions from electric shock. P. Y. JACKSON (Chem. Abstr.).

The Functional Importance of the Quaternary Nitrogen Atoms in Flaxedil: A Study in Structure-activity Relations. Pelikan, Edward, et al. [*J. Pharmacol. Exptl. Therap.*, **104**, 354–62 (1952).]

The effects of 2,6-bis-(diethylaminoethoxy)benzophenone-di-Etl (I) and flaxedil on neuromuscular transmission were qualitatively indistinguishable from those of tubocurarine. In frogs, rabbits, mice and dogs (I) was more potent than flaxedil in producing neuromuscular block but less potent than tubocurarine. In doses equipotent on skeletal muscle (I) was more potent than flaxedil in preventing the effects of vagus stimulation on the heart. The onium groups in the 1 and 3 positions on the benzene ring are responsible for the curare-like action of flaxedil. It is suggested that the quaternary N atom in the 2 position has the chief function of maintaining the onium groups in 1 and 3 positions at a distance from each other nearly optimal for curarizing activity. The electrically charged atom may have only a steric or space-occupying function in the drug molecule. An

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electrically neutral group such as the benzoyl group of (I) may have a similar or even greater effect by virtue of intramolecule steric hindrance.

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

Metabolic Demethylation of Mesantoin. Butler, Thomas C. [*J. Pharmacol. Exptl. Therap.*, **104**, 299–308 (1952).]

After administration of mesantoin to dogs and to human subjects, nirvanol was isolated from the urine. Demethylation of mesantoin is substantially complete in the dog. The optical isomers of nirvanol are excreted in unequal amounts. In dog urine there is a slight preponderance of the I isomer and in human urine it is largely the I isomer. The extent is discussed to which the therapeutic and toxic effects of mesantoin can be attributed to the nirvanol produced from it. The ultraviolet-absorption curves, solubilities, and other physical properties of mesantoin and nirvanol are given.

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

Biochemical Factors Related to Convulsions. Richter, D., et al. [*Abstracts Communs., 1st Intern. Congr. Biochem. (Cambridge, Engl.)*, 181 (1949).]

Electric-shock treatment or convulsant drugs cause liberation of free NH_3 in the brain. No NH_3 appears in the cerebrospinal fluid of epileptics when the decomposition of glutamine is prevented. Acetylcholine is usually high before epileptiform seizures, but decreases rapidly during convulsions. W. C. TOBIE (Chem. Abstr.).

Changes in Glycogen and Lactate in the Central Nervous System during Convulsions. Chance, M. R. A. [*Abstracts Communs., 1st Intern. Congr. Biochem. (Cambridge, Engl.)*, 603 (1949).]

Nervous tissue contains 0·075–0·25 per cent. glycogen (I). The amount increases in convulsions caused by drugs, electrical stimulation, or lack of O. If these procedures are not applied in an intensity sufficient to cause convulsions, the concentration of (I) is not affected. The amount of lactate varies in response to several factors affecting central nervous activity. W. C. TOBIE (Chem. Abstr.).

Inactivation of Convulsants by Hexachlorocyclohexane. Herken, Hans, et al. [*Arch. exptl. Path. u. Pharmakol.*, **215**, 217–30 (1952).]

Hexachlorocyclohexane (I) prevents the generalized convulsions produced by metrazole, picrotoxin, or nikethamide. Because the convulsive effects of these three analeptics can be differentiated, it indicates that the same functional areas of the central nervous system are not involved. The effects of (I) are probably mediated outside the spinal cord, for the convulsion-inhibitory action disappears after supratentorial decerebration. The characteristic fibrillatory and fasciculatory twitchings of muscles produced by prostigmine is influenced by (I), but not those produced by physostigmine. This difference is not due to anticholinesterase activity, but more likely to differences in the central effects of these two drugs. A new method is thus available to differentiate the effects of convulsants by means of chemical blockade of certain brain functions with the isomeric hexachlorocyclohexanes. C. J. CARR (Chem. Abstr.).

Anticonvulsant Action of Methylparafynol (Dormison). Schaffarzick, R. W., et al. [*Stanford Med. Bull.*, **10**, 106 (1952).]

