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The Psychological Response to ACTH, Cortisone, Hydro-Cortisone and Related Steroid Substances.

It has become evident to everyone who has had experience with ACTH, cortisone and related agents that they are potent substances with widespread direct and indirect effects. The number of clinical conditions for which they are being used involves a large group of patients who are otherwise foredoomed at least to prolonged convalescence and incidentally to much psychologic trauma. Even though it is generally agreed that these agents are not a panacea, nevertheless the discovery of their clinical application is a large step forward in the progress of medicine. Like all advances this one is not without hazards. The clinical psychiatrist is required to be familiar with some of these, for many are within his sphere of competence. There are implications for the future of psychiatry that promise much. Here for the first time are agents that can modify ego defences without affecting consciousness. Here for the first time are agents that affect the vital physiologic buffers that have to do with adaptation. These facts bespeak clinical as well as theoretic potentialities for the long-awaited reunion of psychology and physiology.

(Authors' abstr.)

Nor-Epinephrine-like and Epinephrine-like Substances in Psychotic and Psychoneurotic Patients.

1. Sixty-three patients with elevated blood pressures who were routine admissions to the Boston Psychopathic Hospital were given a standardized dose of mecholyl intramuscularly. On the basis of their blood-pressure reactions to the drug during a stated observation period the patients could be divided into two groups: (1) Type A were those in which following the injection of the mecholyl the blood pressure remained below the pre-injection level throughout the observation period. (On the basis of previous experimentation this was interpreted as indicating excessive secretion of an epinephrine-like substance.) (2) Group B were those in which following the injection of mecholyl the blood pressure returned to the pre-injection level within the observation period. (On the basis of previous experimentation this was interpreted as indicating excessive secretion of a nor-

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epinephrine-like substance.) When these two groups were compared in regard to two other variables, the maximum fall in blood pressure after mecholyl, and the area between the mecholyl reaction and the basal blood pressure, the difference between the types was found to be significant at better than the ·01 level.

2. Thirty-nine of 42 cases showing evidence interpreted as indicating excessive secretion of an epinephrine-like substance improved with electric shock therapy. In contrast to this, only 3 of 21 cases showing evidence interpreted as indicating excessive secretion of nor-epinephrine-like substance responded to electric shock. This was significant at better than the ·01 level.

3. The great majority of the cases interpreted as showing excessive secretion of an epinephrine-like substance were diagnosed as manic-depressive or involutional psychosis, whereas the majority of the cases interpreted as showing excessive secretion of a nor-epinephrine-like substance were diagnosed schizophrenia. The response to electric shock followed the automatic type rather than diagnostic category, as the majority of the schizophrenic patients who showed evidence interpreted as indicating excessive secretion of an epinephrine-like substance responded to electric shock therapy.

4. A discussion of the contrasting physiological effects of the two products of the adrenal medulla was made, and the suggestion was offered that the manic-depressive and involutional psychoses represent in man the counterpart of Cannon's fight-flight reaction in cats. (Authors' abstr.)

Parental Deprivation and the "Broken Home" in Dementia Praecox and Other Mental Disorders.

The incidence of parental deprivation and "broken homes" was found to be very similar among individuals suffering from dementia praecox, manic-depressive psychosis, alcoholic state, and "other psychoses," and in normal control subjects. However, it was significantly higher in psychoneurotics and psychopathic personalities. With respect to causes of deprivation, it was noted that mental illness constituted a significant source of parental deprivation in two groups only—dementia praecox and manic-depressive psychosis. Divorce, separation or desertion occurred most frequently in the parents of psychopathic personalities and psychoneurotics. Statistics concerning the age at which deprivation occurred and the parent lost did not exhibit any significant trend. There was apparent tendency for increased incidence of parental deprivation in schizophrenic patients whose illness occurred before the age of 20. The incidence of various types of psychiatric abnormalities was almost identical in the siblings of both deprived and non-deprived patients. The type of psychiatric illness in siblings paralleled that found in the hospitalized patients. It is concluded that the incidence of dementia praecox is unrelated to known external stresses or deprivations. These data lend further support to the etiological importance of heredo-constitutional factors in the development of the major psychoses. Dementia praecox is regarded as a biological deficiency disease based on heredoconstitutional factors. This concept should not lead to an attitude of therapeutic nihilism. (Authors' abstr.)

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A Correlation of Lobotomy Results with Basic Reaction Types.

As suggested by previous lobotomy studies, the grouping of patients by basic reaction types of emotional disturbance, graded according to severity, reveals a consistent and marked correlation between level of illness and the degree and rate of clinical and social recovery. Though this correlation exists throughout the continuum of degree of illness, all types of disintegrated schizophrenics tend to respond to lobotomy in a generally limited degree, and the groups of so-called " integrated " psychotics also tend toward a similar and more favourable reaction to the operation.

Similarly the speed of recovery after lobotomy correlates in high degree with severity of illness. The time required for recovery to the point of readiness for discharge from the hospital is on the average more than double for the " full schizophrenics " than for the integrated psychotics. The speed of recovery is not a function of the length of illness before operation.

A careful differentiation of all patients into two general groupings of those maintaining a basic integration of the self and those suffering from widespread schizophrenic disorganization demonstrates marked differences in rate and degree of clinical and social recovery. Thus 82 per cent. of the former group are symptom-free and have been discharged from the hospital, but only 8 per cent. of the latter were freed from psychosis and but 10 per cent. have been returned to the community.

Although less favorable results have been consistently reported by investigators for schizophrenic cases, the high recovery rate of 77 per cent. in a special classification of " schizophrenics with accompanying trends " suggests that the crucial factor in prognosis is not the presence of a schizophrenic process, but whether this illness has progressed to a stage of chronic and general personality disorganization marked by the persisting features of emotional dulling, loss of contact with people, widespread delusions, hallucinations and intellectual disintegration.

Of the total group of 71 lobotomized patients here considered, 30 per cent. recovered quite completely from their illness and have returned to the community. Another 13 per cent. is considerably improved but still institutionalized, and an additional 27 per cent. made a slight but significant gain in level of adjustment within the hospital. Nine per cent. are more ill after the operation than before. These results are comparable to those recorded elsewhere for similar groups of patients, but toward the lower end of the range of gains.

Despite the degree of recovery reported above, with an understandable emphasis on the criterion of discharge from the hospital, the post-operative progress of these patients toward personal independence and social effectiveness is limited, since two-thirds of those discharged are completely or partly dependent on others for economic support or supervision. Since the symptoms of previous illness have been generally removed in these cases, this impairment in personal efficiency seems due in considerable part to the frontal lobe deficit produced by lobotomy with the technique employed in the authors' cases.

(Authors' abstr.)

Succinyl-Choline-Iodide as a Muscular Relaxant in Electroshock Therapy.

Succinyl-choline-iodide has been used to produce muscular relaxation in 136 patients in connection with 512 electroshock treatments. A method is described in which the preparation is administered intravenously in a mixture with a rapidly acting barbiturate. The powerful and brief effect of succinyl-choline-iodide makes it possible to reduce the convulsions until they are practically negligible, without the risk of prolonged respiratory difficulties. Except for an insignificant vertebral fracture no serious complications were observed either during or after the treatments. In the opinion of the writers, succinyl-choline-iodide is particularly suitable for routine use in connection with electroshock therapy. (Authors' abstr.)

Mechanism of Seizures Induced by Di-Isopropyl Fluorophospahate (DFP).

A simple method for electrical recording from the caudate nucleus and thalamus in the rabbit was described.

The control tracings from the limbic cortex, motor cortex, caudate nucleus and thalamus consisted of aperiodic waves with a frequency of 5–7 per second and an amplitude of 200–300 microvolts. The motor area was interrupted with short bursts of higher amplitude spikes (8–12 per second).

DFP was capable of evoking seizure patterns in all four areas, and usually in the following order : (*a*) thalamus, (*b*) caudate nucleus, (*c*) limbic cortex, and (*d*) motor cortex.

The motor cortex had the highest threshold, and most frequently exhibited seizure waves when the other 3 areas were simultaneously engaged in hyperactivity. These facts suggested the necessity of a functional unity of the four cerebral areas for the participation of the motor cortex in seizures, and may also explain the aura that precedes the attack.

Simultaneous activity between the caudate nucleus and the motor cortex suggested functional connections between these two areas. For the same reason the thalamus and limbic cortex appeared to have a physiologic relationship.

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Spike and dome patterns were observed, most frequently in the thalamus. In some animals thalamic *petit-mal*-like patterns developed into frank *grand-mal*-like spikes.

Depression of convulsant activity without apparent shock suggests the depressant effect of acetylcholine in a concentration greater than that required for hyperactivity. This offers theoretical evidence for central transmission of acetylcholine.

(Authors' abstr.)

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Neuropsychiatric Aspects of Cushing's Syndrome.

The neuropsychiatric abnormalities observed in a series of 25 cases of Cushing's syndrome are described.

The significance of these findings, together with those of a number of other authors, is discussed, and a comparison is drawn between these abnormalities and those which sometimes occur as a complication of treatment with corticotropin and cortisone.

Emphasis is laid on the fact that, although mental disturbance may be severe, recovery from this, as well as from physical disabilities, is to be expected in a reasonable proportion

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of cases as a result of adequate surgery, which, it would seem, is the treatment of choice. Three of the four most severely disturbed patients in this series recovered as a result of such treatment.

The fall in the increased protein content of the cerebrospinal fluid after operation, which has also been observed, is thought to be a further indication of the reversibility of the abnormal cerebral function.

In certain cases full recovery may be delayed or prevented, owing to hypoadrenalism following operation, which may later be controlled, or possibly as a result of grosser or irreversible cerebral damage.

In addition, some possibly significant etiological factors are described, and an effort is made to relate these to the occurrence both of endocrine dysfunction and of mental symptoms. (Authors' abstr.)

Effects of Subtotal Lesions of Frontal Granular Cortex on Delayed Reaction in Monkeys.

Lesions of the dorsal, midlateral and ventrolateral parts of the frontal granular cortex and a composite of these ablations were made in a series of monkeys (*Macaca mulatta*).

The subjects were tested on an auditory discriminative habit and on delayed reaction to auditory and to visual cues.

The animals whose lesions were predominantly in the ventrolateral or dorsal region showed only comparatively slight deficits on the tests; those whose lesions involved the midlateral portion were seriously handicapped on all tests. Among the latter group, total mass of tissue removed appeared to influence severity of symptoms.

Studies of thalamic degeneration were made, and the organization of the projection of nucleus medialis dorsalis is discussed. (Author's abstr.)

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A Theory of Frontal Lobe Function.

A theory of the function of the frontal lobes is offered which states that a function of the frontal lobes and their connections is to aid the persistence of emotional states, chains of thought, motor actions and motor inhibitions.

Support for the theory is found in clinical observation of patients before and after frontal lobotomy. States of worry, fear, depression, tension and negativism are relieved, while conditions of excessive intake of food, outspokenness, and lack of initiative are developed. Both the benefits and the deficits following lobotomy are considered to be evidences of the reduction of this persistence function.

Anatomical and physiological knowledge of the frontal lobes and their connections offers no contradiction to the present theory.

Psychological studies, indirectly and directly, offer support for the persistence theory. On the other hand they show that the frontal lobes do not have a function that can be measured by the routine psychological tests, which mostly show no significant changes after operation. On the other hand, they show that the studies which do delineate changes after lobotomy are those that measure manifestations of this persistence function—for, example, the tests for a decrease in prolonged attention used by Robinson.

(Author's abstr.)

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Clinical and Electroencephalographic Effects of Prefrontal Lobotomy and Topectomy in Chronic Psychoses.

The clinical and electroencephalographic observations following topectomy or lobotomy in a group of 105 patients with chronic psychoses are presented. Comparison of the rate of clinical improvement for 62 lobotomies with that for 19 topectomies in patients with chronic advanced schizophrenia showed a considerably lower value for the topectomy group. It is assumed that this discrepancy is based on the greater severity and chronicity of the psychopathologic process in their case material.

Lobotomy after ineffectual topectomy produced significant improvement in three of seven patients.

The theoretical implications of their clinical results are discussed with regard to similar observations in the literature, the evidence supporting a quantitative principle underlying the mechanism on which the clinical improvement following psychosurgery may be based.

The electroencephalograms in the early stage following prefrontal lobotomy, and topectomy showed severe cortical damage in the form of either a diffuse or a focal slow-wave abnormality. The defects were severer after lobotomy than after topectomy.

The brain-wave patterns of many patients who underwent lobotomy or topectomy reacted differently to sedatives, particularly barbiturates, than before operation. At this time no definite explanation can be given for this observation, and it should be further investigated.

So far, about 30 per cent. of their lobotomy patients show proneness to the development of seizures, whereas only one-third of the patients with paroxysmal patterns had clinical seizures at the time of their examination. Eight (42 per cent.) of 19 topectomized patients have now had one or more clinical seizures, while only two had shown seizure patterns shortly after the operation.

Normal sleep spindle activity is more impaired in patients who have undergone prefrontal lobotomy than in patients who have undergone topectomy.

The difference in the electroencephalographic pattern following lobotomy and that following topectomy is in accordance with the clinical experience that lobotomy constitutes a more radical procedure than topectomy. (Authors' abstr.)

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Suppression-burst Activity from Isolated Cerebral Cortex in Man.

1. Direct electrical recording from the cortex of man has been carried out on 34 patients, before, throughout and following prefrontal lobotomy. Operations were done under local as well as Pentothal anesthesia, and included the classical or standard " open " prefrontal lobotomy and surgical isolation by undercutting of both superior convexity (partial Brodmann areas 9 and 10) and orbital surfaces. The pial circulation was preserved in all cases.

