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

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Audiogenic Fits Produced by Magnesium Deficiency in Tame Domestic Norway Rats and in Wild Norway and Alexandrine Rats.

1. Domestic and wild Norway rats and wild Alexandrine rats on a magnesium-deficient and control diet were tested on alternate days with an air blast for susceptibility to audiogenic seizures. All the rats on the magnesium-deficient diet had fits, while not one of the control animals had a fit.

2. Domestic Norway rats fed the magnesium-deficient diet began to have running fits in an average of 8 days (range 3 to 16); wild Norways in an average of 15 days (range 5 to 30); and wild Alexandrines also in an average of 15 days (range 9 to 24).

3. Magnesium-deficient domestic Norways died usually during their first fit, and none survived more than four fits. Wild Norways and Alexandrines had between 6 and 19 fits, but none of them died during the entire test period of 50 to 55 days. (Author's abstr.)

The Effect of Experimental Insomnia on the Rate of Potential Changes in the Brain.

The changes in the potential pattern of the brain have been quantitatively studied during prolonged wakefulness and during mental activity. It was found that:

1. The EEG, quantitatively analyzed on the basis of per cent. time frequency distribution, affords an accurate objective method of studying the effect of mental activity and of the fatiuge of prolonged wakefulness.

2. Changes in the state of attention or alertness as produced by a mental multiplication problem cause an increase in the rate of the electrical activity of the brain. The changes are regular and the extent of the increase parallels the intensity of the mental effort.

3. Increasing periods of experimental insomnia also result in a progressive increase in the rate of the potential changes in the brain.

4. Superimposing an additional mental effort during experimental insomnia results in irregular changes indicating that the capacity of the fatigued brain to further increase its rate of electrical activity in response to such stimulus is reduced.

5. The changes produced by mental activity and by sleeplessness are in the same direction, although under the conditions of these experiments, not of the same magnitude. This is interpreted to indicate that mental effort required either for working a problem or in staying awake during experimental insomnia produces an increase in the rate of the electrical activity of the brain.

(Authors' abstr.)

Effect of Frontal Lobectomy on Blood Sugars of Normal Cats and Monkeys and Adrenal Denervated Cats.

A. In cats in which sham rage can be produced by bilateral frontal lobectomy:

1. The blood-sugar level under dial or nembutal anesthesia is increased within one half-hour following frontal lobectomy, and may continue raised for at least 4 to 5 hours thereafter.

2. No such rise in blood sugar occurs in cats which are anesthetized with barbiturates without frontal lobectomy.

3. Bilateral removal of an amount of occipital lobe approximately equal to that of bilateral frontal lobectomy causes no such rise in blood sugar.

4. There is an accompanying rise of pulse and respiratory rate when blood sugar rises.

5. Previous adrenal denervation causes the blood sugar rise which appears after frontal lobectomy to fall within 3 to 4 hours.

6. No rise in blood pressure occurs after frontal lobectomy although blood sugar, pulse and respiration increase.

B. In monkeys, which do not develop sham rage after cortical ablations, there is no significant change in blood sugar, pulse, respiration or blood pressure after bilateral frontal or occipital lobe ablation. (Authors' abstr.)

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The Use of Electric Shock Therapy in Psychoneurosis.

Fifty patients suffering from psychoneurosis had treatment supplemented by electric shock in the 3-year period between 1942 and 1944. Those patients whose symptoms were largely anxiety, tension and depression were most benefited. Thus among those with reactive depressions 9 of 11 recovered. Of those with anxiety conditions 10 of 12 were recovered or much improved. Seventeen of 18 suffering from a mixed psychoneurosis were similarly benefited. Of the compulsive obsessive group, 4 were markedly benefited while 4 were improved and 1 unimproved.

These results have been compared with those obtained in the earlier mentioned group of 200 psychoneurotic patients whose treatment was not supplemented by electric shock. There was a distinct difference between the two groups in the average length of hospitalization. In the shock-treated group it was $5\frac{1}{2}$ months while in the non-shock-treated group it was $8\frac{3}{4}$ months. Thus the period of hospitalization of those who received electric shock was less than two-thirds that of the group treated in the pre-shock era.

Thirty-nine per cent. of the 200 non-shock-treated patients and 46 per cent. of the 50 shock-treated patients recovered. This is not an impressive difference considering the discrepancy in the numbers involved. However, 80 per cent. of the shock-treated group were home recovered or much improved, that is distinctly benefited, while but 59 per cent. of the non-shock-treated group were so benefited. Of the 200 patients, 151 received some benefit from treatment while 48 of the 50 shock-treated patients were so considered. (Author's abstr.)

An Evaluation of Shock Therapy.

In view of these findings, it becomes imperative that shock studies concentrate on investigating the readmission and deteriorating aspects of shock therapy. The findings tend to indicate that shock therapy increases the frequency of readmission and thus raises the question of whether the time saved in the hospital at the first admission is not lost by the early readmission following shock treatment. This is particularly significant since it seems likely that shock therapy does produce

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deterioration and personality changes which may explain this increased readmission frequency. It is hoped that this paper may stimulate some research in this direction and that more extensive studies will be made. (Author's abstr.)

Brain Metabolism in Man : Unanesthetized and in Pentothal Narcosis.

1. The effect of pentothal anesthesia was examined in 9 subjects on whom 19 observations were made. Blood was drawn simultaneously from the right and left internal jugular veins and the femoral artery in order to determine the right and left cerebral arteriovenous oxygen differences and the right and left cerebral blood flows, which were measured according to the method of Kety and Schmidt to calculate cerebral metabolic rate. When results from both right and left sides are averaged, the oxygen consumption of the brain in the unanesthetized man is 3·3 c.c. oxygen/100 gm. of tissue/minute. This value, however, represents two groups : a higher one with 3·9 c.c. oxygen/100 gm. of tissue/minute and a lower with 2·7. Because of the asymmetric venous return, the cortical component usually appears preponderantly in one of the two internal jugular veins and it is concluded that the portion of the brain with the higher metabolic rate is the cortex.