Methylparafynol (3-methyl-1-pentyn-3-ol) is of low toxicity, has hypnotic action, and prevents convulsions in animals and man. The effective anticonvulsant dose orally in rats is 48 mgm./kgm., the ataxia-producing dose 102 mgm./kgm., and the sleep-producing dose is 250 mgm./kgm. One hundred and fifty mgm./kgm. dosage shows anticonvulsant action, as measured by reduction of the tonic-extensor phase of supramaximal seizures, for 8 hours or more. When given with phenobarbital there is potentiation of their combined anticonvulsant actions. Six patients with epilepsy have been treated with 250 mgm. four times daily. Good control was obtained in 4, one was worse, and one had too short treatment. Some irritability and insomnia were noted during 5 weeks on the drug.

RUSSEL O. BOWMAN (Chem. Abstr.).

A New Curare Antagonist in Electroshock Therapy and in Clinical Anesthesia. Faulconer, A., Jr., et al. [*Neurology*, **2**, 226 (1952); *Collected Papers Mayo Clinic and Foundation*, **43**, 679–87 (1952).]

Electromyographic studies revealed that maximum change occurs approximately 5 minutes after intravenous administration of curare, that the normal recovery time is in excess of 30 minutes, that intravenous administration of 0·5 mgm. prostigmine 5 minutes after curare accelerates recovery very slightly, that administration of 2·5 mgm. tensilon for each 3 mgm. curare 5 minutes after curare produces in less than 90 seconds a substantial return of the muscle action potential which is maintained satisfactorily, and that electromyographic restoration of function is accompanied by clinical manifestations of decurarization. H. L. MASON (Chem. Abstr.).

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Protection Afforded Mice by Some Anticonvulsants. Radouco, C., et al. [*Arch. sci.* (*Soc. phys. hist. nat. Geneve*), **4**, 408 (1951).]

The protective effect of various anticonvulsants has been determined against lethal doses of strychnine sulfate. A therapeutic index (I) has been calculated which represents the ratio of the dose required to kill 5 per cent. of the animals to the dose required to protect 95 per cent. The highest (I) was obtained with a mixture of phenylethylacetylurea (II) and phenylacetylurea (III), followed by (II) alone, dimethyldithiohydantoin (thiomedan), phenylethylmalonylurea (phenobarbital), ethylphenylmethylhydantoin (mesantoin), trimethyloxazolidinedione (tridione) and (III) alone.

H. I. CHINN (Chem. Abstr.).

Effect of Adrenocortical Steroids and Adrenocorticotropic Hormone (ACTH) on Electroshock Seizure Threshold (EST). Woodbury, D. M., et al. [*J. Pharmacol. Exptl. Therap.*, **105** (1952).]

Daily injection of a small dose of desoxycorticosterone acetate, 11-desoxy-17-hydroxycorticosterone acetate (compound S), or ACTH elevated the EST of rats. Corticosterone acetate had no significant effect. The EST was slightly lowered by 11-dehydrocorticosterone acetate, considerably lowered by 17-hydroxycorticosterone acetate (compound F), and markedly lowered by cortisone acetate. L. E. GILSON (Chem. Abstr.).

Effects of Chronic Anticonvulsant Administration on Cortisone-induced Brain Hyperexcitability. Fingl, E., et al. [*J. Pharmacol. Exptl. Therap.*, **105**, 37 (1952).]

Repeated administration of diphenylhydantoin or barbiturates raised the cortisone-lowered threshold to electroshock seizures in rats. L. E. GILSON (Chem. Abstr.).

Effects of Chronic Administration of Anticonvulsant Drugs, Alone and in Combination with Desoxycorticosterone, on Electroshock Seizure Threshold (EST) and Tissue Electrolytes. Woodbury, D. M., et al. [*J. Pharmacol. Exptl. Therap.*, **105**, 46 (1952).]

Chronic administration of diphenylhydantoin raised the EST of rats 15 per cent.; single doses were ineffective. Phenobarbital (chronic) raised the EST 28 per cent. Desoxycorticosterone acetate (DCA) had a slight effect alone, and given with either of the above two drugs markedly increased their effect on EST. Trimethadione alone had no effect on EST but slightly increased the effect of DCA. Changes in H_2O, Na, K, and Cl in various tissues produced by the above treatments were determined. No significant influence on brain electrolytes was noted and in other tissues the effects were slight.