2. All cases showed a marked decrease in electrical activity from cortex rostral to the section, and all but one showed the development of bursts of fast activity alternating with quiet sections of record. Such bursts were usually superimposed on or followed by high voltage very slow delta activity.

3. This suppression-burst activity was confined to isolated cortex, and was not seen from leads lateral and posterior to such cortex. It was characteristically asynchronous from right and left sides.

4. Suppression-burst activity, as judged from its continued presence at the time of repeat operation, persisted for over a year in the electrogram of undercut cortex, but was not detected in the scalp E.E.G.

5. Suppression-burst activity while resembling the patterns of barbiturate bursts, does not depend on barbiturate or other anesthesia, for it developed in characteristic form in cases operated under local anesthesia.

6. This pattern is probably analogous to that seen in cats following lesions to the basal diencephalon. It is possibly related to the release of cortex from the influence of the reticular activating system.

7. Some of the literature dealing with the relative role of cortex and thalamus is reviewed. It is concluded that there is autochthonous electrocortical activity, and that reverberating thalamo-cortical circuits are not necessary for the maintenance of such activity. (Authors' abstr.)

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Electroencephalographic Changes after Hyperventilation and Psychoton (Benzedrine-Sulphate) in Epileptics.

Comparison of Psychoton (benzedrine) activation with hyperventilation activation in 90 epileptics is presented. Psychoton produces less activation than hyperventilation. After administration of Psychoton 28 per cent. out of 90 patients became active. After hyperventilation activation occurred in 43 per cent. We have grouped the changes into three categories as follows: diffuse dysrhythmia bilaterally synchronous, focal abnormalities and paradoxical reactions. Four patients had characteristic 3/sec. wave and spike diffuse dysrhythmia. Psychoton may be indicated in cases where hyperventilation is not satisfactory. Contraindications include the danger of producing a clinical epileptic attack such as occurred in six of the authors' patients. (Authors' abstr.)

An Electroencephalographic Study of the Antagonism between Metrazol and Sodium Amytal.

The effect of metrazol on the barbiturate activity of the brain was studied in 18 experiments on 15 subjects. Metrazol completely removed the slow activity; the fast activity was either diminished or unchanged. The effect produced by metrazol may be interpreted as increased interneuronal activity evoked by the drug. (Author's abstr.)

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E.E.G. Findings in a Certain Type of Psychosomatic Headache: Dysrhythmic Migraine.

An electroencephalographically recognizable type of migraine has been described in 8 subjects.

Although the E.E.G. abnormalities varied, high voltage, slow paroxysms were noted in all records and all tracings could be easily activated by hyperventilation.

Besides the common findings of "ordinary" migraine, aphasic episodes and attacks of syncope were frequent.

Anticonvulsant medication benefited these patients, quite in contrast to "ordinary migraine."

Psychodynamic factors appear of maximum importance, and should be considered in all patients afflicted with true migraine associated with definite E.E.G. abnormalities.

Should the author's findings in this small group of subjects be confirmed by other investigators, then the term "dysrhythmic migraine" for this loosely connected syndrome is submitted for consideration. (Author's abstr.)

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Significance of the Thalamus in Psychoses.

The thalamic nuclei in twelve cases of dementia praecox, paranoid type, were examined histologically by special methods. All showed an old chronic disease of nerve cells filled with large groups of inclusion bodies sequestered in the cytoplasm. Usually there was a single group in each cell, and the individual inclusions, though closely crowded together, were very large in some cases. Actual loss of cells or breaking of their surfaces was moderate. In fact, most of the cells were intact, and it seemed evident that the cells had tolerated the inclusions for a long time. Honeycombed cytoplasm and slightly vesicular nuclei in old cases with brush-work within the nuclear membrane were usually present. In the cortex changes were more severe, resulting in cell destruction, voiding of inclusions and loss of dendrites and axons. These changes affected the small cells of layers 4 and 3. It seemed reasonable to infer that the hallucinations, delusions and paranoid symptoms were the result of abnormal discharges of thalamic and cortical cells.

In fifteen cases of psychoses with mental deterioration there was always a great loss of nerve cells, as high as 90 per cent. of the cell population, in the association nuclei of the thalamus. The pulvinar and medial dorsal nuclei were often severely destroyed. The cell destruction was probably a slow process with minimal irritation in the thalamus. Damage of all layers of cells in the cortex was a contributing factor. In a number of the cases, necrosis of cells independent of the inclusion bodies, oligogliosis and senile plaques

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were associated with necrosis, but they were not the usual causes of cell disease and disruption. The latter was a somewhat specific antecedent process related to the inclusion bodies and some hyperergic substance causing the formation of abnormal protein. Distorted growth of honeycombed cytoplasm, brush-work in nuclei, growth of glia fibers, amyloid changes in nuclei of oligoglia cells and proliferation of perivascular and microglia cells indicated abnormal growths of protein.

In cases with sensory disturbances, especially hallucinations and related delusions, there was an acute disruption of nerve-cells in the sensory nuclei of the thalamus. This breaking down of nerve-cells was seen in the lateral geniculate body (visual relay to cortex), in the medial geniculate body (auditory relay to cortex) and in the ventral posterior nucleus (relay for bodily sensibilities to the cortex). The ventral lateral nucleus (relay of cerebellar impulses to cortex) was usually affected.

In senile psychoses of relatively late and sudden onset, with confusion, irritability, disorientation, delusions, loss of memory and symbolic functions, there was an acute breakdown and shattering of nerve cells in the association nuclei of the thalamus. Usually this wholesale disruption of nerve cells filled with large inclusion bodies was most prominent in the pulvinar, lateral posterior and medial dorsal nuclei of the thalamus. Violent behavior seemed to be associated with an acute shattering of cells. Mental deterioration was related to the more complete loss of cells.

Four cases of manic-depressive psychosis showed disease of thalamic cells similar to those of other clinical types. Pycnotic changes were more common. The nerve cells had small, hyalinized nuclei with dwarfed rims of cytoplasm around them. The cells of the cortex were particularly small with the pycnotic nuclei.

Five cases of psychosis with syphilitic meningo-encephalitis differed from the other psychoses chiefly in the thickened meninges and blood-vessels and fenestration of the outer layers 1 and 2 of the cortex.

Axons were studied by the silver technique in the thalamic region in five cases. This included the thalamic radiations, internal capsule, basis pedunculi and adjacent structures. Axonal damage was not a conspicuous feature, but where it occurred it was unmistakable. Dropping out of axons from the bundles of radiations and deformity of axons with enlargements and twistings were abnormal features. Damage to axons occurred in the neighborhood of the diseased nerve-cells. The number of axons in the thalamus was much in excess of nerve-fibers, due to presence of fibers coming from the cortex. Terminal neuropil among the thalamic cells was severely affected.

Disruption of cortical cells and changes in radial bundles were contributing factors in most of the cases. From a limited number of sample sections it was not possible to gain a reliable idea of the distribution of cortical disease. The authors' samples usually included the occipital, temporal, parietal, frontal and hippocampal cortices, but not all parts in all cases. However, it was clear that the cortex was severely involved in cases with simple mental deterioration and in Alzheimer's disease. Gliosis, amyloid bodies, necroses and senile plaques were occasionally seen in these cases. In some instances it seemed that the onset of cortical destruction with small inclusion bodies was a new episode with exacerbation of an old brain disease.

The 36 cases examined histologically showed that disease of thalamic nerve-cells was a constant feature of various clinical types of psychoses. In all cases cortical cells were also involved. Correlation of clinical symptoms with disease of the sensory and association nuclei was strongly suggested by this study. However, it must be stated that the disease was generalized, affecting both thalamus and cortex in various degrees. There was no specific pattern for any type, but only a predominance of cell affection in different areas of the thalamus and cortex, and difference in degree of cell destruction. It seemed that nerve-cells were more involved than axons, and that the active symptoms exhibited by the patients were an expression of altered nerve-cell function. This would favor the current views, which hold that the functional manifestations of the psychoses are basically disorders reflecting fundamentally abnormal physiology and morphologic changes in the thalamocerebral level of the central nervous system. The chemical disorder and its hyperergic effects on nuclear (cell) metabolism, glia proliferation, changes in axons and walls of the blood-vessels must be taken into consideration. The moderate changes in the fiber tracts, changes such as demyelination, nests of oligoglia nuclei and amyloid bodies appeared to result from some abnormal protein donated by the nerve-cell disease.

(Authors' abstr.)

Some Biochemical Considerations of Psychotic Behavior.

This paper discusses experiments indicating that disturbances in the balance of enzyme kinetics may be associated with psychotic behavior.

Aberrations of adrenal steroid metabolism in schizophrenic patients are reviewed and considered in relation to possible etiological factors. (Author's abstr.)

Effects of Factors that Modify Cerebral Blood-flow on Hallucinations in Schizophrenia.

Inhalation of carbon dioxide may result in temporary disappearance of hallucinations in some patients with schizophrenia. Marked diminution in cerebral blood-flow may

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result in reappearance of hallucinations in some schizophrenic patients in whom hallucinations were present in the past; when cerebral blood-flow is decreased in subjects who never had hallucinations the subjects may experience brief, vivid visual images of events that happened in the distant past. The possible significance of changes in cerebral blood-flow in regard to the appearance or disappearance of hallucinations in various conditions is indicated. (Author's abstr.)

Comparison of Decamethonium Bromide (C10) *and D-Tubocurarine as Preventives of Traumatic Complications in Electroshock Therapy.*

The value of any new relaxant for prevention of traumatic complications in electroshock can be adequately assessed only by carefully controlled comparison with *d*-tubocurarine in a sufficiently large series. The method must take into account differences in pharmacologic action. Such comparisons of the new drug C10 with *d*-tubocurarine in 680 treatments show the following:

1. Paresis was as adequate with C10 as with *d*-tubocurarine.
2. No simple method of determining optimum dosage was found for C10. It is established for *d*-tubocurarine.
3. C10 has an unpredictably variable effect in some patients with repeated dosage.
4. At optimum dosage the effects on circulation and respiration are similar, and neither drug increases the convulsive threshold.
5. Differences in side effects of pre-treatment anxiety and excessive salivation were so slight as to be unimportant. Histamine-like reactions were not seen with either drug.
6. The shorter action of C10 was no advantage in the authors' use of conventional electric shock therapy.
7. C10 has at present no adequate pharmacologic antagonist.
8. Fatigue does not change the action of C10, while it increases the effect of *d*-tubocurarine.
9. Both drugs are relatively safe if competently used. Safeguards are well established with *d*-tubocurarine, but are less so with C10.

D-tubocurarine therefore still remains the drug of choice, compared with C10, for the prevention of traumatic complications in electric shock therapy. (Authors' abstr.)

The Schizophrenias of Childhood.

Investigation of the schizophrenias of childhood is valuable because hereditary influences are more accessible to examination and evaluation, and because maternal contributions *in utero* are temporally less remote and both are less complicated by environmental and somatic factors.

The present report has reviewed the following:

1. Observations on eight childhood schizophrenics treated with histamine over a three-month period. Five were male, three female. Five of the patients had previously been treated elsewhere with E.C.T., with temporary improvement reported in four and no change in one.
2. In this histamine-treated series clinical improvement was recorded as an average of ratings by the psychiatrist, the nurse, the psychologist, and the parent. The results revealed:

Grade	Number of patients.
4+	1
3+	2
2+	3
1+	1
0	1

3. Three patients, in the 9-year age-group, scored 3+ and 4+ improvements. The importance of approaching puberty in those patients who responded best to therapy was taken into account and discussed neuroendocrinologically.
4. Significantly, the patients evidencing best response "tolerated" the least amount of histamine as indicated by blood-pressure.
5. A high tolerance to thyroid hormone was exhibited by all children.
6. A high incidence of thyroid pathology was found in the mothers of the children.
7. A high incidence of compensated schizophrenia was observed in the mothers.
8. The possibility of an *in utero* neuroendocrinologic contribution to the etiology and pathogenesis of schizophrenia is posed.
9. The significance of the age of onset and the changing sex ratio of male to female schizophrenics is raised and discussed.
10. The findings are interpreted in the light of a physiodynamic neuroendocrinologic formulation, suggesting that operative adrenocortical excess is related to the etiology and pathogenesis of schizophrenia. In this light alterations in thyroid physiology and thyroid pathology may reflect the results of compensatory attempts to counter the operative adrenocortical excess.

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Histamine biochemotherapy has opened new approaches both to the treatment of the schizophrenias of childhood and to the investigation of the etiology and pathogenesis of this disorder of equilibration. (Authors' abstr.)

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Psychology *vs.* Anatomy in the Treatment of "Arm Neuroses" with Physiotherapy. *Braatoy, T.* 215
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The Effects of Frontal Topectomy on Autonomic Nervous System Stability in Schizophrenia.

(1) The autonomic stability of two groups of chronic schizophrenic patients (paranoid and hebephrenic-catatonic) and a normal control group was tested by means of epinephrine (adrenergic), mecholyl (cholinergic), and cold pressor stimuli. The schizophrenic patients were studied before and after superior and orbital ablations of prefrontal cortex (topectomy). The blood-pressure responses were measured in all instances and the electrical skin resistance was determined with the mecholyl test. Concomitant psychiatric observations were made.

(2) All pre-operative reactions of the paranoid group were within the normal range with all tests. The hebephrenic-catatonic group showed blood-pressure hyporeaction to the mecholyl and cold pressor tests.