2. In every instance pentothal anesthesia induced a depression in metabolic rate. The average during the second and third stages of anesthesia is 2·1 c.c. oxygen/100 gm. of tissue/minute, a reduction of 36 per cent. from the control value. The pattern of pentothal anesthesia shows that cortical oxidations are depressed earlier and more profoundly than those of the rest of the brain, which in turn may also be subjected to metabolic inhibition.

3. Because of some effects of pentothal, which cannot be attributed to metabolic inhibition, it is concluded that pentothal narcosis is on a bipartite basis, including metabolic depression as one factor and inhibition of nerve function as another. The clinical signs of pentothal narcosis can be best explained on this bipartite basis.

4. In the resting individual, the high metabolism of the cortex is correlated with its rapid blood flow. It is probable that the parts of the brain with the higher metabolic rates possess a greater vascular complement and that this is a structural adaptation to metabolic requirements. On the other hand, the retarded cerebral blood flow observed with pentothal anesthesia is functional and in part is a response to a decreased metabolic rate. The depression of metabolism induced by pentothal alters both the cerebral arteriovenous oxygen difference and cerebral blood flow. In most instances, both are decreased and, therefore, each of these factors is modified to account for the fall in cerebral metabolic rate. (Authors' abstr.)

Psychological Factors in Men with Peptic Ulcers.

Twenty men with peptic ulcers were studied from the psychosomatic point of view. None were psychologically mature. All of them had strong dependent desires which were secondary to either rejection or spoiling in early childhood. One group utilized the mechanism of over-compensation to deny these desires, resulting in the overt character picture of the driving, hard-working, ambitious business man. However, the authors found that the majority of their patients in a charity hospital were either outwardly passive and effeminate or openly acted out their deep oral desires. Ulcer symptoms developed in all of their patients as responses to frustration of these cravings, when the various defense mechanisms they used to handle such conflicts proved inadequate. (Authors' abstr.)

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Cerebral Anoxia from High Altitude Asphyxiation: A Clinicopathologic Study of Two Fatal Cases with Unusually Long Survival and a Clinical Report of a Non-fatal Case.

Three cases of anoxic anoxia occurring in aviators while engaged in combat are presented in detail. In 2 cases the anoxia proved fatal in 40 hours and 3 weeks respectively, and in the third instance the patient was observed for a period of 3 weeks and was then transferred to the United States. The degree and duration of anoxia in each case are not completely known. In the first, the accident occurred at an elevation of " more than 20,000 feet," the patient being found unconscious 5 minutes after completion of a bomb run, at which time resuscitation was commenced. In the second, the patient was exposed to an atmosphere at 24,000 feet for approximately 10 minutes. In the third, it was at 27,000 feet that the oxygen tank of the plane was shot away, necessitating a rapid descent to 7,000 feet, during which time no effort could be made to revive the patient.

In the case of approximately 40 hours' duration (Case 1) a conspicuous necrosis of ganglion cells was observed in laminas III to VI of the cerebral cortex, the striatum, the cerebellum, Sommer's sector of the hippocampus and the anterior horns of the spinal cord, mostly focal in character, and degeneration of myelin in the internal capsule. Also observed were early proliferation of the fixed tissue cells of the leptomeninges and vascular adventitia and mild exudation of lymphocytes and neutrophils into the meshes of the arachnoid, the perivascular spaces, and, to a limited extent, the parenchyma of the brain. In the case of 3 weeks' duration (Case 2) the changes were of virtually the same location except that the cerebral white matter, brain stem and spinal cord were relatively spared. The profound damage in these cases of sudden and severe anoxic anoxia is strikingly similar to that observed in some of the other forms of anoxia. (Authors' abstr.)

Incidence of Anisocoria and Difference in Size of Palpebral Fissures in Five Hundred Normal Subjects.

Five hundred neurologically normal persons were studied with reference to the incidence of anisocoria and of differences in the width of the palpebral fissures. Nearly 17 per cent. of the patients showed a slight but perceptible anisocoria. In 4 per cent. the difference in pupillary size was pronounced. Inequality of the palpebral fissures of a slight degree was noted in nearly 36 per cent. of the patients. Pronounced differences were noted in nearly 6 per cent. When both the pupils and the fissures were unequal, the smaller pupil and the narrower fissure were on the same side in 77 per cent. of the patients. However, in nearly one-half the patients with anisocoria the fissures were equal, and inequality of the fissures was accompanied with equality of the pupils in 73 per cent. of the patients, revealing unequal fissures. Consequently, inequality or imbalance of sympathetic innervation could be held responsible for at least some instances of the observed anisocoria, but in general, no gross factor could be identified as responsible for any asymmetry of sympathetic stimulation. In other instances differences in errors of refraction may play a role in causing unequal pupils. The incidence of inequality of the palpebral fissures is relatively high, and mild degrees may be considered without significance. Anisocoria should never be dismissed as an anomaly until a thorough search reveals no etiologic basis for it. (Author's abstr.)

Relation of Mental Imagery to Hallucinations.

The mental imagery of 40 patients with schizophrenia, 10 patients who had recovered from an alcoholic hallucinosis, and 114 normal subjects was tested.

Schizophrenic patients with auditory hallucinations were found to have a significantly lower mean percentage of auditory imagery than either normal subjects or schizophrenic patients without auditory hallucinations. The normal subjects and the schizophrenic patients without auditory hallucinations did not differ significantly in this respect.