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

Effect of Adrenaline, Glucose, and Certain Steroids on Fatal Convulsive Seizures in Mice. Vicari, E. M., et al. [*Proc. Soc. Exptl. Biol. Med.*, **80**, 47 (1952).]

In a susceptible strain of inbread DBA mice the occurrence of fatal audiogenic seizures was significantly decreased by administration of adrenaline, glucose, cortin, cortisone, testosterone, estradiol, and pregnenolone. The last three compounds were the most effective, especially testosterone. L. E. GILSON (Chem. Abstr.).

Gemonal, A New Drug for Convulsive and Related Disorders. Perlstein, A. M. [*Pediatrics*, **5**, 448 (1950).]

In animal experiments gemonal 50 mgm./kgm. given orally is protective against fatal doses of metrazole without the sedation that is typical with phenobarbital. Lethal dose of gemonal in mice and cats was 250 mgm./kgm. body weight. The human dose recommended was 1·5–2 times that of phenobarbital. STEVEN CARSON (Chem. Abstr.).

Effect of Glutamic Acid on Mental Function: Pilot Study. Kerr, W. J., Jr., et al. [*Pediatrics*, **5**, 645–8 (1950).]

Large doses of L-glutamic acid given to normal children produced no significant increase in testable intelligence compared to those receiving a placebo. Results did not substantiate previous reports of increased measurable intelligence. The IQ point gain of both were in the standardized test-retest gain values. Attitudinal effects were minimized by carefully controlled procedures described. STEVEN CARSON (Chem. Abstr.).

Benzedrine and Dexedrine in the Treatment of Children's Behavior Disorders. Bradley, C. [*Pediatrics*, **5**, 24–38 (1950).]

The effect of benzedrine (I) (dl-amphetamine sulfate) and dexedrine (II) (d-amphetamine sulfate) upon the behavior of maladjusted children was studied in a controlled children's psychiatric hospital. Maladjusted behavior of restlessness, nervousness, hyperactivity and distractability became subdued with (I) and (II) treatment and more successful participation in children's activities was seen. Side effects noted with this therapy were depressant effects upon appetite, frequent production of insomnia, and a markedly less pressor effect which may usually be disregarded. Oral doses of 20 mgm. for (I) and 10 mgm.

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for (II) were found to be optimal in studies of 7-day duration and longer periods. Cases treated were of 4 different diagnostic groups; behavior disorders of psychogenic origin (I) improved 70·3 per cent. and (I) and (II) were equally effective. In behavior problems associated with convulsive disorders (I)-treated cases showed 76·9 per cent. improvement and (II)-treated cases showed 45·4 per cent. improvement with (I) being the drug of choice. In psychopathic personalities (I)-treated patients showed 84 per cent. improvement with both (I) and (II) being equally effective. In children with schizoid personalities 63 per cent. showed improvement with (I) and 50 per cent. showed it with (II), there being little choice between the two. (I)-treated children showed no developing tolerance to the drug, with no habituation to (I) seen in children after 12 years of use. Peripheral vasoconstriction was seen quite often for 3–4 hours after treatment. One-third showed best response to (I), the same number to (II), and the same number showed equal response to both, whether favorable or unfavorable. The behavior responses after (I) and (II) therapy are discussed. STEVEN CARSON (Chem. Abstr.).

Modification in Responses to Sodium of Nerve Fibers Treated with Drugs. Crescitelli, Frederick, et al. [*Am. J. Physiol.*, **169**, 638–48 (1952).]

Experiments showed a significant interaction between certain nerve-blocking drugs and the concentration of Na ions in the external solution. The differential action on the different fiber types of drugs, like amyl carbamate and cocaine, is explained in terms of an interference with a Na mechanism in nerve fibers which have different Na requirements for conduction. E. D. WALTER (Chem. Absts.).

The Central Depressant Properties of o-Toloxypropyl Carbamates. Berger, F. M. [*J. Pharmacol. Exptl. Therap.*, **104**, 468–73 (1952).]