(3) After superior and orbital topectomy there was slight, transient hyper-reaction to epinephrine and mecholyl, suggesting a release of cortical inhibition of autonomic functions. The post-operative response to the cold pressor test showed diminished reactivity, in the paranoid group, or the appearance of a normal response where hypo-reactivity existed previously (hebephrenic-catatonic group). Autonomic nervous system stability in schizophrenia is disturbed in only a mild degree after topectomy and rapid compensation seems to occur. No significant differences were observed between the orbital or superior groups.

(4) The relationship between these findings and psychologic factors are discussed and the pertinent literature reviewed. (Author's abstr.)

The Frontal Lobes and Anguish. A New Formulation of an Old Problem.

The advent of psychosurgery has upset the apple-cart of our organized knowledge concerning the functions of the human frontal lobes as well as one large section of the field of psychopathology. The crucial change in those persons who respond to psychosurgery is an affective one, and only to a very minor degree, if at all, an intellectual one. It has been necessary to reconsider not only our older concepts, but also the various reports of

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changes which are said to follow psychosurgery. The author has tried to show that the significant alteration is to diminution in varying degrees of a specific mental experience which has been given various names by different observers, and which he has termed anguish. He has given evidence indicating that anguish is a specific, delimited, mental phenomenon which occurs in some, but not all, patients suffering from mental illness, and in some, but not all, patients suffering from intractable pain.

He has advanced the hypothesis that this anguish is a specific experience which occurs when some agent carried in the blood-stream sensitizes cortical tissue, usually tissue in the prefrontal areas in persons who are susceptible. This susceptibility is activated largely by the influx of intra-organic sensory impulses probably projected from the thalamic nuclei. This reactivity gives rise to the unique mental experience of anguish.

Finally, he has given some indications of possible procedures which could be applied in a situation where anguish is frequently diminished or abolished, namely, electroconvulsive therapy, which might lead us on to greater objective knowledge both in psychopathology and in neurophysiology than now exists. (Author's abstr.)

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Patterns of Sensory Disturbance in the Trunk and Face in Polyneuritis. *Savitsky, N., and E.* 433
*The Effect of Rapid Intravenous Metrazol on the E.E.G. *Smith, J., et al.* . . 443

Organic Sequelae of Electric Convulsive Therapy, including Facial and Body Dysgnosias.

Besides the well-known reactions, electric convulsive therapy may cause manic and paranoid syndromes; also distortions of gnostic function, dysgnosias, involving perception of the patient's own face, fingers and other parts. Faces of strangers may assume a quality of familiarity and grotesqueness, whereas familiar faces may assume a quality of strangeness. (Author's abstr.)

Amphetamine and Addiction.

Amphetamine resembles other sympathomimetic drugs in its mild autonomic nervous effects, but far excels most of them in its central action. It causes wakefulness, anorexia, increased talkativeness and seems to promote an inner feeling of vigorous well-being, favouring constructive activity, but also raising the danger of habit formation.

There are reports of its abuse among alcoholics and institutional inmates. Seven cases of chronic over-usage reported by other authors are analysed, along with 7 additional cases, 4 of which were studied in detail. All used amphetamine, at times dextrarotatory as well as levorotatory, for periods of time up to 15 years. They developed psychic dependence and a compulsion to continue taking the drug. Dosage remained between 20 and 30 mgm. daily in only 3 out of 13 patients; the other 10 increased their consumption to between 100 and 700 mgm. per day. Tolerance develops rapidly to the drug. Though there were periodic autonomic side-effects, no clear-cut hypertension or other physical disability appeared. Except for somnolence, possibly caused by exhaustion, there were no withdrawal phenomena. Transient psychotic reactions, marked by overactivity, delusions and rarely hallucinations, described by others as a complication of amphetamine overdosage, appeared in 4 patients. Three others needed hospitalization at one or another point for psychiatric reasons. Others functioned effectively for a surprising length of time, and sometimes amphetamine seemed to replace more disrupting symptoms, such as alcoholism.

Using a broad, socially oriented definition, addiction to amphetamine does occur, though it is infrequent and often relatively benign.

Detailed study revealed these addicts to be isolated individuals struggling against delinquent tendencies, passive craving, and chronic depression. They were helped by amphetamine, which they had first used at times of particular stress. The drug appears to assist "elated" defensive activity rather than "ecstatic" oblivion. Possibly its peripheral and central effects are part of one process of mobilization for activity. Study of its interaction with chronic character attitudes may be relevant to the investigation of other biologic substances, as well as the biologic side of certain emotional processes. (Author's abstr.)

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The Effect of Rapid Intravenous Metrazol on the Electroencephalogram.

Six cases of polyneuritis, of varied etiology, are reported with specific patterns of sensory disturbance on the trunk and face (diphtheritic, alcoholic, diabetic and Guillain-Barré).

The areas of sensory change correspond to the cutaneous distribution of the distal portions of the nerves involved.

The occurrence of these changes seemed related to severity of involvement rather than to any specific etiologic factor.

It is suggested that these patterns of sensory loss are similar to the characteristic " glove and stocking " loss found in the extremities. (Authors' abstr.)

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Prolonged Compression of the Brain Resulting from an Extradural Haemorrhage. *Rowbotham, G. F., and Whalley, N.* 64

Cognitive Factors in Epilepsy.

The average intelligence of a group of 161 epileptic patients is only slightly below normal: median I.Q. is 94 on the Progressive Matrices Test and the median V.A.Q. is 96 on the Mill Hill Vocabulary Test.

The distribution of gradings on the Progressive Matrices Test of the epileptic patients differs significantly from that of a normal population.

Over 12 per cent. of the 161 epileptic patients are below the level of mental deficiency on both the verbal and non-verbal tests.

A group of 19 patients whose condition is considered " unchanged " or " worse " show a significant fall in vocabulary quotient on re-testing after an interval of two years: 18 patients whose attacks are decreasing show no significant fall.

Epileptic patients with minor attacks show a larger fall in vocabulary quotient on re-testing than those with major or major and minor attacks, but none of the differences is significant.

Patients whose education has been interrupted due to epilepsy show a significant fall in vocabulary quotient on re-testing.

No group of epileptic patients shows a significant change in progressive matrices quotient on re-testing.

A group of 57 epileptic children, matched for sex, age and score on progressive matrices score with a control group, shows a lower scatter of scores on separate sets of progressive matrices. This difference is suggestive of somewhat greater reliability but is not statistically significant.

The epileptic children took longer to do the Progressive Matrices Test than the control group. This difference is statistically significant, but it is possible that part of the difference is due to the fact that two different testers administered the tests.

The epileptic children's inferiority in immediate memory is not significant, and their inferiority in delayed recall, while somewhat greater, is below the level of statistical significance.

The epileptic children are superior in both fluency scores: in " reproductive fluency " the difference is not significant, but in " imaginative fluency " it is statistically significant.

The epileptic children show no significant difference in vocabulary. (Author's abstr.)

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Ablation of Abnormal Cortex in Cerebral Palsy. *Penfield, W.* 73
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*The Suppression of the Clonic Phase in Electrically Induced Convulsions in Man. *Alexander, L.* 169
Experimental Torticollis of Rhombencephalic Origin. *Kemberling, S. R., et al.* . 182
Cerebral Swelling and Cerebral Edema. *Small, R. G., and Krehl, W. A.* . . . 192

The Suppression of the Clonic Phase in Electrically Induced Convulsions in Man.

Electrically induced convulsions in man last an average of 40 seconds—including the latency period of 46–50 seconds—irrespective of the strength and duration of the convulsion inducing stimulus.

Electrically induced convulsions can be made purely tonic instead of tonic-clonic (such as they usually are) by continuing the stimulus which induced the convulsion throughout its entire duration. This observation lends support to Penfield's and Erickson's theory of the cortical origin of the clonic phase, because the clonic phase can be suppressed by a stimulus which must be presumed to have become inhibitory after its original excitatory effect.

Abolition of the clonic phase in no way lessens the depression-relieving effect of electroshock treatment. This clearly indicates that the clonic phase is not necessary for the specific anti-depressant therapeutic effect of electroshock.

As a practical measure the use of this technique of suppressing the clonic phase has proved useful in preventing post-ictal respiratory embarrassment, and has in the author's clinical work almost completely replaced the use of curare in administering electro-shock to individuals with abnormalities of the skeletal system, especially spinal fractures, to pregnant women, and in other conditions in which violent clonic convulsions could be harmful. (Author's abstr.)

J. NEUROPHYSIOL.

VOL. XV. 1952.

*Ipsilateral Facial Representation in Motor Cortex of Macaque. *Lauer, E. W.* . 1
Cortical Response to Stimulation of Lateral Geniculate Body and the Potentiation Thereof by Continuous Illumination of Retina. *Chang, H.-T.* . . . 5
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Studies on Intraretinal Action Potential with Low-resistance Micro-electrode. *Tomita, T., and Funaishi, A.* 75

Ipsilateral Facial Representation in Motor Cortex of Macaque.

1. Under very light ether anesthesia it is possible to elicit ipsilateral facial movements by stimulation of the cerebral cortex of the macaque.

2. Such ipsilateral movements in the macaque are not limited to the upper facial muscles, but include those of the lower part of the face as well.

3. The area for ipsilateral movements is separate and distinct from that for contralateral.

4. Within the primary facial motor area the region for ipsilateral movements lies lateral to that for contralateral but above the subcentral dimple.

5. An area for ipsilateral movement can also be demonstrated in the second motor area on the superior lip of the lateral fissure. This region lies anterior to that from which contralateral facial movements are obtained. (Author's abstr.)

Cerebro-cerebellar Relationships in the Monkey.

Cerebro-cerebellar relationships were studied in the monkey (*Macaca mulatta*) by electrically stimulating various areas on the lateral cerebral surface and recording from the pial surface of the cerebellum (excluding the basal surfaces).

1. Cerebral sensory and motor areas 3, 1, 2 and 4 project to the tactile areas of the cerebellum, i.e., anterior lobe, l. simplex and paramedian lobules and immediately adjacent folia. Cerebral leg regions project to anterior points in the contralateral anterior lobe and to posterior points in both paramedian lobules, whereas cerebral face regions project to posterior points in the anterior lobe and l. simplex and to anterior points in the paramedian lobules. Cerebral arm regions project to intermediate positions in both the anterior cerebellar lobe and paramedian lobule.

2. The cerebral auditory receiving area projects laterally and medially to the lobulus simplex and surrounding folia.

3. The cerebral visual receiving area (area 17) projects to the lobulus simplex and surrounding folia, as do cerebral areas 8 and 9.

4. Areas 6 and 4s of the cerebrum project widely to contralateral crus 1 and 11 and lobulus simplex. (Authors' abstr.)

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Effects of Localized Coetical Destruction on Auditory Discriminative Conditioning in Cat. *Meyer, D. R., and Woolsey, C. N.* 149

Projection of Cortical Area 6 to Brain Stem in Monkey.

1. Following strychnine activation, area 6 can be shown to project ipsilaterally to the subthalamic nucleus, the substantia nigra, the tegmentum of the midbrain and pons, the red nucleus and the central grey.

2. The tegmental regions concerned are ventral and dorsolateral portions in the midbrain and pons.

3. These connections must subserve the motor activity, which can be demonstrated on stimulation of area 6 following pyramidal section. (Authors' abstr.)

Quantitative Distribution of Dipeptidase and Acetylcholine Esterase in Architectonic Layers of Rat Cerebral Cortex.

The quantitative distributions of dipeptidase and acetylcholine esterase have been determined in the cytoarchitectonic layers of rat somatosensory isocortex.

Dipeptidase activity is highest in layers II, IV, Vb and VIa. Its architectonic distribution suggests that nerve-cell bodies and perhaps also those of neuroglia are the principal sites of proteolytic activity in the cerebral cortex.

Acetylcholine esterase activity is relatively high in layer I, the junction of layers II and IIIa, and in layers IIIb, Va and Vc. Its intracortical distribution indicates that acetylcholine esterase is primarily associated with the neuropil, and suggests localization of this enzyme at the surfaces of dendrites and axones including synaptic terminals.
(Author's abstr.)

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*Effect of Ablation of Prestriate Cortex on Auditory-visual Association in Monkey. *Evarts, E. V.* 191
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Effect of Ablation of Prestriate Cortex on Auditory-visual Association in Monkey.

Extensive ablation of the prestriate area (Brodmann's area 18) in the monkey (*Macaca mulatta*) has been found to be without effect on either retention or post-operative learning of a conditional problem requiring the subject to select a red stimulus in the absence of sound and a green stimulus in the presence of the sound of a buzzer. The significance of this finding with regard to the behavioural role of cortico-cortical connections is discussed.
(Author's abstr.)

Sites of Origin of Electric Potentials in Striate Cortex.

The location with respect to depth in the optic cortex of the sources of certain components of potential in responses to single optic nerve volleys has been investigated by various techniques in rabbits and cats.

The first spike is assigned to the arrival of impulses over the optic radiation, the second to the first response of cortical cells, probably including Golgi type II cells of layer IV. The following two or three spikes appearing at 1·5 msec. intervals and of 1·5 msec. durations arise from successively higher levels of cortex.

The slow surface-positive wave underlying these spikes appears to be associated with them, the earlier part originating lower in the cortex than the later.

The negative wave immediately following the positive is found in the lower third of the cortex, probably arising from layer VI. Since in an occasional normal record, and uniformly

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under the influence of strychnine, an earlier and considerably greater negative wave is present, and since this occupies the whole depth of the cortex under strychnine, these two negative waves are inferred to be different in origin.

The late negative wave presumably arises in cells different from those responsible for the positive components. The early negative wave is assigned to conduction from the cell bodies along apical dendrites toward the cortical surface. Its absence in the normal cortical record indicates that such conduction usually does not follow upon afferent stimulation of the cortex. Strychnine, which is too weak to affect the form or intensity of the normal surface-positive components, induces the response represented by this negativity.