Patients who had recovered from auditory hallucinosis were found to have a significantly lower mean percentage of auditory imagery than normal subjects. The mean percentages of auditory imagery for patients who had recovered from an alcoholic hallucinosis and for schizophrenic patients with auditory hallucinations did not differ significantly.

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Not only do these findings disprove the old theory that auditory hallucinations are exaggerations of predominating auditory imagery, but they suggest the new concept that one of the factors responsible for auditory hallucinations is relatively deficient auditory imagery. (Authors' abstr.)

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Prefrontal Leucotomy : A Neuro-anatomical Report.

An anatomical study of 7 leucotomized and 1 lobectomized human hemispheres has led to the following results :

(1) The anteromedial nucleus of the thalamus projects to at least the pre-callosal part of the cingulate gyrus ; the anteroventral nucleus to more posterior parts of the cingulate gyrus ; and the axial orientation of this projection in at least anteromedialis is the same as in animals.

(2) There is some evidence that pars magnocellularis of the dorso-medial nucleus of the thalamus projects to only the medial half of the orbital region of the prefrontal cortex (areas 12 and medial 11), while the portion of pars parvicellularis of the dorsomedial nucleus which lies adjacent to pars magnocellularis projects to the lateral half of the orbital region (areas lateral 11 and probably 47). The dorsolateral portion of pars parvicellularis is found degenerated after lesions of areas 45 and 46 in the inferior frontal gyrus, the ventrolateral portion after lesions affecting the vicinity of area 8 in the superior frontal gyrus. Degeneration of the central portion of pars parvicellularis seems to correlate with a lesion involving areas 46 and 9 (or 10) in the middle frontal gyrus. An anteroposterior axis in the dorsomedial nucleus tends to project to an anteroposterior axis in the frontal lobe.

These observations are not necessarily incompatible with Walker's concept of an axial correlation between the dorsomedial nucleus and the prefrontal cortex in monkeys ; but there are some disagreements in detail which necessitate further comparative studies.

(3) Degeneration in nucleus submedius of the thalamus is found to take place after leucotomy. It occurs after involvement of approximately the same areas as

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those whose damage leads to degeneration in the adjacent ventrolateral portion of pars parvicellularis of the dorsomedial nucleus, i.e. the vicinity of area 8 in the superior frontal gyrus.

(4) The most anteromedial portion of the ventral nuclear complex of the thalamus projects to area 6, and not more rostrally. The anterior part of the reticular nucleus of the thalamus appears to share in this projection to area 6.

(5) The anterior thalamic radiation courses through the tip of the ventral nuclear complex. Thereafter the projection fibres from the medial parts of the dorsomedial nucleus run in the ventral half of the anterior limb of the internal capsule, while the fibres from the central and lateral parts of the dorsomedial nucleus, together with projection fibres from the anterior nuclear complex, run upwards into the dorsomedial half of the anterior limb of the internal capsule.

(6) The existence of a prefronto-pontile tract (Arnold's Bundle) in the human brain is confirmed. It is tentatively suggested that it arises in area 10. It passes down the medial aspect of the anterior limb of the internal capsule and terminates in dorsomedially situated cells of the anterior pons. The question of termination of elements of the tract in the subthalamic nucleus and substantia nigra is discussed.

(7) Preliminary investigation of long association tracts related to the prefrontal cortex reveals definite degeneration only in fibres which may represent the uncinate fasciculus and fasciculus cinguli. No degeneration is discernible in the subcallosal, superior longitudinal, arcuate or inferior occipito-frontal fasciculi. A sclerosed tract which runs for some distance adjacent to the lateral border of the subcallosal fasciculus is considered to represent part of the course of the projection fibres of the anteromedial nucleus of the thalamus to the cingular cortex, and perhaps also fronto-occipital long association fibres. (Authors' abstr.)

Disease of the Nervous System Occurring Among Research Workers on Swayback in Lambs.

(1) Four of the 7 individuals who worked intensively in their respective roles, on the demyelinating disease known as swayback in lambs, developed a disease of the central nervous system, which is clinically indistinguishable from disseminated sclerosis.

(2) This might be due to an hitherto unidentifiable occupational hazard of chemical research workers.

(3) This might also indicate that there is some causal connection between swayback and disseminated sclerosis, and some consideration has been given to speculation along these lines, viz. to some common infective agent acting only in the presence of a trace element deficiency.

(4) As swayback is a demyelinating disease and can be prevented by copper therapy, it is apparent that trace element deficiencies should be considered in connection with analogous diseases of man. (Authors' abstr.)

Some Physical Aspects of Encephalography.

Gas does not rise beyond the first constriction which it encounters when it is injected into a glass model of the ventricles.

Gas passes readily through the cavities when an element of elasticity is introduced into the closure of the model.

The flow of gas within glass models is analyzed and the findings correlated with encephalograph *in vivo*. It is believed that the lateral ventricles undergo expansion during encephalography. The expansion (and the entry of gas) depends upon the rise of the pressure at the distal end of the gas bubble caused by replacement of fluid in the lower midline cavities. The increment can be measured by the vertical extent of the column replaced. The expansion of the ventricles leads to expansion of the cerebral hemispheres, and downward displacement of cerebrospinal fluid from the subarachnoid space. The pressure differential expansion is greater when the head is erect. Hence the degree of expansion is greater when the head is erect than when it is flexed. This is the only means of entry of gas when the head is flexed sufficiently to bring the foramen of Monro below the termination of the aqueduct. When the head is erect, however, the elastic recoil of the cerebral hemispheres produces a downflow of fluid after each inflow of gas. This also contributes to the better filling in this posture.