The paralyzing activity, toxicity, and anticonvulsant action of mephenesin and several closely related o-toloxypropanol derivates and their carbamate esters were studied. The carbamates of 3-(o-toloxy)-1, 2-propanediol and 1-(o-toloxy)-2-propanol had weaker activities than the parent compounds. The carbamate of 3-(o-toloxy)-1-isopropoxy-2-propanol had a weaker paralyzing action than the parent compound. None of the compounds produced paralysis of significantly longer duration than did mephenesin. The acute toxicity of all the carbamate derivatives was lower than that of the parent compounds. The anticonvulsant activity of the carbamates was greater in intensity but of equally short duration as the parent compounds. L. E. GILSON (Chem. Abstr.).

Treatment of Paralysis Agitans with New Preparations. Winther, K. [*Ugeskrift Laeger*, **112**, 745–8 (1950).]

The preparations used for treatment of Parkinsonism were parpanit, diparcol, and phenergan. Parpanit had a better effect on tremor but a lesser effect on rigidity than the other drugs, but its side-effects were more pronounced. B. A. (Chem. Abstr.).

Side Reactions of Narcotics and Hypnotics. Hofmann, Heinrich, and Held, Ursula. [*Pharmazie*, **6**, 646–52 (1951).]

A review with 230 references. EDWARD H. SHEERS (Chem. Abstr.).

Some Aspects of the Human Pharmacology of Tetraethylthiuramdisulfide (Antabuse)-alcohol Reactions. Hine, Charles H., et al. [*J. Clin. Invest.*, **31**, 317–25 (1952).]

A study was made of 51 problem drinkers following a test drink of alcohol prior to and after antabuse therapy. Antabuse did not alter normal blood-alcohol levels. It did not appear to affect either the rate of absorption or the metabolism of alcohol. It increased the normal resting-blood acetaldehyde level. There was a significant increase in acetaldehyde in the antabuse-treated subject as compared to untreated patients after ingestion of alcohol. Acetaldehyde may be the toxic agent responsible for the most serious consequences of the alcohol-antabuse reaction. Because of the often dangerous cardiovascular effects of antabuse it should be used cautiously. JOHN T. MYERS (Chem. Abstr.).

Variations in the Pyruvic Acid and Acetaldehyde Contents of the Blood under the Influence of Alcohol. Lecoq, Raoul. [*Compt. Rend. Soc. Biol.*, **145**, 1603–6 (1951).]

Administration of EtOH to rabbits pretreated with tetraethylthiuram disulfide (TTD) caused a small increase in blood AcH and a large increase in pyruvic acid (maximum value observed was 27 mgm./l.). Blood from 10 normal human subjects given neither EtOH nor TTD contained 0·3–3·5, av. 1·6 mgm./l., of AcH and 3·0–6·2, av. 5·0 mgm./l. of pyruvic acid. Blood from 10 chronic alcoholic patients (not given TTD) contained 1·3–10·1, av. 5·1 mgm./l., of AcH and 5·4–11·6., av. 7·8 mgm./l., of pyruvic acid.

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

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Action of Histamine and Synthetic Antihistaminics in the Ethanol-tetraethylthiuram Disulfide Effect. Lecoq, Raoul, et al. [*Compt. Rend. Soc. Biol.*, **145**, 1606–9 (1951).]

As determined by chronaximetric experiments on rats, histamine (I) and acetylcholine decrease, and adrenaline increases, the nervous effects of EtOH. Tetraethylthiuram disulfide (TTD) alone counteracts the nervous effects of adrenaline, has no influence on the effects of acetylcholine, and augments the nervous effects of (I). TTD followed by EtOH very markedly augments the nervous effects of (I); this action is partially suppressed by relatively large doses of the antihistaminic, phenergan.

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

Accumulation of Acetaldehyde in Blood after Administration of Antabuse and Alcohol. Smith, H. W. [*Rev. Can. Biol.*, **9**, 95 (1950).]