With very dilute strychnine, large positive responses of the cortex are followed immediately by the early negativity, but lower responses may show a delay between the positive and early negative waves. In such cases the two negative waves can be distinguished in the same record.

The early positive wave is inferred to represent the activity of basal dendrites of the neurones, of which the spikes represent the activity of the cell bodies. On the basis of the present work and various previous information available as to the character of the activity of other neurones, a tentative description of the course of activation of cortical neurones is proposed. (Authors' abstr.)

Observations on the Mechanism of Experimental Cerebellar Seizures.

1. Cerebellar seizures from cerebellar stimulation occur in the absence of the motor area and most of the cerebral cortex.

2. Although the pathways concerned with the muscular movements involved are not known, the seizures can occur in complete form following section of one basis pedunculi, a pyramid, the dorsal roots to an extremity, the vestibular apparatus, both eighth cranial nerves, or the upper three cervical nerves of both sides.

3. The seizures may occur in complete form after partial splitting of the cerebellum, or in modified form; or may be confined to the homolateral side after complete splitting of the cerebellum.

4. With simultaneous stimulation of the cerebral motor area and the cerebellum no evidence of inhibition of movements induced by the cerebral stimulation was seen, but there was some evidence of facilitation. The cerebral stimuli and associated movement when brief did not stop or obviously change cerebellar effects. Spontaneous movements are commonly superimposed on cerebellar effects. The sequence of movements throughout a seizure being paired and contrasted like the phases of stimulus and rebound, it is suggested that this may represent a basic phenomenon in normal functioning of the cerebellum in its control of muscle synergy. (Authors' abstr.)

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Recorded Interviews Demonstrating Organ Choice Mechanisms. *Rogg, S. G.* . . 87
Telepathic Mechanism in Dreams. *Damstra, M. N.* 100

Mental Changes Experimentally Produced by L.S.D.

Observations are reported on the mental changes in normal adults produced by d-lysergic acid diethylamide tartrate (L.S.D.). Seventeen experiments were done on volunteers, 10 men and 5 women, with an age range of 19 to 48 years. Two of the women underwent two experiments each. The drug was given by mouth, usually in dosage of 1 gamma per kilogram of body weight.

Besides subjective symptoms, alterations were observed in the following areas : thinking and speech ; emotion, mood and affect ; sensory and time perception ; behavior ; morbid ideas and sensory experiences ; and neurological signs. The reaction exhibited three phases lasting a total of 12 to 16 hours ; in some subjects a fourth phase, as a post-L.S.D. effect lasting one to several days, was seen.

The L.S.D. reaction showed some aspects of an exogenous toxic picture. Even more impressive, however, was the stimulation of schizophrenic reactions and manifestations. Simple schizophrenic and turmoil states were common. Transient paranoid trends were frequent. Various isolated findings in schizophrenia such as negativism, ambivalence, blocking, and unexplained smiling were witnessed. Schizo-affective and manic-like states were also encountered. Cathartic ventilation was seen in only one subject. The reaction was not specific, and the extent to which it was dependent upon the basic personality of the subject was undetermined.

The clinical effects of L.S.D. imply involvement of the higher or highest centers of the central nervous system, and perhaps of lower levels of the nervous system as well.

Further study of L.S.D. is indicated because of the remarkable simulation of findings seen in schizophrenic and affective psychoses on administration of an amazingly small amount of this substance by mouth. (Authors' abstr.)

Prefrontal Leukotomy : A Clinical Survey of 100 *Cases Given an Active Retraining Program in a Mental Hospital.*

A clinical survey is presented of 100 patients of whom 89 per cent. were classified as schizophrenia, and who were consecutively subjected to bilateral prefrontal leukotomy from March, 1946, to January, 1950.

The post-leukotomy retraining program is described. This appears to be an important adjunct to the rehabilitation of the patient.

Proper orientation of the relatives is an important factor in aiding the patient's extramural adjustment.

The adoption of a uniform and adequate critical breakdown in presenting results leads to a more accurate evaluation.

Though general improvement was obtained in 81 cases, further analysis reveals that only 24 patients were able to leave the hospital, and of these only 7 were regarded as returned to their pre-psychotic status.

In this series there appears to be a relationship between the greater degree of improvement and patients in the younger age-group, those with shorter periods of illness and shorter duration of hospitalization.

Except for the immediate post-operative period, incontinence was relatively improved.

The percentage of abnormal E.E.Gs. increased markedly directly after the procedure ; the patterns gradually improved over a period of more than six months.

Seventeen patients developed *grand mal* seizures up to two years post-operatively ; but of these, only three had persistent attacks. There was no definite relationship between seizure activity in the E.E.Gs. and the incidence of clinical attacks.

Best results were obtained in those patients who had 65 per cent. to 80 per cent. prefrontal leukotomies.

Marked changes in behavior in this series were noted only after severing the fourth (a lower) quadrant. (Authors' abstr.)

APRIL.

A Contribution to the Study of the Phenomenon of Resistance. *Eidelberg, L.* . 177
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On a Specific Source of Resistance in Psychotherapy Hitherto Underestimated. *Bergler, E.* 250
Some Problems Connected with Fodor's Birth-Trauma Therapy. *Peerbolte, M. L.* . . 292
Psychosomatic Implications in a Case of Paget's Disease with Psychosis. *Notkin, J.* 307

A Clinical Evaluation of the Use of Decamethonium Bromide (C_{10}) in Convulsive Shock Therapy.

Curare and decamethonium are dissimilar drugs, although both produce muscular relaxation. The weakness produced by curare simulates myasthenia gravis, while the action of decamethonium simulates the paralysis of botulism. Because of their dissimilarity there will be situations where one is to be preferred to the other. In shock therapy, which is a relatively brief procedure, but which has to be repeated on subsequent days (in contradistinction to surgery, where the reverse is true), the advantages of C_{10} would seem to outweigh the disadvantages. The chief advantages are the shorter action of the drug and the relative sparing of the tongue and larynx; the disadvantages are the lack of antidote and the inability to predict the first dose. These disadvantages can be handled by the method of fractional administration of C_{10}. All drugs mentioned are satisfactory relaxing agents, although the writer prefers decamethonium in shock therapy.

One must close with a warning that curare, syncurine and the barbiturates are extremely valuable, but are potent and dangerous drugs which should not be used unless one is acquainted with their idiosyncrasies and is prepared to handle all emergencies that might arise, including respiratory embarrassment. On the other hand, it has seemed to the writer that administering shock therapy without these modifications is in the same category as operating without an anesthetic. (Author's abstr.)

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Psychiatric Observations in Patients Treated with Cortisone and ACTH.

1. Psychiatric observations of a preliminary series of 8 cases of collagen and allied diseases treated with cortisone and ACTH have been presented.

2. It was found that these hormones induced a variety of emotional responses, as follows:

a. Initial euphoria in 7 cases.
Persistent euphoria in 2 cases.

b. Effects on psychotic reactions in 3 cases.
(1) Alleviated.
(2) Provoked.
(3) Aggravated.

c. Ambivalance, depression, and other responses in 3 cases.

3. Personality factors always contributed to the emotional reactions to cortisone and ACTH therapy.

4. The direct hormonal, pharmacological and psychological stimulating effect of cortisone and ACTH is responsible for bringing out latent emotional responses of the individual.

5. The emotional factors found in these diseases indicate the presence of a psychosomatic component.

6. The stimulating action of cortisone and ACTH as well as their withdrawal induces an abrupt change of severe physical symptoms deeply embedded in the patient's way of life:

a. Euphoria was usually evoked initially and psychotic trends were relieved.

b. This abrupt change in symptoms was experienced as a threat to the psychological and psychosomatic equilibrium, and gave rise to adverse reactions such as delusions, excitement, depressions, hostility and ambivalence.

7. On tracing back the pre-disease personalities it was found that the observed reactions to the hormone treatment coincided with former behavior patterns and appeared to be exacerbated versions of them. (Author's abstr.)

Q. J. EX. PSYCHOL.

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SCHW. ARCH. NEUR. PSYCHIAT.

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1. Physiology, Biochemistry, etc.

Biochemical Action of the Nerve. III. Cholinesterase of the Human Serum. Shigeo Okinaka, Osamu Kitamoto, Masami Yoshikawa, Jûya Gotô, Yoshiyata Takahashi and Akira Oyama (Univ. Tokyo). [*Igaku to Seibutsugaku (Med. and Biol.)*, **18**, 114–17 (1951); *cf. C. A.*, **45**, 4759*d*.]

Cholinesterase activities (I) of the normal human serum varied among individuals, ranging from 50 to 90 (av. 65·4) (cu.mm. CO_2 evolved/min./c.c. of serum). No effects of sexes, ages, and seasons of the year were observed. Decreases in serum (I) were fairly parallel to the clinical diagnosis and the results of tests for hepatic activities. They were also apparent in neoplastic diseases, especially in cancer of the stomach. Serum (I) in normal humans, in patients with hepatic or neoplastic diseases and in those with tuberculosis was 50–90, 10–60, 20–100 respectively. Characteristic changes in serum (I) were not observed in patients with endocrinological or nervous diseases. Erythrocyte (I) were more active than Plasma (I), the former being parallel to the values of hematocrit and hemoglobin. (I) in the human cerebrospinal fluid is negligibly small. M. N. (Chem. Abstr.).

Significance of Acetylcholine in Development of Central (Nerve) Block. I. N. Volkova (Kazan State Med. Inst.). [*Fiziol. Zhur. S.S.S.R.*, **37**, 422–30 (1951).]

The perfusate taken from the canal of frog spinal cord during a block of its reflex activity loses its blocking ability if treated with cholinesterase. Hence the blocking action of the perfusate depends on the presence of acetylcholine. Disturbance of phospholipide metabolism (removal of pancreas) which disturbs acetylcholine formation also is reflected in the development of block in the spinal cord; atropine also weakens the development of a block of reflex action. Eserine and acetylcholine added to the perfused solution display a blocking action themselves on the reflex activity of the spinal cord. The reflex action of the spinal cord is not affected *per se* by disturbed production of acetylcholine.
G. M. Kosolapoff (Chem. Abstr.).

Activity of Acetylcholine System in Human Epileptogenic Focus. Donald B. Tower and K. A. C. Elliot (McGill Univ., Montreal, Can.). [*J. Applied Physiol.*, **4**, 669–76 (1952).]

The activities of the components of the acetylcholine (I) system were measured in samples of cerebral cortex from epileptic patients. There was no significant difference between epileptogenic and normal tissue in (I) content or in the rate of synthesis of free (I) by slices incubated in media containing normal and high K concentrations. Epileptogenic tissue showed a tendency to have elevated cholinesterase activity and failed to produce bound (I).
T. McK. (Chem. Abstr.).

Decrease by Narcosis in the Amount of Acetylcholine Extractable from Motor Nerves. Livius Bernardis. [*Z. Vitamin-, Hormon- u. Fermentforsch.*, **4**, 69–82 (1951) (in German).]

Much acetylcholine (I) is lost if tissues are extracted by grinding with sea sand containing carbonates. A synthesis of (I) occurs when ventral roots of the spinal cord are placed in Ringer solution; the average increase during 2 hours was 33·5 per cent. Eserine has no effect on this synthesis, but narcotics (ether, $CHCl_3$, 10 per cent. EtOH) inhibit this process.
E. Hirschberg (Chem. Abstr.).

Aneurine and Acetylcholine in Nerve Degeneration. Karl Umrath (Univ. Graz, Austria). [*Z. Vitamin-, Hormon- u. Fermentforsch.*, **4**, 19–26 (1951); *cf. C. A.*, **44**, 3105*h*.]

The aneurine content of degenerating ischiatic nerves, but not of other nerves, of mammals decreases by 30 per cent. 1–2 days after production of the lesion, but again reaches normal levels on the 4th day. The well-known decrease in acetylcholine content begins only on the 2nd day. Erich Hirschberg (Chem. Abstr.).

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Action of Phenamine (Benzedrine ?) on Content of Acetylcholine and Activity of Cholinesterase in Central Nervous System. E. Kakushkina and L. Petkevich (State Biol. Museum, Moscow). [*Fiziol. Zhur., S.S.S.R.*, **37**, 81–5 (1951).]

Phenamine administered subcutaneously to rats at 10 mgm./kgm. dose does not affect the concentration of acetylcholine in the large hemispheres of the brain, but cholinesterase activity declines over 20–40 minutes, then rises considerably above normal (over 250 per cent.). G. M. KOSOLAPOFF (Chem. Abstr.).

Depolarization of the Motor End-plate by Decamethonium and Acetylcholine. B. D. Burns and W. D. M. Paton (Natl. Inst. Med. Research, London). [*J. Physiol. (London)*, **115**, 41–73 (1951).]

Intravenous and intra-arterial injections of decamethonium (I) caused depolarization of the cat gracilis muscle, as recorded by Ag-AgCl nonpolarizable leads. This effect was localized in the motor-end plate regions of the muscle, and was antagonized by pentamethonium and *d*-tubocurarine chloride. Since a cathode to the end-plate region reproduces the depolarization by (I) and by acetylcholine, and the passage of an anodal current reverses this effect, the end-plate blocking action of these drugs may be the result of a persistent localized cathode. M. ROCKSTEIN (Chem. Abstr.).

Effects of Convulsant and Narcotic Drugs on Acetylcholine Synthesis. Hugh McLennan and K. A. C. Elliott (McGill Univ., Montreal, Can.). [*J. Pharmacol. Exptl. Therap.*, **103**, 35–43 (1951); *cf. C. A.*, **45**, 2565*g*.]