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The manipulations found necessary to transfer gas from one cavity of the model to another are described and the application of these findings to the radiography of the ventricles is considered. (Author's abstr.)

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The Effect of Oral Administration of Lactic Acid upon the Clinical Course of Depressive States.

The authors are well aware that the data offered in this paper are far from being complete and are by no means conclusive. Nevertheless, the results seem to indicate that the oral administration of lactic acid and sodium lactate influences the mood of patients in depressive states. In some instances the influence is no more than an improvement in sleep. In others, improvement in mood has occurred without any change in content of thought. In the patients who recovered from the depressive state under L.A., improvement in sleep, in mood and ultimately in content of thought became apparent. The authors do not wish to present this

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method as a new or well-defined form of therapy of depressive states, but they feel that the evidence from this work seems to indicate that the oral administration of lactic acid and sodium lactate can exert some influence on the mood, suggesting that the role of carbohydrate metabolism associated with depressive states bears further investigation.

It is well known that almost all patients with depression ultimately recover. Might it not be, therefore, that what we have interpreted as improvement and recovery with L.A. is no more than what would be observed in the spontaneous course of the disease ? Their data seem to suggest, however, that when so many patients show improvement with the administration of this metabolite that this might not be mere coincidence. If the L.A. is withdrawn two or three days after the sleep has shown initial improvement, the patient usually returns to the disturbed sleep pattern, but sleep can frequently be restored again by renewed administration. This is the more striking as many of the authors' patients even with considerable doses of barbiturates or paraldehyde still had sleep disturbances. Another question might be raised as to the role of the diarrhoea associated with the ingestion of L.A. in effecting the improvement, but usually the patient experiences diarrhoea only during the first two or three administrations when his condition is still subjectively and objectively unchanged. In addition, diarrhea produced by purgatives has no effect on depressions. Changes of the acid-base balance or the effect of the intravenous administration of lactic acid were not studied. With regard to the role of suggestion, it must be reiterated that every attempt was made to preclude the use of psychotherapy, even in its subtle forms, and if suggestion were helpful in cases of depression, the introduction of convulsive therapy would have been unnecessary. Another objection might be that the authors' cases were only so slightly depressed that a short period of rest or the protection of a hospital environment might have served as reason for the improvement. This could be true in certain instances, although practically all of their patients were so deeply depressed that electic shock therapy had been recommended.

Work, physical exercise, " total push " and physiotherapy have long been regarded as adjuvants, if not sole remedies, in the cure of depressive states. Convulsive therapy might conceivably be looked upon as severe and concentrated muscular activity in which the stimulus to the central nervous system would be incidental only. If we now see that lactic acid given by mouth can produce effects similar to various physical therapies, we might well consider lactic acid as the common denominator in all these methods of treatment.

(Authors' abstr.)

Conditioned PGR (Psychogalvanic Response) in States of Pathological Anxiety.

The authors have endeavoured to investigate the effect of pathological anxiety on the rate of conditioning, in order to determine whether the rate of conditioning might be eventually a valuable objective indicator of the degree of anxiety. The conditioned stimulus was a nonsense-syllable of low association value, the unconditioned stimulus was the sound of a buzzer and the conditioned response was the PGR (psychogalvanic response).

Two groups were used in this experiment. One was a group of 82 Hunter College students and the other a group of 51 patients from the In-patient Department of the Payne Whitney Psychiatric Clinic, some of whom had anxiety and some of whom did not, according to psychiatric observation.

The criterion of conditioning for the test was three successive marked responses to the conditioned stimulus when unaccompanied by the sound of the buzzer. The score was determined by counting the number of times the buzzer was sounded before this criterion was fulfilled.

All but 4 of the normal group had a score of from 14 to 58, while with but one exception all of the patients who were diagnosed by the psychiatric staff as having anxiety had a score of 14 or less.

The repeat correlation on 36 of the normal subjects was ·88. On repeat tests given to the patients the score in most instances increased or decreased as their anxiety increased or decreased, according to psychiatric diagnosis.

Differences in age, sex and general intelligence did not appear to affect the rate of conditioning. (Authors' abstr.)

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MAY,

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A Case of Systemic Torula Infection with Tumour Formation in the Meninges. *Krainer, L., et al.* 158

Neurotic Predisposition and the Disorganization Observed in Experiments with the Cambridge Cockpit.

It is contended that the disorganization of activity observed in the Cockpit test is essentially similar to that occurring in the neurotic reactions of aircrew to stress. In tests, the " overactivity " reaction resembled the acute anxiety reactions of aircrew, and the " withdrawal " reaction resembled various neurotic reactions, of which some have been labelled " hysteria." It has been shown that in some cases the effects observed in the tests were part of a more general reaction comprising frankly neurotic features. In some cases the test reaction recapitulated a previous neurotic illness. It has also been shown that the degree and type of the disorganization observed in the test depended upon the grade and type of the neurotic predisposition as assessed at an independent psychiatric interview. The test behaviour of experimental subjects, whether fit pilots, or pilots suffering from overt neurotic symptoms, tended to be of the kind expected. Thus the test behaviour was abnormal in two-thirds of the patients, but only in one-quarter of the fit pilots. The " overactivity " reaction was shown especially by those assessed as obsessional at interview, whereas the " withdrawal " reaction tended to be shown by those of hysterical disposition. (Authors' abstr.)

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Parenchymatous Cortical Cerebellar Atrophy Associated with Pick's Disease.

1. In a case of parenchymatous cortical cerebellar atrophy the loss of Purkinjë cells was combined with practically complete disappearance of nerve cells in the rostral three-fourths of the inferior olivary nucleus.

2. The atrophic changes in the cerebellum were associated with similar alterations in certain parts of the cerebrum where they were interpreted as those of Pick's disease.