AcH accumulates markedly in the blood when alcohol is ingested by persons who have had several doses of antabuse (tetraethylthiuram disulfide). This also occurred in mice, rats, guinea-pigs, cats, and dogs. As the dose of alcohol was increased, the response was intensified up to a limit, which appeared to be caused by gastric retention of a large portion of the very large doses of alcohol. Other considerations of the data indicate that the major factor in determining the intensity of the antabuse-alcohol response is the dose of alcohol.

B. A. (Chem. Abstr.).

The Pharmacological Antagonism of Sodium Succinate and Barbiturates. Mezzich, R. G. [*Actas y trabajos congr. peruano quim.*, 3° *Congr., Lima, Peru* (**1**), 394–400 (1949); *cf. C. A.*, **45**, 2099*i*.]

The pharmacological properties of succinates are discussed. In experiments on 25 rabbits, 1 g. Na succinate/kg. body weight prevented death by nembutal (130–180 mg./kg.) in 9 of 14 cases. Without succinate, all 11 controls succumbed to the same amounts of nembutal. Na succinate has strong analeptic properties which decline after solutions have been allowed to stand for several days.

The Pharmacological Antagonism of Barbiturates and Strychnine. Cornejo, J. C. [*Actas y trabajos congr. peruano quim.*, 3° *Congr., Lima, Peru* (**1**), 415 (1949).]

Strychnine is effective against lethal doses of barbiturates, but is ineffective if the dose much exceeds a minimum lethal dose. W. C. TOBIE (Chem. Abstr.).

Selective Reponse to Narcotics of Spinal Centres with Different Central Delays. Petersen, I. [*Acta Physiol. Scand.*, **25**, *Suppl.* 91, 44 pp. (1951).]

When a narcotic (ether, dial, EtOH) is administered to a decerebrate preparation the thresholds for pyramidal activation of different muscle groups increase in the following order: Distal muscles of hind leg, proximal muscles of hind leg, distal muscles of fore limb, proximal muscles of fore limb. This differential action is independent of blood-pressure fall. It was also shown that flexor reflexes evoked by natural stimulation of skin receptors of the fore limbs are more resistant to narcotics than those in the hind limbs, whereas tendon reflexes are equally resistant in both. S. MORGULIS (Chem. Abstr.).

The Potentiating Effects of Various Drugs upon the Action of Hypnotics and Analgesics. (I), (II). The Effects upon the Evipan Action. The Effects upon the Morphine Action. Fujimura, H., et al. [*Bull. Inst. Chem. Research. Kyoto Univ.*, **25**, 36–49 (1951).]

The hypnotic action of evipan was increased in duration (and also in intensity) by 63–80 per cent by simultaneous subcutaneous injection of some antihistaminics in mice. 4′-Chlorobenadryl was 10 per cent. more effective than benadryl. Benadryl also increased the activity of barbital. With several local anesthetics except cocaine, their increasing effects were not always parallel to their anesthetic activities. Those having N,N-dimethyl radical seemed more effective than those having N,N-diethyl radical. Evipan was potentiated by aminopyrine and antipyrine, the former being more effective than the latter. NaBr and tridione (3,5,5-trimethyl-2,4-oxazolidinedione) did so by 40 and 70 per cent. respectively. Myanesin and hustosil (1,2-dihydroxy-3-(2-methoxyphenoxy)propane) had similar actions. The analgesic action of morphine was potentiated by benadryl and other antihistaminics, several local anesthetics except percaine and cocaine. Evipan, NaBr, tridione, myanesin, and hustosil did not potentiate morphine even with the addition of benadryl and antipyrine. Tutocaine and aminopyrine had some analgesic actions like morphine. A discussion from the viewpoint of chemical structure was given.

S. KITAOKA (Chem. Abstr.).

The Mechanism of the Action of Analgesics. (I): The Action of Anesthetics and Analgesics upon the Electrophysiological Phenomenon of the Brain. Yasuhara, Motohiro. [*Bull. Inst. Chem. Research. Kyoto Univ.*, **28**, 83 (1952).]