The synthesis of free acetylcholine (I) by brain slices under optimal conditions is accelerated by very low concentrations and inhibited by higher concentrations of a variety of convulsant and narcotic or anticonvulsant drugs (picrotoxin, pentylenetetrazole, thujone, camphor, pentobarbital. phenobarbital, amytal, CBr_3CH_2OH, chloretone, diphenylhydantoin). When two drugs were present together, each in a concentration which alone caused acceleration, inhibition occurred; this inhibition was greater than was obtained with a considerably higher concentration of either drug alone. The drugs would not replace K as a stimulant of synthesis of (I). No obvious effect on bound (I) was seen. Similar effects of single and paired drugs on (I) synthesis by cell-free brain extracts were obtained, but the inhibitory effects of high concentrations were less marked. The concentrations of narcotics which cause inhibition with slices *in vitro* correspond to the established concentrations *in vivo* during narcosis. The concentrations of water-soluble convulsant drugs which cause acceleration *in vitro* correspond to the established concentrations producing convulsions *in vivo*. Methionine sulfoximine, the toxic factor of NCl_3-treated flour, exerts stimulatory and inhibitory effects on (I) synthesis like the other drugs mentioned. That derived from L-methionine is more active than that from DL-methionine.

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

Action of Narcotics on the Free and Bound Acetylcholine of Rat Brain. Albert Jean Rosenberg and Nicole Etling (Inst. biol. phys.-chim., Paris). [*Compt. rend soc. biol.*, **145**, 527–8 (1951).]

Chloral hydrate in the presence of glucose slightly decreased the formation of acetylcholine during the aerobic respiration of rat brain homogenate. Chloretone, gardenal and soneryl had no inhibiting action. L. E. GILSON (Chem. Abstr.).

Lipolytic Activity of Cerebrospinal Fluid in Neurolues. G. G. Giordano (Univ. Naples) and P. Salvi. [*Acta Neurol. (Naples)*, **6**, 665–8 (1951).]

The C.S.F. of 46 patients, mostly with progressive paralysis, showed a slightly higher tributyrinolytic activity than normal ($1{\cdot}50 \pm 0{\cdot}82$ against $1{\cdot}40 \pm 0{\cdot}60$ c.c. 0·01 N NaOH/100 c.c.). The increase was more evident in C.S.F. of higher protein content. The increased lipolytic activity may be due to activation of the enzyme by albumin, rather than to an increase of the enzyme units. C. SCANDURA (Chem. Abstr.).

Chromatography of Free Amino-acids in Cerebrospinal Fluid. Dargut Kemali (Univ. Naples). [*Acta Neurol. (Naples)*, **6**, 212–17 (1951).]

By the chromatographic method of Consden *et al.* (*C. A.*, **39**, 537[1]) only alanine was found (amounts higher than normal) in the C.S.F. of patients with various nervous diseases, mostly schizophrenia. C. SCANDURA (Chem. Abstr.).

Citric Acid in the Cerebrospinal Fluid. I. Martensson and T. Thunberg (Univ. Lund, Sweden). [*Acta Med. Scand.*, **140**, 454–63 (1951).]

The citric acid content of fluid obtained by lumbar puncture is higher than that of cisternal fluid, which in turn does not materially differ from ventricular fluid (60 p.p.m., 38·8 p.p.m. and 37·2 p.p.m. respectively). There is no sex difference, but the citric acid concentration increases with age. In patients the citric acid concentration is very variable, and is highest in cerebrovascular lesions and lowest in epilepsy and cerebral tumours. In

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the cerebrospinal fluid the citric acid level is much higher than that in serum, the latter being correlated with that of cisternal fluid. There is close correlation between the citric acid and protein content of the lumbar fluid. S. MORGULIS (Chem. Abstr.).

*The Mercuric Iodide Reaction as Applied to the Cerebrospinal Fluid. Masatoshi Yano (Keiô Univ., Tokyo). [Igaku to Seibutsugaku (Med. and Biol.), **19**, 247–9 (1951).]*

Serial dilution is made of the cerebrospinal fluid (I) with Ringer solution at pH 7·5 or with 0·066 M phosphate buffer at pH 7·5, and to each 1 c.c. of these solutions are added 1 c.c. of 1 per cent. aqueous Kl solution and 1 c.c. of 1 per cent. aqueous $HgCl_2$ solution in that order. After 24 hours the number of the last test-tube, the content of which remains orange-coloured (*i.e.*, the reaction is negative), is recorded. Negative HgI_2-reactions are given with the 3rd tube, and with (I) from patients with meningitis and with the Froin phenomena until the 6–9th tube and the 9–11th tube, respectively. The increases of lactic acid and of fibrinogen are suggested to play important roles in the HgI_2-reaction with the (I) of patients with meningitis. M. NAKAMURA (Chem. Abstr.).

*Atropine and Related Compounds on the Metabolism of Electrically Stimulated Sections of Mammalian Cerebral Cortex. H. McIlwain (Maudsley Hosp., London). [Brit. J. Pharmacol., **6**, 531–9 (1951); cf. C. A., **45**, 3082f.]*

The increase in respiration and glycolysis of cerebral cortex, brought about *in vitro* by electrical stimulation, was inhibited by atropine, hyoscine, hyoscyamine and cocaine in concentration of 10^{-4} molar. This concentration had little action on normal respiration and glycolysis. Atropine was ineffective in antagonizing increased respiration and glycolysis induced by K or by 2,4-dinitrophenol. Eserine was without effect on normal or stimulated metabolism. RICHARD F. RILEY (Chem. Abstr.).

*Actions of Electrical Stimulation and of 2,4-Dinitrophenol on the Phosphates in Sections of Mammalian Brain in vitro. H. McIlwain and Marion B. R. Gore (Maudsley Hosp., Lond). [Biochem. J., **50**, 24–8 (1951).]*

The application of potential gradients to sections of cerebral cortex metabolizing *in vitro* caused increased respiration, glycolysis, and inorganic P, and decreased creatine phosphate. About 15 minutes after the stimulation was stopped, metabolic conditions were in part restored to the prestimulation levels. 2,4-Dinitrophenol in 5×10^{-4} M concentration caused maximum increase in respiration, equal to that caused by electrical stimulation. However, the two effects are not additive. The 2,4-dinitrophenol very promptly caused a fall in creatine phosphate and a rise in the inorganic P. S. MORGULIS (Chem. Abstr.).

*Prothrombin in Nervous Patients. II. Prothrombin Activity in Vascular Cerebellar Lesions. Mario Ferraris (Univ. Genoa, Italy). [Sistema nervoso, **3**, 343–54 (1951).]*

In 45 and 7·5 per cent. respectively of 40 cases prothrombin times were slightly longer (up to 40 seconds) and shorter (14 seconds) than normal. C. SCANDURA (Chem. Abstr.).

*Pyruvic Acid in Schizophrenia. L. Dalla Torre (Univ. Rome), V. Boccardelli and G. Bonfiglio. [Lavoro neuro-psichiat., **9**, 420–6 (1951).]*

In 26 patients with schizophrenia, without treatment for 2 months, the pyruvic acid content of blood was 1·05–2·50 (average 1·59) mgm. per cent.
C. SCANDURA (Chem. Abstr.).

*Carbon Dioxide Accumulation and Oxygen Depletion as Limiting Factors in Convulsive Activity. Gun Belfrage (Pharmacol. Inst., Uppsala, Sweden). [Acta Physiol. Scand., **25**, 15–23 (1952).]*

Convulsive seizures were electrically induced in rabbits. The duration of the tonic phase was only slightly affected by inhaling CO_2 in animals which had little or no clonic phase while breathing air. In such animals the duration of the tonic phase was sensitive to O_2 deficit. Other animals, breathing air, showed a pronounced clonic phase, and their tonic phase was much more sensitive to excess CO_2 while relatively less sensitive to O_2 deficit. In different animals the tonic part of the convulsion was limited either by excess CO_2 or by depletion of O_2. The operation of the limiting factor depends on the sensitivity of the central nervous system to CO_2. S. MORGULIS (Chem. Abstr.).

*Morphology of Phosphatase Reactions in Nerve Tissues. Salvatore Tolone (Univ. Naples) and Domenico Ventra. [Acta Neurol. (Naples), **6**, 529–617 (1951).]*

The topographical and structural distribution (46 photomicrographs) of alkaline and acid phosphatases (respectively by the method of Gomori modified by Danielli (*C. A.*, **44**, 8405*b*) and modified by Moog in the parenchymal and nonparenchymal parts of normal nerve tissues of rabbits, dogs and cats was investigated.
C. SCANDURA (Chem. Abstr.).

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Action of Malononitrile in Rabbit Brain. Guido Reale and Lydia D'Argenio (Univ. Siena, Italy). [*Riv. patol. nervosa e mentale*, **72**, 331–41 (1951); *cf. C. A.*, **45**, 3947*b*.]

A histopathological study of rabbits treated with malononitrile or malononitrile + $Na_2S_2O_3$ indicated that the former causes nerve cell degeneration rather than stimulation.
ERICH HIRSCHBERG (Chem. Abstr.).

Studies in Permeability in Relation to Nerve Function. III. Permeability of Brain Cortex Slices to Glycine and Aspartic Acid. Saul R. Korey and R. Mitchell (Columbia Univ.). [*Biochem. et Biophys. Acta*, **7**, 507–19 (1951) (*in English*); *cf. C. A.*, **44**, 3592*f*.]

The rates of penetration of N^{15}-labelled glycine, aspartic acid and urea into the interstitial compartment and neuronal cells of rabbit cortical tissue slices were determined. The volume of the interstitial compartment lies between 19 and 34 per cent. of the total, and equilibrium between it and the surrounding medium occurred rapidly (7 to 11 minutes with inulin, 2½ to 5 minutes with the amino-acids). Penetration of amino-acids into the tissue cells did not begin until after interstitial equilibrium was complete, and total equilibrium occurred after 1 hour (glycine) or longer. In contrast to the amino-acids, urea penetrates the tissues as rapidly as the interstitial compartment. The rates of penetration of the two amino-acids are about the same, but that of aspartic acid is very temperate-dependent ($Q_{10} = 1{\cdot}0$). Respiratory inhibition by HCN decreases the rate for aspartic acid, but not for glycine. These differences suggest that the penetration of aspartic acid is associated with an active cell process, while that of glycine is not. Inhibitors of acetylcholinesterase (eserine and DFP) have no effect. Diffusion coefficients calculated from the data are from one-eighth to one-fourth of those determined by standard methods in aqueous solutions.
C. TANFORD (Chem. Abstr.).

Effect of Vitamin B_1 on Conditioned Reflex Activity of Dogs. L. O. Zeval'd. [*Zhur. Vysshei Nervoi Deyatel. im. I.P. Pavlova*, **1**, 160–4 (1951).]

While low level injections of vitamin B_1 have no effect on the magnitude of conditioned reflexes, a high dosage (10 mgm. daily or more) leads to decreased magnitude of the reflexes, loss of stability of the reflex activities, and apparently changes in functional state of the cerebral cortex. Stimulants used were light and noise. The threshold level varies with the individual dogs. G. M. KOSOLAPOFF (Chem. Abstr.).

The Uptake of Radioactive Phosphorus in Normal Brain and Brain Tumours. J. E. Stapleton, Wylie McKissock and H. E. A. Farran. [*Brit. J. Radiol.*, **25**, 69–75 (1952).]

Radioactive P was administered to 34 patients with intracranial space-occupying lesions. The relative concentrations in 13 histologically proved tumours ranged from 0·9:1 to 34·1. The specific activity of normal brain tissue appeared to be not more than half the average specific activity of the body as a whole and was usually less. The specific activity of cellular tumour tissue varied widely, but was considerably above the upper limit of the specific activity of normal brain tissue. G. L. CLARK (Chem. Abstr.).

Dependence of Thyroid Functions on Cerebral Centers. A. A. Voitkevich. [*Zhur. Obshchei Biol.*, **12**, 331–45 (1951).]

Thyroid activity in chicks depends on nerve impulses; it is not restored in decerebrated chicks by giving a centrifugate of homogenized pituitary and physiological salt solution (2 daily 0·5 ml. injections for 10 days) or by methylthiouracil (2 daily 5 mgm. doses *per os* for 10 days). JULIAN F. SMITH (Chem. Abstr.).

Epileptogenic Action of Glutamate Directly Applied into the Brain of Animals and Inhibitory Effect of Proteins and Tissue Emulsions on its Action. Shosuke Okamoto (Keiô-gijuku Univ. School Med. Japan). [*J. Physiol. Soc. Japan*, **13**, 555–62 (1951).]

The solution of Na glutamate (I) which is injected directly into the brain cortex of dog or guinea-pig can cause epileptic convulsions of the animals. Ovoalbumin, emulsion of brain cortex or muscle and several serum proteins inhibit this epileptogenic action of (I). Animal-charcoal, acid kaolin, gum arabic and $Al(OH)_3$ show no inhibitory action. Addition of nicotine, precipitation of the protein, increase of pH and faradization can protect the inhibitory effect of proteins and tissue emulsions. ITIRO TYUMA (Chem. Abstr.).

Enzymes of Grey Matter and White Matter of Dog Brain; Distribution of Certain Non-oxidative Enzymes. A. R. McNabb (Univ. Western Ontario, London). [*Can. J. Med. Sci.*, **29**, 208–15 (1951).]

Cholinesterase (pseudo- and true), common esterase, phosphomonoesterase, amylase and β-glucuronidase were determined in homogenates of white and grey matter of dog brain. Grey matter had more cholinesterase activity than white matter, with the true cholinesterase predominating in both tissues. The common esterase (tributyrin substrate

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plus eserine), acid and alkaline phosphomonoesterases and amylase all showed greater activity in homogenates of grey matter than those of white matter. β-Glucuronidase activity was greater in the white matter. W. DONALD GRAHAM (Chem. Abstr.).