3. Some features of the clinical history suggests that the condition was familial. (Authors' abstr.)

On the Mechanism and Localization of the Symptoms of Electroshock and Electronarcosis.

The symptoms of electroshock and electronarcosis in decerebrate, uni- and bilateral decorticate preparations, and in animals with one deafferented hind leg were compared with the syndrome of shock and narcosis in normal animals.

In the decerebrate preparations shock and narcosis produced an enhancement of the decerebrate rigidity and an increase of the respiratory rate. It was postulated that in the normal animal these symptoms of medullar stimulation are masked by inhibition, produced by the stimulation of structures situated rostrally of the decerebration section in the midbrain.

The respiratory arrest observed in the course of electroshock and electronarcosis in the intact animal is considerably shortened in the decerebrate preparation. This indicates that the arrest in the normal animal is not caused by a paralyzing action of the current directly on the respiratory centre, but again by inhibition of that centre.

Uni- and bilateral decortication did not produce major changes in the symptoms of electroshock and electronarcosis. This may indicate the relative unimportance of the cortex for the production of these syndromes.

The observations on animals with one deafferented limb made it clear that in general no spinal reflex mechanism is involved in the production of the extensor contractions which are part of the shock and narcosis symptoms. (Authors' abstr.)

Temporal Lobotomy.

A theoretical discussion is presented of the psycho-physiological mechanism of the prefrontal lobotomy and of the possible importance of the temporal lobes for emotional integration.

A new psychosurgical operation or temporal lobotomy is described by which a bilateral and deep section of the temporal lobe is produced in front of the tip of the temporal horn of the ventricle. The physiological aim of this operation is to cut the uncus, the beginning of the hippocampus, the uncinate fasciculus and other associational intercortical pathways.

The operation has been tried on two patients. One of them with predominant auditory hallucinations and strong associated emotional reactions, was not relieved by the temporal lobotomy. A secondary prefrontal lobotomy was more successful, although there were also more profound changes in the mental reactions after the frontal operation. In another case of a long-time deteriorated schizophrenic the temporal lobotomy was performed after an unsuccessful prefrontal operation. Some lessening of agitation was obtained. No gross neurological disturbances appeared after the temporal lobe sections and only in the first case was there some temporary difficulty in understanding speech and some loss of hearing. Further experience is necessary to evaluate fairly this operation, despite the fact that its first results have not been very striking. Larger sections of the temporal lobes may be necessary. (Author's abstr.)

J. NEUROPHYSIOL.

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*Synaptic Conduction to Giant Fibers of the Cockroach and the Action of Anticholinesterases. *Roeder, K. D., et al.* 1

*Generality of the Role of Acetylcholine in Nerve and Muscle Conduction. *Bullock, T. H., et al.* 11

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*The Effect of Sedatives upon Delayed Response in Monkeys Following Removal of the Prefrontal Lobes. *Wade, M.* 57
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*Effects of Potassium on the Endplate Potential and Neuromuscular Transmission in the Curarized Semitendinosus of the Frog. *Walker, S. M., and Laporte, Y.* 79

Synaptic Conduction to Giant Fibers of the Cockroach and the Action of Anticholinesterases.

1. A large number of sensory fibers from the cercus of the cockroach enter the 6th abdominal ganglion and form synaptic connections with 12 to 16 giant fibers which ascend the cord.

2. These synapses conduct synchronously up to 400 stimuli per second with a delay of 0·6 to 1·5 milliseconds. Spatial summation occurs.

3. Treatment with DFP causes marked synaptic facilitation alternating with periods of synaptic block, a condition which persists after washing in saline. The conduction process in the giant fibers appears to be unaffected by DFP in the concentrations used. It is concluded that trans-synaptic conduction is dependent on cholinesterase.

4. In the presence of DFP acetylcholine blocks trans-synaptic conduction, though alone it has no action.

5. Physostigmine, prostigmine and strychnine block trans-synaptic conduction with no sign of the facilitation and after-discharges characteristic of DFP. These drugs fail to sensitize the ganglion to the blocking action of acetylcholine.

(Authors' abstr.)

Generality of the Role of Acetylcholine in Nerve and Muscle Conduction.

Evidence suggesting the generality of an essential role of ACh in the conduction of nerve and muscle has been offered in two different types of experimental approach.

One method is based on the effect of cholinesterase inhibitors on the action potential of different kinds of nerves and of muscle.

1. As samples of sensory nerves, the optic and superficial ophthalmic nerves of *Raja erinacea* were selected. DFP abolishes reversibly the action potentials of sensory as well as of motor and mixed nerves.

2. The effect of cholinesterase inhibitors on adrenergic nerves was tested in experiments on the splanchnic nerve of *Rana catesbeiana*. Eserine abolishes the action potential of this nerve. The effect is easily reversible.

3. The action potential of the curarized frog's sartorius muscle (*Rana pipiens*) is completely and reversibly abolished by DFP. Eserine has the same effect.

Another type of approach, by which the assumption of an essential role of ACh may be supported, is evidence for the presence of the specific cholinesterase which is known to occur only in nerve and muscle.

4. In both sensory nerves in which the effect of DFP has been demonstrated, the optic and superficial ophthalmic nerve of *Raja*, specific cholinesterase is present in a concentration within the range that had previously been found in other nervous tissue and in muscle.

5. Cholinesterase is also found in high concentration in adrenergic nerves, i.e. the splanchnic nerve of the bullfrog and the postganglionic fiber of the superior cervical ganglion of cat. In the former the rate of ACh hydrolysis is 10 mg./g./hr. and in the latter it is 25 mg./g./hr.