A special electric response in the brain cortex is caused by stimulation of the sciatic nerve. This may be related to the sense of pain. The electric response was determined using a cathode-ray oscillograph and cathode-ray-coupled amplifier and an AgCl electrode

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placed on sensorimotor cortices or the hypothalamus of rabbits and cats. The electroencephalogram always showed a large deviation shortly after stimulation of the sciatic as well as the median nerve. This deviation faded away when animals were anesthetized with anesthetics or hypnotics such as ether, chloral hydrate, urethan, myanesin. Barbiturate derivatives such as amytal, dial, luminal, evipan, and pentothal-Na did not exert such action but only facilitated the revelation of this response as well as lessening the other deviation and levelling out the curves. When narcosis by barbiturate was so deep that the base line of the electroencephalogram was quite smooth, a small deviation preceded the large one. Morphine also abolished the large deviation like ether, etc., in cats. These electric responses of the brain were not found in animals which were spinal anesthetized with local anesthetics such as procaine, cocaine, and percamin. Ether, chloral hydrate, myanesin, procaine, cocaine and morphine antagonized the action of barbiturates. Central stimulants such as strychnine, camphor, caffeine as well as pervitine were ineffective in reproducing the large deviation once abolished by ether.

SHOZABURO KITAOKA (Chem. Abstr.).

The Effects of l-*Adrenaline and* l-*Noradrenaline upon Cerebral Circulation and Metabolism in Man. King, Benton, D., et al.* [*J. Clin. Invest.*, **31**, 273–9 (1952).]

The effects of continuous intravenous infusions of synthetic l-adrenaline and l-noradrenaline on arterial blood-pressure and pulse rate, arterial and internal jugular blood gases, and cerebral blood-flow, O consumption and vascular resistance, were studied in man. Adrenaline produced an increase in mean arterial blood-pressure and cerebral blood-flow without a significant change in cerebrovascular resistance, and also an increase in cerebral O consumption. l-Noradrenaline, a more potent pressor drug, produced a marked increase in cerebrovascular resistance and a decrease in cerebral blood-flow despite a substantial increase in mean arterial blood-pressure. Cerebral O consumption was not significantly altered.

JOHN T. MYERS (Chem. Abstr.).

The Effect of Theophylline with Ethylenediamine (Aminophylline) on Cerebral Hemodynamics in the Presence of Cardiac Failure with and without Cheyne-Stokes Respiration. Moyer, John H., et al. [*J. Clin. Invest.*, **31**, 267–72 (1952).]

Aminophylline (I) increases the cerebrovascular resistance in patients with cardiac failure and decreases the cerebral blood-flow. Although the arterial blood-CO_2 content usually decreases, the changes are not statistically significant. The jugular-CO_2 content either increases or does not change. Therefore the depression of cerebral blood-flow is not a reflection of decreased CO_2 in the brain. It is more likely a direct effect of (I) on the cerebral vessels. Although the arteriovenous-O differences increase as a partial compensation for the decreased blood-flow, compensation is inadequate. Therefore the cerebral O consumption seems to decrease when (I) is given in cardiac failure. There is no difference in the overall cerebral hemodynamic response of patients in cardiac failure which manifest Cheyne-Stokes respiration and those which do not. The arrest of Cheyne-Stokes respiration after (I) is probably due to a stimulating effect on the respiratory centre. This may be a direct effect, or an indirect effect secondary to the depressed cerebral circulation and the resultant rise in medullary tissue CO_2.

JOHN T. MYERS (Chem. Abstr.).

Poisoning by Barbiturates. Success of Conservative Treatment. Locket, S., et al. [*Lancet*, **262**, 580–2 (1952).]

Analyses of 84 cases with 2 deaths. Recovery after 13·3 gm. of sodium iso-amethyl barbiturate is reported.

BARBARA R. MURRAY (Chem. Abstr.).

Effect of Chemical and Electrical Narcosis on Phagocytosis. Sherstneva, O. S. [*Arkh. Patol.*, **14**, No. 2, 78–81 (1952).]

Chloral hydrate narcosis in rabbits causes an immediate lowering by 14–15 per cent. of the phagocytic properties of the blood; this disappears with the emergence from narcosis. Electrical narcosis sharply lowers the phagocytic properties as well (as much as 22 per cent.) The chemical action appears to result from narcotic block of the central nervous system.

G. M. KOSOLAPOFF (Chem. Abstr.).

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