Hepatolenticular Degeneration; Biochemical Observations in Children with and without Neurological Symptoms; Hyperaminoaciduria. Bertil Hood and Sven Erik Fagerberg (Falu Hosp., Falun, Sweden). [*Acta Med. Scand.*, **140**, 374–80 (1951).]

A family of 11 children was studied. One child died of hepatic cirrhosis at the age of 9, and 3 children developed hepatolenticular degeneration between 10–12 years. Hepatic involvement with no neurological symptoms was present in 3 girls. They showed pronounced hyperaminoaciduria but normal nonprotein blood N. Feeding a high-protein, low-fat diet with intermittent addition of 1 g. choline did not apparently prevent the progress of the degenerative process. S. MORGULIS (Chem. Abstr.).

Pathologic Physiology of Cerebral Metabolic Disease. Joseph F. Fazekas and Ralph W Alman (Gallinger Munic. Hosp., Washington, D.C.). [*Med. Clinics N. Am.*, **34**. 1801–15 (1950).]

Cerebral metabolism is believed to proceed normally at maximum rate. It may be depressed by substrate deprivation, inhibition, or deficiency of intracellular enzymes, or O lack. Change in hormone concentration seems to have no effect. CO_2 is the best stimulant for cerebral vasodilation. Differences between various parts of the central nervous system in sensitivity to impairment of energy supply are based on local differences in metabolic requirements. ERICH HEFTMANN (Chem. Abstr.).

Proteolytic Enzyme Systems in Patients with Emotional Disorders. James S. L. Jacobs, Philip M. West and Clinton E. Tempereau (Univ. of California, Los Angeles). [*Proc. Soc. Exptl. Biol. Med.*, **78**, 410–12, (1951).]

Determinations of the chymotrypsin concentration in the serum were made as a measure of the rate of protein destruction, and the urinary uropepsin excretion was determined as a measure of adrenal activity. The results show that emotional disorders are accompanied by changes in protein metabolism and adrenal activity. The disturbance is generally in the direction of increased protein catabolism, being well correlated with emotional response when the disorder is essentially an anxiety reaction to acute stress, less well correlated in schizophrenic psychosis, and lacking in correlation in conversion hysteria. A comparison of schizophrenic psychotics with normal controls reveals that the former exhibit a generally higher and more variable state of adrenal activity. L. E. GILSON (Chem. Abstr.).

Changes in Brain Water, Brain Chloride and Serum Chloride after Bilateral Nephrectomy in Rats. Robert G. Small and W. A. Krehl (Yale Univ.). [*Proc. Soc. Exptl. Biol. Med.*, **78**, 378–81 (1951).]

An accurate procedure is described in detail for the determination of Cl in small samples of cerebral tissue. Cerebral edema did not occur in rats subjected to bilateral nephrectomy, nor was there any increase in brain Cl. After nephrectomy the serum Cl fell rapidly. L. E. GILSON (Chem. Abstr.).

Adenosinetriphosphatase (ATPase) Activity of Brain. Marion B. R. Gore (Maudsley Hosp., London). [*Biochem. J.*, **50**, 18–24 (1951).]

It seems very probable that the mammalian brain contains an enzyme which liberates inorganic P from adenosinetriphosphate (ATP) (by splitting 2 phosphate groups), which is activated by Mg++ and inhibited by Ca++, thiol-group reactants, or NaF. Its function in brain tissue is not clearly understood, and it is not understood how the energy released by the breakdown of ATP is utilized in the brain. Myosin, the ATPase of muscle, is activated by Ca++ and inhibited by Mg++; however, the muscle also contains a labile ATPase activated by Mg++ and inhibited by Ca++ with an optimum pH 6·8 (optimum for myosin is pH 9·4). The brain homogenates also contain an enzyme acting on inorganic pyrophosphate, and it is suggested that two separate enzymes are concerned with the splitting of ATP and of pyrophosphate. S. MORGULIS (Chem. Abstr.).

Electrical Stimulation in vitro of the Metabolism of Glucose by Mammalian Cerebral Cortex. H. McIlwain, G. Anguiano and J. D. Cheshire (Maudsley Hosp., London). [*Biochem. J.*, **50**, 12–18 (1951).]

Glucose, the main substrate of the brain *in vivo*, is almost entirely converted to CO_2, H_2O and lactic acid. Changing potential gradients which cause an increase in respiration of slices of cerebral cortex also increase the rate of utilization of added glucose and the rate of glucolysis (from 15–40 μ mol./gm./hr. to about 100 μ mol./gm./hr.) The response certainly occurs within 2 minutes or even quicker. S. MORGULIS (Chem. Abstr.).

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Electrical Phenomena in Nerve. III. Frog Sciatic Nerve. Abraham M. Shanes (Georgetown Univ., Washington, D.C.). [*J. Cellular Comp. Physiol.*, **38**, 17–40 (1951); *cf. C. A.*, **44**, 1612e.]

Stabilizers (pyribenzamine, cocaine, procaine, yohimbine) increase the resting potential, delay depolarization during anoxia, and decrease the hyperpolarization in 5 per cent. CO_2. Veratrine resembles Ca precipitants in exerting opposite effects; DDT, in concentrations sufficient to cause weak repetitive activity, had no such action. The fact that effective concentrations are those which modify threshold and the action potential suggests that one common labile factor is involved in these phenomena. Metabolic alterations are an unlikely basis for interpretation of these results, since the concentrations involved are far below those known to have a respiratory effect. K shifts are major factors directly responsible for at least the slower bioelectric fluctuations in nerve.

H. L. Mason (Chem. Abstr.).

A Means of Metabolic Investigation of Small Portions of the Central Nervous System in an Active State. H. McIlwain (Maudsley Hosp., London). [*Biochem. J.*, **50**, 132–40 (1951).]

An apparatus is described by which potential gradients can be applied to tissue pieces weighing 0·2 to 150 mgm. in a saline nutritive medium, without direct contact of the tissue with the electrodes. Increase in the respiratory rate of the tissue thus stimulated can be demonstrated. S. Morgulis (Chem. Abstr.).

The Influence of Adrenocorticotropic Hormone (ACTH) on Central Nervous System and Neuromuscular Function. Gilbert H. Glaser, Clark T. Randt, Paul F. A. Hoefer, H. Houston Merritt and Cornelius H. Traeger. [*Trans. Am. Neurol. Assoc.*, **75**, 98–104 (1950).]

In 29 patients with rheumatoid arthritis, dermatomyositis, toxic diffuse goiter, regional ileitis, multiple sclerosis, progressive muscular atrophy, progressive muscular dystrophy and paralysis agitans ACTH was not permanently therapeutically effective, but produced electroencephalographic and mental disturbances. It also caused salt and water retention, K excretion, alkalosis, hyperglycemia, glycosuria, fall in circulating eosinophils, increased excretion of 11-oxysteroids, 17-ketosteroids, and creatine, hypertension, acne, hirsutism and facial edema. Marion Horn Peskin (Chem. Abstr.).

Some Effects of Cortisone Acetate and ACTH in Neuromuscular Disorders. G. M. Shy, W. V. Cone, S. Brendler, R. Rabinovitch and D. McEachern. [*Trans. Am. Neurol. Assoc.*, **75**, 96–8 (1950).]

Cortisone acetate (in 1 case supplemented by adreno-corticotropic hormone (ACTH)) abolished the myotonic state but led to only doubtful improvement in the dystrophic state in 2 patients with dystrophia myotonica, led to marked improvement in the constitutional state in 1 patient with generalized lupus erythematosus and acute dystrophic process in the skeletal muscles, led to marked improvement in 2 cases of menopausal muscular dystrophy, temporarily aggravated 1 case of myasthenia gravis, and did not improve 1 case each of juvenile progressive muscular dystrophy and motor neuron disease. Six of the 9 patients showed excessive creatinuria (15–85 per cent. of the total creatine-creatinine excretion), which remained constant even with marked clinical improvement. Glucose curves of treated patients showed a higher rise and slower fall than normal.

Marion Horn Peskin (Chem. Abstr.).

The External Diagnostic Localization of Brain Lesions Using Radioactive Potassium. Anthony F. Susen, Wilfred T. Small and Francis D. Moore (Harvard Med. School, Boston, Mass.). [*Surg. Forum, Proc. 36th Clin. Congr. Am. Coll. Surgeons*, 1950, 362–8 (pub. 1951).]

Mainly radiological. The radioactive properties of K^{41}, $(I)^{131}$ (in organic combination) and biochemical factors affecting their localization are discussed.

W. C. Tobie (Chem. Abstr.).

The Moore Technique of Localization of Cerebral Tumors with Radioactive Substances. Edward B. Schlesinger (Presbyterian Hosp., New York, N.Y.) [*Ibid.*, 368–70.]

Failures to localize tumours with radioactive diiodofluorescein were due to anatomical factors. W. C. Tobie (Chem. Abstr.).

Radioactive Potassium, a New Isotope for Brain-tumor Localization. Bertram Selverstone, Wm. H. Sweet and Richard J. Ireton. [*Ibid.*, 371–5; *cf. C. A.*, **43**, 9232e.]

K^{41} injected intravenously localizes in high concentrations in most cerebral tumors as compared with normal brain, although astrocytoma may be an exception. Its properties as compared with those of P^{32} are discussed. W. C. Tobie (Chem. Abstr.).

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Formation, Flow and Absorption of Cerebrospinal Fluid. (II) Studies with Heavy Water in the Normal Man. Wm. H. Sweet, Bertram Selverstone, Sidney Soloway and DeWitt Stetten. [*Ibid.*, 376–81 ; *cf. C. A.*, **43**, 9209*a*.]

The rates of entry of H_2O and Na into several portions of the cerebrospinal fluid of man were determined by simultaneous determinations of D and Na^{24} after giving heavy water and Na^{24} Cl intravenously. D enrichment was much more rapid than Na^{24} enrichment.
W. C. Tobie (Chem. Abstr.).

The Distribution of Radioactive Phosphorus in Normal and Diseased Brain Tissue. W. Eugene Stern and Curtis Marshall (*Johns Hopkins Hosp., Baltimore, Md.*). [*Surg. Forum, Proc. 36th Clin. Congr. Am. Coll. Surgeons*, 1950, 400–1 (pub. 1951).]

Cats were given small amounts of P^{32} (as phosphate) intravenously. The uptake of P^{32} was greater in experimental brain lesions than in normal brain tissue. The concentration was greatest in the acid-soluble fraction. W. C. Tobie (Chem. Abstr.).

Schizophrenia and Hormones. Wm. Malamud (*Boston Univ., Mass.*). [*New Engl. J. Med.*, **244**, 908–14 (1951).]

A review of the relation of schizophrenia to endocrine disturbances, and the use of hormones (particularly adreno-corticotropic hormone and cortisone) for therapy of schizophrenia. Marion Horn Peskin (Chem. Abstr.).

The Color of the Filtrate of the Diluted and Boiled Blood in Psychoses : I. Masatoshi Yano (*Keiô Univ., Tokyo*). [*Igaku to Seibutsugaku* (*Med. and Biol.*), **20**, 15–19 (1951).]

The blood is diluted to make a 10 per cent. solution with distilled water, heated in the water-bath for 30 minutes, filtered, and the color of the filtrate compared in a Duboscq colorimeter. Marked decreases in the color intensities are observed with the bloods of patients with paralysis, pervitin intoxication, and with the bloods taken soon after electric shock. The patients, whose bloods give filtrates remaining at decreased color intensity for a long time, seem to have a poor prognosis. Pretreatment of the patient with an opiate before the shock prevented the decrease in the color intensity of the filtrate.
Michinori Nakamura (Chem. Abstr.).

Metabolic Patterns of Schizophrenic and Control Groups. M. Kendall Young, Jr., Helen Kirby Berry, Ernest Beerstecher, Jr., and Jim S. Berry (*Univ. of Austin, Texas*). [*Univ. Texas Pub., No.* 5109, 189–97 (1951).]

The urine and saliva metabolic patterns of 18 male schizophrenics (I) and II controls (II), 20–45 years of age, were studied by chemical and paper chromatographic methods. The (I) showed a higher urinary level of Mg and of all amino-acids except histamine. Diazonium-coupling compounds were found in the urines of (I), but not of (II). Salivary glucose was higher in (I). G. W. Newell (Chem. Abstr.).

Exploration of Metabolic Patterns in Mentally Deficient Children. Louise Cain (*Univ. of Texas, Austin*). [*Univ. Texas Pub. No.* 5109, 198–205 (1951).]

The urinary metabolic patterns of 13 mentally deficient children, ages 7–11, and 10 controls, ages 5–11, were studied by paper chromatography. In general, the greater excretion of metabolites was associated with a higher degree of mental deficiency. The data indicate that moron, imbecile and control groups each exhibit distinctive excretion patterns.
G. W. Newell (Chem. Abstr.).

Cerebral Circulation and Metabolism in Hyperthyroidism. Peritz Scheinberg (*Duke Univ., Durham, N.C.* [*J. Clin. Invest.*, **29**, 1010–13, (1950).]

None of the cerebral metabolic functions varies from the normal in hyperthyroidism. It is postulated that cerebral metabolism normally functions at nearly its maximum rate, with a large portion of the energy used by the brain going to maintain its structural and biochemical organization. Psychic manifestations which occur in the brain in hyperthryoidism are not related to local increased metabolism. John T. Myers (Chem. Abstr.).