6. In *Tubularia*, one of the hydrozoan coelenterates, which is the lowest group of animals to possess a nervous system comparable to that of higher animals, and in *Planaria*, the specificity of cholinesterase was found to be as high as that of any other cholinesterase tested. (Authors' abstr.)

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Giant Nerve Fiber System of the Crayfish. A Contribution to Comparative Physiology of Synapse.

The giant fibers in the central nervous system of the crayfish, *Cambarus clarkii*, were isolated in the oesophageal commissures and stimulated. It was found that the same peripheral mechanisms are brought into action by stimulation of any of the four giants.

The two medial giants are independent of each other. They conduct at a speed of 15–20 meters per second. They differ in no respect from peripheral nerve fibers.

The segmented lateral giants are interconnected in all ganglia posterior of the 4th thoracic. Stimulation of one invariably leads to excitation in the other. Their conduction speed is 10 to 15 meters per second. Transmission from one segment to the next of the same fiber is accomplished within 0·1 millisecond. The crossing time from one fiber to the other causes a similar delay in different ganglia, and takes about 0·5 millisecond. By cutting the lateral giants between different ganglia it is possible to delay the arrival of the impulse by forcing it to cross repeatedly.

In fresh preparations motor fibers of the roots of the abdominal ganglia are excited by stimulation of each of the four giants. The place of transfer between the lateral giant and the root at the same side is more peripheral than that with the medial giants.

The relation between impulses in the giants and the roots was studied. The first and third routes of the abdominal ganglia were found, in fresh preparations, to be excited by each giant impulse, no matter how closely they followed each other. With high frequencies of stimulation blocking of the root fiber occurs, preventing the passage of impulses. This blocking is not due to a refractory period, when the giant is stimulated with double shocks, the second impulse is effective under these conditions.

Aged preparations especially show a lengthening of the refractory period, in which a second giant fiber impulse does not cause a root potential.

Whereas the connections of the different elements in the lateral giants conduct with equal facility in either direction, the transmission from the giants to the roots is one-way. (Author's abstr.)

Topographical Representation of Muscles in Motor Cortex of Monkeys.

The topographical representation in the motor cortex of individual muscles acting over the ankle-joint has been investigated in nine macaque monkeys under Dial anesthesia. Simultaneous responses of eight muscles were recorded by isometric myographs during stimulation of the motor cortex.

The leg area was systematically explored millimeter by millimeter with a Goodwin thyratron stimulator and a unipolar electrode. The records were analyzed for evidence of muscle representation in terms of "solitary responses," tension-ratio and latency. Not only individual muscles, but also slips of a muscle have a focal point in the cortex from which a solitary response of that muscle is elicitable or the response is stronger and more prompt relative to other muscles. Among the muscles investigated, the anatomical flexors were found less responsive than the extensors. The inhibition of flexor responses by simultaneous excitation of the cortical extensor points is one factor in the unresponsiveness of the flexor muscles. Of the extensor group the muscles acting on the toes are more responsive than a muscle acting on the ankle. A hypothetical organization of Betz cells into a field composed of a focus and a fringe, the latter exhibiting overlap, is suggested to account for the type of muscle representation observed. (Authors' abstr.)

The Effect of Sedatives upon Delayed Response in Monkeys Following Removal of the Prefrontal Lobes.

Two monkeys which before operation gave a satisfactory performance in the delayed response experiment were unable to do so after removal of the prefrontal lobes.

Following intraperitoneal injections of nembutal or dial they were able to make scores reliably above chance up to delays of 25 seconds.

After withdrawal of drugs one animal retained this ability.

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The significance of these results is discussed from the point of view that inattention due to increased activity and distractibility has been the cause of previously reported failure rather than the loss of immediate memory or retroactive inhibition. (Author's abstr.)

Effect of Di-isopropyl Fluorphosphate (DFP) on Action Potential and Cholinesterase of Nerve. II.

1. Studies on the correlation of the effects of DFP on the action potential and cholinesterase activity have been extended to the giant fibers of the stellar nerve of squid and to the fin nerve.

2. The effects of a range of concentration of DFP have been studied in these nerves and in the lobster cord.

3. The technique of the experiments has been modified to permit continuous recording of the action potential of the nerves during exposure to and recovery from the compound.

4. On exposure of the nerves to 1 mgm. of DFP at room temperature (22–25° C.) the action potential is abolished slowly. The action potential of the stellar nerve disappears in 10–12 minutes; that of the fin nerve in 30–40 minutes.

5. Higher concentrations of DFP result in quicker action. Three to four mgm. of DFP abolish the potential of the stellar nerve in 2–4 minutes. Five mgm. of DFP act on the giant fibers of the lobster cord in the same time.

6. The reappearance of the spike during recovery from exposure to the higher concentration is more rapid than when lower concentrations of DFP have been used. The spikes reappear within a few seconds and recovery is complete within a few minutes.

7. Tested under the same conditions, the action of eserine on the stellar nerve is slower. The molar concentration of eserine must be about twice as high as that of DFP to obtain the same rate of action. This indicates a lower rate of penetration of eserine.

8. After the electrical activity of the nerves of the three preparations had returned to normal, the cholinesterase activity was determined. In all cases the enzyme activity was about 20 per cent. of untreated control nerves.

9. In similar experiments performed on the abdominal cord of the lobster, but at 5–7° C., the remaining enzyme activity was close to 50 per cent. as was to be expected from the lower rate of the irreversible inhibitory process at low temperatures.

10. The correlation established between the presence of cholinesterase and the electrical activity of the nerves of the squid and lobster has been extended to the case of the bullfrog and frog sciatic nerves. Two hours after injection of massive doses of DFP into the animals, cholinesterase was still present in the nerves.

11. The presence of the cholinesterase was demonstrated by the method of bio-assay. It is shown that the manometric technique is not adequate in this particular case, due to a combination of adverse factors. (Authors' abstr.)

Effects of Potassium on the Endplate Potential and Neuromuscular Transmission in the Curarized Semitendinosus of the Frog.

1. A technique for intra-arterial injection in the isolated muscle is described.

2. Small increases of K first facilitate and then depress neuromuscular transmission. It is suggested that both of these effects of K may involve alteration of the excitability of the muscle fibers and alteration of the size of the e.p.p.

3. During the period of depression a response is followed by prolonged reduction of responsiveness. It is pointed out that K diminishes restoration in some manner not revealed by the electrical signs of repolarization. (Authors' abstr.)

MARCH.

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*Effect of DFP on Action Potential and Cholinesterase of Nerve. III. *Grundfert, H., et al.* 155

Decerebrate Rigidity.

It is known that intravenous injection of appropriate doses of sodium cyanide results in a transient state of true decerebrate rigidity. The present experiments show that during the period of functional decerebration the electrical activity of all structures above the midbrain is absent. The activity of the suppressor region in the bulbar reticular formation is slightly depressed, while that of the facilitatory region in the lateral pontile tegmentum is unchanged or increased.

The hypothesis is advanced that both NaCN and appropriate lesions in the midbrain produce decerebrate rigidity by interrupting all afferent impulses to the bulbar suppressor region, thereby causing a deprivation-paralysis of that structure. The facilitatory region in the lateral pontile tegmentum, however, continues to receive afferent impulses from the cranial nerve nuclei as well as from the cord, and thus its facilitatory influence on the internuncial pools of the ventral horns of the cord continues unchecked. The balance between inhibitory and facilitatory impulses arriving in the cord is thereby upset. In the absence of impulses from the suppressor region in the bulb, this internuncial activity is greatly increased and is manifested peripherally as extensor rigidity.

It has been shown that the decerebrate state induced by NaCN may be modified by small lesions in the reticular formation of the brain stem and, furthermore, that it may be entirely prevented by lesions which selectively destroy the facilitatory region in the pontile tegmentum. Lesions restricted to the midline suppressor region, on the other hand, yield decerebrate rigidity. Although this hypothesis cannot be proven by the facts available at present, it seems to explain all the known observations regarding decerebrate rigidity. (Author's abstr.)

Convulsive Activity Induced by Fluoroacetate.

(1) Intravenous injection of sodium fluoroacetate causes local, rhythmic, seizure discharges in subcortical structures. These occur at the time when the animal is exhibiting repeated tonic seizures.

(2) There is no clear correlation between the electrical activity of the cortex and the paroxysmal activity occurring in the thalamus, hypothalamus or reticular formation of the pons.

(3) Dome and spike activity has been recorded from the cortex synchronously with rapid seizure discharges in subcortical structures. (Author's abstr.)

Injury Potentials Along Peripheral Nerves in Relation to Histological Structure.

The injury potentials at different levels of peripheral nerves in the cat's lumbosacral region have been measured. They were found to diminish continuously from the spinal nerve roots towards the periphery. The proportion between the injury potentials of the ventral roots and the tibial nerve was 4 : 1. Ventral roots had, on an average, 4·7 mV higher injury potentials than dorsal roots.

This drop of the injury potential along the nerve was found to be related to the calibre of the nerve fibres at the different levels. A general correlation was observed between cross-sectional fibre area per total nerve cross-sectional area on the one hand and injury potential on the other, so that a greater relative fibre cross-sectional area corresponded to a higher injury potential.

Calibre spectra are presented for a number of nerves at different levels as well as for motor and sensory roots (cat). (Author's abstr.)

Injury Potentials at Different Levels of Cross-section of Spinal Cord.

The injury potentials of different points of the cross-section of the spinal cord have been investigated with wick electrodes or glass capillaries and compared with the histological picture.

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The grey substance always has a lower injury potential than the white substance.

The white substance of the dorsal funiculus has a higher injury potential than that of both lateral and ventral funiculi.

The value of the injury potential of the dorsal funiculus was found to be 28·5 mV ± 2·1 (17 exp.), measured against the surface of the cord.

(Author's abstr.)

Effect of Afferent Impulses on Cortical Suppressor Areas.

Afferent nociceptive impulses initiated by electrical or mechanical stimulation of the sciatic nerve, injection of hypertonic NaCl solution into a muscle, or stretching of a contractured muscle led to an excitation of the suppressor as well as the sensori-motor and projection areas of the cortex. Quantitative experiments show similar reactions to threshold and supra-threshold stimuli. The excitatory process seems to be based on a diminished synchronization and on recruitment of additional cortical neurons. It is suggested that the suppressor areas are involved in a homeostatic mechanism. (Author's abstr.)

Influence of Suppressor Areas on Afferent Impulses.

Electrical stimulation of the frontal, parietal, or occipital suppressor areas of the cat results not only in a diminution or suppression of cortical activity, but also in a diminution or suppression of the cortical effects induced by afferent somatic and visceral impulses. (Author's abstr.)

Prolonged Facilitation of Synaptic Excitation in Sympathetic Ganglia.

Following the conduction of one or more volleys of impulses along the presynaptic and postsynaptic neurones of a sympathetic ganglion, there are long-lasting changes which facilitate subsequent excitation of the ganglion cells by impulses in the presynaptic fibers. Such facilitation may persist for many minutes.

A single ganglion cell which does not respond to slowly recurring volleys of preganglionic impulses may be brought into action by the arrival of more frequently repeated volleys. Presumably this is due to the persistance of some effect induced by each presynaptic impulse. The frequency of discharge from a cell is increased by an increase in the frequency of excitation.