The Metabolism of Tryptophan in Certain Nervous Diseases. Giuseppe Verga (*Univ. Milan*) [*Acta Vitaminol.*, **5**, 62–6 (1951).]

The urinary elimination of xanthurenic acid was determined following intake of 100 mgm. *l*-tryptophan per kgm. body weight by 7 patients (4 epileptics, 2 with lateral sclerosis, and 1 with progressive muscular atrophy). A positive xanthurenic index (xanthurenic acid eliminated in mgm./*l*-tryptophan intake in mgm. × 100) was found in 6 cases. The relation between altered tryptophan metabolism and vitamin B_6 insufficiency and the use of pyridoxine in treatment of these nervous conditions was discussed.
F. R. Bucci (Chem. Abstr.).

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Connection Between the State of the Nervous System and Variations of the Chloride Content in the Blood. K. S. Kosyakov. [*Fiziol. Zhur. S.S.S.R.*, **37**, 93–102 (1951).]

Examination of much clinical material shows that a state of excitement is accompanied by heightened variability of blood composition, while a state of repression of nervous activity leads to lowered variability, as compared with the normal, constantly present variability. G. M. KOSOLAPOFF (Chem. Abstr.).

Sugar and Lactic Acid in Brain Tissue upon Fading and Re-establishment of the Life Functions of an Organism. M. S. Gaevskaya (*Ministry Health, Moscow*). [*Arkh. Patol.*, **13**, *No.* 3, 34–41 (1951).]

In brain tissue of dogs dying of acute blood-letting there occurs at the onset of terminal pause a preponderance of glycolysis over respiration. At the instant of onset of clinical death, free sugar vanishes and much lactic acid accumulates; the picture remains constant for the following 9 minutes, showing almost complete fading of glycolysis. Upon revival there is an immediate rise in free sugar and lactic acid, with a rise in glycolysis which assures a restoration of basic life functions. After 1 hour of revival the lactic acid level reaches normal and oxidative processes take over from glycolysis; the unusually high sugar level also returns to normal after some 4 hours. G. M. KOSOLAPOFF (Chem. Abstr.).

Recent Studies of the Cerebral Circulation. C. F. Schmidt (*Univ. of Pennsylvana, Philadelphia*). [*Harvey Lectures, ser.* **44**, 124–44 (1948–1949); *cf. C. A.*, **42**, 8941*i*.]

A review of attempts to measure the volume of blood flowing through the brain by using various devices, and of the successful application of an indirect method, i.e., that of determining the rate at which N_2O diffuses from the arterial blood into the brain and thence into the cerebral venous blood. This method has been used in studies concerning the behaviour of the human cerebral circulation under various conditions, e.g., hyperventilation in aviation, hypertension, diabetes, schizophrenia.

JULIA O. HOLMES (Chem. Abstr.).

Proteolipides, A New Type of Tissue Lipoproteins; Their Isolation from Brain. Jordi Folch-Pi and M. Lees (*McLean Hosp., Waverly, Mass.*). [*J. Biol. Chem.*, **191**, 807–17 (1951); *cf. C. A.*, **43**, 4318*f*.]

Proteolipides differ from lipoproteins in being insoluble in water but soluble in $CHCl_3$-MeOH-H_2O mixtures. They are present in the following tissues listed in order of decreasing content; brain white matter, brain tumors, brain grey matter, heart, kidney, liver, lung, smooth muscle, and skeletal muscle; none in blood plasma. White matter yielded 3 fractions: A is a mixture of proteolipide and free lipides; pure lipide fractions can be isolated without splitting the proteolipide. The isolated protein moiety contains 1·76 per cent. S and is trypsin-resistant. Proteolipide B is a microcrystallized powder. The composition varies with the method of isolation, and is about 50 per cent. protein, 20 per cent. cerebrosides, and 30 per cent. phosphatides. Proteolipide C is a birefringent white powder. It is 70–75 per cent. protein; the rest is mainly phosphatides. The protein moiety contains 1·76 per cent. S and is trypsin resistant. FELIX SAUNDER (Chem. Abstr.).

Isolation of Brain Strandin, a New Type of Large-molecule Tissue Component. Jordi Folch-Pi, S. Arsove and J. A. Meath (*McLean Hosp., Waverly, Mass.*). [*J. Biol. Chem.*, **191**, 819–31 (1951); *cf. preceding abstract.*]

Strandin, a substance of high molecule weight, was extracted from brain tissue by 2:1 (by volume) $CHCl_3$-MeOH. It is especially abundant in grey matter. It contains 2·6 per cent. N, <0·2 per cent. P, and <0·2 per cent. S; <1·5 per cent. neuraminic acid, fatty acids, sphingosine, or a sphingosine-like substance, carbohydrate, and a primary amine which is combined through its NH_2 group. The presence of a chromogenic group which is destroyed quantitatively with the production of brown color on heating with 6 N HCl 15 minutes at 100° has been used for the development of a method for estimation of strandin. Strandin prepared by three different methods yielded essentially identical products which were all electrophoretically homogeneous, and in the ultracentrifuge showed a main component (80 per cent.) with a minimum possible molecule weight of 250,000.

FELIX SAUNDERS (Chem. Abstr.).

Preparation of Lipide Extracts from Brain Tissue. Jordi Folch-Pi, I. Ascoli, M. Lees, J. A. Meath and F. N. Le-Baron (*McLean Hosp., Waverly, Mass.*). [*J. Biol. Chem.*, **191**, 833–41 (1951); *cf. C. A.*, **33**, 7834[1]; *preceding abstract.*]

Lipides are extracted from homogenized brain tissue by means of 2:1 $CHCl_3$-MeOH. Insoluble substances are removed by filtration and the filtrate is washed with water to remove nonlipide contaminants. Proteolipides, strandin, and lipides, with the exception of a constant amount of brain diphosphoinositide which is bound to a protein by a solvent-resistant bond, are extracted by this method. The washing removes from the crude extract all nonlipide contaminants, and most of the strandin and diphosphoinositide. More tissue solids are removed than by other methods, most of the excess being strandin and proteolipides. FELIX SAUNDERS (Chem. Abstr.).

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Radioactive Isotopes in the Localization of Brain Tumours. Bertram Selverstone. [*Presse méd.*, **59**, 1093–4 (1951).]

P^{32} given intravenously as phosphate buffered at pH 7 is accumulated selectively in meningiomas, metastatic cancer, neurinomas, and especially in gliomas.

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

Metabolic Response in vitro to Electrical Stimulation of Sections of Mammalian Brain. H. McIlwain (*Maudsley Hosp., London*). [*Biochem. J.*, **49**, 382–93 (1951).]

The manometric apparatus was modified to enable the operator to apply electric stimuli to thin brain tissue slices under metabolic conditions. The voltage needed for metabolic response *in vitro* does not differ much from that necessary for autonomic responses *in vivo*. The metabolic response is apparently maximum within 1–2 minutes of the commencement of stimulation. Motor responses *in vivo* occur within fractions of a second. Usually the metabolic response ceased promptly on stopping the current, but in some instances an increased rate persisted for a few minutes after stimulation. Both *in vitro* and *in vivo* the tissue is very resistant to fatigue ; an appreciable fall in responses occurs only after some hours. If the voltage applied to brain-cortex slices was above a threshold value, the respiration increased with increase in voltage.

S. MORGULIS (Chem. Abstr.).

A Case of Pellagrous Neuropathy. P. W. Hutton. [*E. African Med. J.*, **27**, 325–7 (1950).]

Discussion of a case of nicotinic acid deficiency apparently not due to dietary or digestive inadequacy.

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

Some Effects of Dehydroascorbic Acid on the Central Nervous System. John W. Patters and Donald W. Mastin (*Western Reserve Univ., Cleveland, O.*). [*Am. J. Physiol.*, **167**, 119–26 (1951) ; *cf. C. A.*, **45**, 6285*a*.]

The intravenous injection of dehydroascorbic acid (DHA) in rats produces salivation and lacrimation. Lacrimation is prevented by atropine. Salivation is prevented by atropine and by the destruction of the chorda tympani nerve. The intravenous injection of DHA produces a rise in blood-pressure similar to that following the injection of adrenaline. The response is prevented by dibenamine, atropine, sympathectomy with right splanchnicotomy, and by low cervical cordotomy. It is not influenced by adrenalectomy. When repeated injections of a given dose of DHA are given to a rat, the blood-pressure response increases progressively to a maximum and then falls off. The toxicity of DHA is markedly decreased by the administration of artificial respiration. Dibenamine and atropine increases the toxicity. The ascorbic acid level of the brain is more than doubled by the intravenous injection of 200 mgm./kgm. of DHA. A similar dose of ascorbic acid has no effect. It is postulated that the central nervous system stimulation which follows the intravenous injection of DHA is the result of the production of acid by the reduction of neutral DHA to ascrobic acid.

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

Central Nervous Control of Food and Water Intake. H. M. Bruce and G. C. Kennedy (*Natl. Inst. Med. Research, London*). [*Proc. Roy. Soc.* (*London*), *B*, **138**, 528–44 (1951).]

A study of the influence of the rat hypothalamus on food and water consumption. Lesions of the tuberal nuclei caused obesity, and the effect of reduced water intake upon food consumption was increased. Lesions of the supraoptic region produced diabetes insipidus, and the effect of the ration on water exchange was exaggerated. Variations in the chemical composition of the ration showed that the animal could maintain a constant calcium intake while varying its water consumption widely.

JOSEPH S. HEPBURN (Chem. Abstr.).

2. Pharmacology and Treatment.

p-Hydroxypropiophenone in Psychiatry, with Control of its Activity on the Genital Function of Women. P. Haour and J. Miribel (*Faculté méd., Lyon, France*). [*J. Med. Lyon*, **32**, 991–5 (1951).]

Eight women in full genital activity received daily 0·3–1·5 gm. of p-hydroxypropiophenone (I) for manic-depressive psychosis. In 4 menstruation ceased and their vaginal smears showed increase of karyopyknotic and acidophilous cells. Some treated women showed some thyroidal disorder, which suggested a specific effect on the hypophysiothyrotropic function. Menopausal women showed no effect in vaginal cytology.

G. SAG (Chem. Abstr.).

Pharmacologic Dissociation of Behavior and Electroencephalogram " Sleep Patterns " in Dogs. Morphine, N-allyl-morphine, and Atropine. Abraham Wikler (*U.S. Pub. Health Service Hosp., Lexington, Ky.*). [*Proc. Soc. Exptl. Biol. Med.*, **79**, 261–5 (1952).]

In unanesthetized, uncurarized dogs, certain doses of the above drugs produce similar changes in the electroencephalogram, similar to or identical with the " burst-slow wave "

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patterns obtained during natural sleep or pentobarbital anesthesia. The significance of these findings is discussed. L. E. GILSON (Chem. Abstr.).

Effect of Phenamine (Benzedrine) on the Activity of the Higher Regions of the Central Nervous System of Animals (White Rats). V. K. Faddeeva. [*Zhur. Vysshei Nervnoi Deyatel. im. I. P. Pavlova* (**1**), 165–86 (1951).]

Phenamine at low dosage (0·6 mgm./kgm.) shortens the latent period of motor reflex reactions and slightly increases non-conditioned reflexes (food, orientation, and defense). This may be attributed to relaxed internal hindrance of the reflexes. Higher doses (1·2 mgm./kgm.) usually give 3-phase action : short initial decrease of latent period, followed by its lengthening or even disappearance of reflex, along with general increase of animal mobility, and a final new shortening of the latent period. High doses (2·4 mgm./kgm.) also generally have 3-phase action, but the 1st stage is very short, while the 2nd lasts for several days and may involve a complete loss of conditioned reflex activity. Here the protective hindrance appears to involve not only the cortex, but also the subcortical layers of the brain. At toxic doses all conditioned reactions are hindered catastrophically, and non-conditioned reflexes decline sharply after an initial enhancement. The drug stimulates the various regions of the brain, and at too high a level causes hindrance to develop.
G. M. KOSOLAPOFF (Chem. Abstr.).

The Use of Vitamin B_{12} in the Management of the Neurological Manifestations of Diabetes Mellitus, with Notes on the Administration of Massive Doses. Salvatore M. Sancetta, Perry R. Ayres and Roy W. Scott (Western Reserve Univ., Cleveland, O.). [*Ann. Int. Med.*, **35**, 1028–48 (1951).]

Vitamin B_{12} exerts a specific though unknown effect on the nervous tissue metabolism in diabetes mellitus leading to complete remission. Massive doses do not appear to carry a cumulative effect. JOHN T. MYERS (Chem. Abstr.).

Death Following the Ingestion of Alcohol in an Antabuse-treated Patient. Robert O. Jones. [*Can. Med. Assoc. J.*, **60**, 609–12 (1949).]

In an antabuse-treated case, death followed the ingestion of only 1 fluid ounce (30 c.c.) of rum. The blood AcH was high. Physiol. factors are discussed.
W. C. TOBIE (Chem. Abstr.).

Phenylacetylurea in the Treatment of Convulsive Seizures. Sidney Carter, Daniel Sciarra and H. Houston Merritt. [*Trans. Am. Neurol. Assoc.*, **75**, 255–8 (1950).]

Phenylacetylurea (phenurone) (I), tried in 63 patients with seizures, reduced frequency of seizures in 32 per cent. and completely controlled seizures in none. Toxic effects appeared in 62 per cent., and included leukopenia, evidences of liver dysfunctions, and gastrointestinal disturbances. While (I) has some anticonvulsant activity, it is not superior to the established anticonvulsants, and its toxicity limits its usefulness.
MARION HORN PESKIN (Chem. Abstr.).

The Effect of Nembutal on the in vivo Rate of Oxygen Consumption of the Cerebral Cortex. R. G. Grenell and P. W. Davies. [*Trans. Am. Neurol. Assoc.*, **75**, 105–8 (1950).]

A concentration of 0·5 mM. nembutal in the perfusate of the suprasylvian gyrus of the cat cortex caused a drop of 20–25 per cent. in rate of O consumption ; respiration was abolished by 10 mM. MARION HORN PESKIN (Chem. Abstr.).

Antagonism and Synergism between Narcotics and Sympathomimetic Amines in their Action on the Central Nervous System of Vertebrates : IV. S. Ya. Arbuzov. [*Fiziol. Zhur. S.S.S.R.*, **36**, 704–11 (1950) ; *cf. C. A.*, **43**, 7141*g* ; **45**, 4827*h*.]

The comparative action of adrenaline, sympathol, ephedrine, phenamine (benzedrine) pervitin, chloral hydrate, and medinal on sympathectomized rabbits was studied, with body temperature, reflex time, and length of narcotic states as the index. The sympathectomized animals show enhanced sensitivity to narcotics, more to medinal than to chloral hydrate. If all neck ganglia are removed the narcotic state is lengthened 2–3 times. Phenylalkylamines change the reflex time by the removal of the 2-phase reaction, with predominance of the hindering component. Antagonism between the two sets of drugs is weakly expressed and re-establishment of body temperature lags far behind the waking period, and the amines only partly compensate the disturbance of the nervous system by the operative means. Animals lacking all neck sympathetic ganglia show very weak waking processes and the action of pharmacological stimulants is lowered.
G. M. KOSOLAPOFF (Chem. Abstr.).

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The Anticonvulsant Action of Polyhydroxy Alcohols. Gerhard Bornmann (Univ. Münster i. W. Ger.). [*Arch. exptl. Path. Pharmakol.*, **213**, 114–20 (1951).]

Ethylene glycol, 1,2-propanediol, 1,3-butanediol (I), 1,2,3-propanteriol, and 1,2,4-butanetriol injected subcutaneously significantly protected mice against death from metrazole. (I) raised electro-shock threshold in rats from 50 to 130 per cent. while iso-Pr alcohol (II) raised the threshold 90 per cent. The subcutaneous LD_{50} for mice is 8·41 ml./kgm. for (II) and 16·5 ml./kgm. for (I). KARL F. URBACH (Chem. Abstr.).

The Effect of Emotion and of 2-Tetrahydronaphthylamine on the Adrenal Cortex of the Rat. M. Vogt (Univ. Edinburgh, Scot.). [*J. Physiol. (London)*, **114**, 465–70 (1951).]

Normal adult male Wistar rats subjected, for the first time, to rectal temperature measurement, showed after 1 hour a 40 per cent. drop of normal adrenal ascorbic acid (I) content, established by the method of Roe and Kuether (*C. A.*, **37**, 3118[1]). Six days of consecutive training eliminated this response to an emotional stimulus. A subcutaneous injection of 60 mgm./kgm. of 2-tetrahydronaphthylamine (II) caused a fall of (I) by 56 per cent. in normal rats and by 37 per cent. in demedullated rats. Untrained previously adrenalectomized rats with the remaining adrenal demedullated showed an 18 per cent. fall in (I) hour after measurement of rectal temperature. Emotion probably does not release adrenocorticotropic hormone exclusively through stimulation of the adrenal medulla.
M. ROCKSTEIN (Chem. Abstr.).

Anticonvulsant Activity of 2,2-Disubstituted 1,3-Propanediols in Electroshock Seizures. F. M. Berger (Wallace Labs., New Brunswick, N.J.). [*Proc. Soc. Exptl. Biol. Med.*, **78**, 277–9 (1951); *cf. C. A.*, **45**, 265*a*.]

Compounds studied were 2,2-dimethyl-, 2,2-diethyl-, 2,2-dipropyl-, 2-butyl-, 2,2-dibutyl-, 2-ethyl-2-methyl-, 2-isopropyl-2-methyl-, 2-propyl-2-methyl-, 2-butyl-2-methyl-, 2-butyl-2-ethyl-, 2-ethoxy-2-ethyl-, 2-ethyl-2-phenyl-, 2-phenyl-, 2,2-diphenyl-, 2-phenoxy-2-phenyl-, and 2,2-dibenzyl-1, 3-propanediol. All compounds in suitable doses protected mice against electroshock convulsion. The molecule configuration favourable for maximum activity is the presence of a quaternary C atom to which 1 or 2 Ph radicals are attached. Several of the compounds were about as potent as mephenesin. The most potent (the diphenyl derivative) was about one-sixth as potent as Na phenobarbital.
L. E. GILSON (Chem. Abstr.).

Central Nervous Depressive Effect of Khellin. Graham Chen, Charles R. Ensor and David Russell (Parke, Davis & Co., Detroit, Mich.). [*Proc. Soc. Exptl. Biol. Med.*, **78**, 305–7 (1951).]

Khellin (from *Ammi visnaga*) given orally was effective in suppressing excitement induced by caffeine in rats. At slightly depressive levels it was more effective against metrazol than against electroshock convulsions. The central nervous depression produced by khellin in mice is mild but of long duration. Khellin is more toxic for cats than for rats and mice. No excitement was shown by cats after ingestion of a lethal dose.
L. E. GILSON (Chem. Abstr.).

The Action of Diisopropyl Fluophosphonate on the Central Nervous System of the Cat. Mary Chennells, W. W. Floyd and S. Wright (Middlesex Hosp. Med. School, London). [*J. Physiol. (London)*, **114**, 107–18 (1951).]

Intrathecal diisopropyl fluophosphonate (DFP) (0·7 mgm./kgm. body-weight in propylene glycol (2 per cent.) injected at the level of the 7th lumbar vertebra in chloralose- or dial-anaesthetized and decerebrated cats facilitated the knee-jerk-flexor and crossed-extensor reflexes, as determined by the method described by Chennells *et al.* (*C.A.*, **43**, 7587*i*), but the nerve-muscle response was unchanged. No greater sensitivity of one reflex over another to DFP was observed. Larger doses of DFP, however, depressed the same reflexes. DFP in mean dosages of 2·5 mgm./kgm. also enhanced the flexor reflex response to a train of afferent stimuli. Intravenous injections produced similar responses for larger and smaller dosages of DFP, except that potentiation of nerve-muscle responses was also observed in the form of increased amplitude and duration of mechanical response to maximum motor nerve volleys, plus repetitive release of the action potential. In some cases mild generalized convulsive responses were observed for intrathecal injections of DFP, but cases of convulsions from intravenous injection of DFP were more readily obtained and more violent. It is suggested that the potentiation action of DFP is on some part of the central nervous system and similar to that of the anticholinesterases, but the potentiation of reflexes must not be dependent on higher centres, as indicated by results from the decerebrated animals and animals with mid-thoracic spinal transections.
MORRIS ROCKSTEIN (Chem. Abstr.).

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Action of Calabash Curare and Related Curariform Substances on the Central Nervous System of the Cat. S. Salama and Samson Wright (*Middlesex Hosp. Med. School, London*). [*Brit. J. Pharmacol.*, **6**, 459–70 (1951) ; *cf. C. A.*, **44**, 6032*c*.]

d-Tubocurarine (I), calabash curare (II), and curarine dimethyl ether dimethiodide (III) had a central excitant and peripheral paralysing action. The central actions of (III) were weaker than those of (I) and (II). The central activity of (II) was approximately equal to that of (I), but had a greater direct stimulating action on the spinal-cord centres. *d*- and *l*-Bebeerine were inactive centrally and had a very feeble peripheral paralyzing action. β-Erythroidine and dihydro-β-erythrodine had considerable peripheral paralysing activity and no central excitant action but rather a weak, possible nonspecific, central depressant action. RICHARD F. RILEY (Chem. Abstr.).

Convulsive Agents and the Phosphates of Brain Examined in vitro. G. Anguiano and H. McIlwain (*Maudsley Hospital, London*). [*Brit. J. Pharmacol.*, **6**, 448–53 (1951) ; *cf. C. A.*, **45**, 5271*a*.]

Pentamethylene tetrazole and strychnine did not affect inorganic and creatine phosphate in slices of cerebral cortex *in vitro* in concentrations effective in intact animals. Caffeine and picrotoxin caused relatively small changes. Applied potential gradients, simulating those which cause convulsions *in vivo*, increased O uptake and inorganic phosphate, and decreased creatine phosphate. RICHARD F. RILEY (Chem. Abstr.).

Mode of Action of Sodium Diphenylhydantoinate (Dilantin) in Epilepsy. Robert B. Aird and Louis Strait (*Univ. of California Med. School, San Francisco*). [*J. Pharmacol. Exptl. Therap.*, **103**, 136–46 (1951).]

Na diphenylhydantoinate raises the convulsive threshold of white mice treated with convulsive doses of cocaine. In cats it decreases the amount of cocaine passing from the blood into the brain tissue and cerebrospinal fluid, and thus protects to a certain extent against convulsive doses of cocaine. L. E. GILSON (Chem. Abstr.).

Effects of Narcotics and Convulsants on Tissue Glycolysis and Respiration. L. J. Webb and K. A. C. Elliott (*McGill Univ., Montreal, Can.*). [*J. Pharmacol. Exptl. Therap.*, **103**, 24–34 (1951).]

Glycolysis by brain tissue in the presence of O is greatly increased by low concentrations of various narcotics (pentobarbital, phenobarbital, amytal, CBr_3-CH_2OH, chloral hydrate). Maximum glycolytic rate, equal to or exceeding the normal rate of anaerobic glycolysis, occurs when the O uptake is about 50 per cent. inhibited by the drug. The rate of glycolysis is lowered again and the O uptake is further depressed by higher concentrations. Anaerobic glycolysis is unaffected or slightly accelerated by low drug concentrations, but is inhibited by concentrations greater than those which cause maximum aerobic glycolysis. The effects on glycolysis and respiration are reversible at low drug concentrations but irreversible at concentrations that inhibit glycolysis. Pentobarbital exerts similar effects on the metabolism of testis and kidney tissue slices. O uptake by brain slices is increased in the presence of succinate, ascorbate, or glutathione in the presence or absence of the above drugs. Succinate does not affect the aerobic glycolysis induced by pentobarbital ; ascorbate and glutathione reduce it. A few convulsant drugs tested did not markedly affect respiration or glycolysis except at relatively high concentrations.
L. E. GILSON (Chem. Abstr.).

Anticonvulsant Activity of α-Phenylsuccinimides. Graham Chen, Ruth Portman, Charles R. Ensor and Andrew C. Bratton, Jr., (*Parke, Davis & Co., Detroit, Mich.*). [*J. Pharmacol. Exptl. Therap.*, **103**, 54–61 (1951).]

A large number of derivatives of α-phenylsuccinimide with Me, Et, Pr, allyl, iso-Pr, Bu, and iso-Bu substituted in various positions were tested for anticonvulsant activity. The α, β-Me and Et substituted compounds were more effective against metrazole convulsions than against electroshock convulsions. Methylation of the heterocyclic N of most of these compounds increased the anti-metrazole potency. This enhancing effect decreased with increasing length and branching of the alkyl chain. α, α- and α, β-diphenylsuccinimides were more effective in suppressing electroshock convulsions than metrazole-induced convulsions. Methylation of the heterocyclic N of these compounds diminished their anti-electroshock activity. L. E. GILSON (Chem. Abstr.).

Delayed Arrest of Rat Brain Slice Respiration Caused by Pentobarbital During the Metabolism of Glucose. J. L. Karlsson, V. C. Sutherland and H. W. Elliott (*Univ. of California Med. School, San Francisco*). [*J. Pharmacol. Exptl. Therap.*, **103**, 1–6 (1951).]

Oxidation by rat brain slices of glucose, but not of pyruvate, in the presence of a concentration of pentobarbital capable of producing anesthesia *in vivo* leads to a delayed but sudden interference with further O uptake. The effect is definitely linked to the metabolism of glucose, since if glucose is added while the tissue is oxidizing pyruvate, metabolic

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arrest occurs after a certain length of time. Extracellular toxicity or exhaustion of metabolites has been ruled out, so the metabolic arrest must be caused by phenomena inside the tissue. L. E. GILSON (Chem. Abstr.).

Central Stimulating and Depressing Effects of Certain Pyrimidine Derivatives. *J. Jacob.* [*Experientia*, **7**, 352–3 (1951) (*in French*).]

In mice and rabbits 2-amino-4-dimethylamino-5-benzyl-pyrimidine and 2,4-bis (dimethylamino)-5-benzylpyrimidine induce restlessness, tremors and convulsions. They antagonize barbiturate narcosis and restore partially the respiratory rhythm previously depressed by morphine. 2,4-Dipyridyl-5-benzylpyrimidine is a potent narcotic in rabbits. D. S. FARNER (Chem. Abstr.).

Treatment of Persons Suffering from Migraine by Histamine and Antihistamine Substances. *László Biro* (*Országos Társadalombiztosító Intézet Koltói Ann Kárháza, Budapest*). [*Orvosok Lapja és Népegészségugy*, **4**, 11–13 (1948).]

Experiments made on 30 persons showed that subcutaneous injection of 0·01 mgm. histamine caused migraine attacks in 25. The attack could be stopped by giving ergotamine tartrate. Sensitivity could be healed by injections of histamine every second day in doses increasing from 0·001 to 0·01 mgm. Further experiments made on 15 people proved that 11 showed lively reactions on giving histamine. These reactions could be stopped either by gynergen or by 200 mgm. intravenous or intramuscular injections of antistine. ISTVÁN FINÁLY (Chem. Abstr.).

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