When studying the response of a group of ganglion cells, the magnitude of the postganglionic action potential provides a measure of the number of ganglion cells responding to a volley of preganglionic impulses. The magnitude of this postganglionic response to a given preganglionic volley may be increased by as much as 10-fold, following a brief period of repetitive excitation through the preganglionic fibers. This indicates that many more ganglion cells respond to a given number of presynaptic impulses, following previous activity.

By increasing the frequency and duration of the conditioning train of impulses, the number of ganglion cells responding to a given preganglionic volley and the duration of this facilitation are increased. Following a single conditioning volley, a small degree of facilitation is detectable for a few seconds. After many volleys, the effect may last for more than five minutes.

Antidromic stimulation does not facilitate the response of a ganglion cell to synaptic excitation; on the contrary, it lowers the irritability of the cell. Also, the excitation of a ganglion cell by one set of presynaptic endings does not increase the irritability of the cell for subsequent excitation by other presynaptic endings. Furthermore, the response of a cell to acetylcholine is reduced by previous synaptic or antidromic excitation. These facts argue against the possibility that prolonged facilitation is due to previous activity of the ganglion cell itself.

The duration and magnitude of the prolonged facilitation is unaffected by modifying the circulation through a ganglion. This and other evidence indicate that the effect is not due to the persistence of some chemical agent in the synaptic region.

There remains the possibility that prolonged facilitation is due to a long-continued alteration in the presynaptic endings, which causes the nerve impulses arriving at the synapse to have a more effective excitatory action.

The relation of these phenomena to our recent observation of prolonged after-discharge of rhythmically recurring impulses is discussed. (Authors' abstr.)

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Effect of Di-isopropylfluorophosphate (DFP) on Action Potential and Cholinesterase of Nerve. III.

The study of the correlation between conduction and cholinesterase activity in nerves exposed to DFP has been continued and additional proof is offered for the close association of the two processes. The following results have been obtained with the superior cervical sympathetic nerve of the cat at 37° C.

1. When the nerve is exposed to 4 mgm. of DFP per c.c. (0·02 M), the action potential is abolished within 2–5 minutes, but recovers when the nerve is returned to Ringer's solution.

2. A, B, and C fibers are equally affected.

3. After recovery the cholinesterase activity is about 20 per cent. of the normal. This is the same percentage as found previously in other nerves treated with DFP in the same way.

4. On additional exposure of the nerve to DFP for 20 minutes, the action potential is abolished irreversibly. This rate of irreversible abolition of the action potential is in good agreement with the rate of irreversible inactivation of cholinesterase exposed *in vitro* to DFP at 37° C.

5. Eserine at an equimolar concentration abolishes the action potential in the same way, although at a lower rate.

6. In contrast to the effect of DFP, the action of eserine is reversible even if the nerve is exposed for an additional 20 minutes after abolition of the action potential. This is in agreement with the reversibility of the cholinesterase inhibition by eserine demonstrated on the same nerves.

With the bullfrog sciatic nerve at room temperatures (20–24° C.), the following results have been obtained:

7. The action potential is reversibly abolished by exposure of the nerve to eserine (6·5 mgm. per c.c. or 0·02 M).

8. Even when the nerve is exposed to eserine repeatedly and for long periods of time, the action potential reappears when the nerve is washed in Ringer's solution.

9. On exposure of the nerve to 4 mgm. of DFP per c.c. for 27–85 minutes, the action potential was abolished but recovered when the nerve was returned to Ringer's solution. Exposure for 120 minutes, however, abolished the action potential irreversibly. The time required to abolish conduction irreversibly is about the same as that found with the lobster cord at the same temperatures.

10. The parallelism between cholinesterase activity and action potential found previously in nerves exposed to DFP as a function of time has now also been established as a function of temperature. (Authors' abstr.)

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VOL. IV. MARCH, 1947.

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J. PSYCHOL.

VOL. XXIII. APRIL, 1947.

An Exemplification of Various Neuroses and Comparable Humm-Wadsworth Temperament Scale Profiles. *Beales, B. B., and Bluett, C. G.* . 133
Probing Canadian Prejudices. *Gerstein, R.* 151
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The Efficiency of the Group Rorschach Test in the Psychiatric Screening of Marine Corps Recruits.

The use of the Group Rorschach Test, in conjunction with a mental test and a pencil and paper personality inventory, in the psychiatric screening of Marine Corps recruits has been described. It has been shown that in the author's experiment the Group Rorschach Test differentiates between recruits who adjust and those who fail to adjust to recruit training in the Marine Corps. The group method had been shown to identify neuropsychiatric misfits missed by a typical pencil and paper personality inventory and that a simple and economical inspection evaluation of each group protocol is adequate to the needs of psychiatric screening of recruits. The Mean-Square contingency coefficient between inspection evaluations of 99 group records by two clinical psychologists is ·80, and the Mean-Square contingency coefficient between inspection evaluations of 141 group protocols and a check list evaluation of the same group records after they had been scored is ·91.

The experiment has shown that there is a high positive relationship between inspection evaluated group records and Drill Instructor performance ratings of the same subjects. There is also a high positive relationship between inspection evaluated group protocols and the personal and social history factors of the same subjects. It has also been suggested that the Group Rorschach Test is practicable for use in the psychiatric screening of Marine Corps recruits and leads to the identification of over 86 per cent. of those neuropsychiatrically unfit, when combined in a test battery with a psychometric test and a pencil and paper personality inventory.

(Author's abstr.)

J. SOC. PSYCHOL.

VOL. XXV. FEBRUARY, 1947.

*Correlates of Criminal Behavior. *Lodge, C. T.* 3
Abilities and Interests of Japanese-American High School Seniors. *Portenier, L. G.* 53
Frame of Reference in " pro " and " anti " Evaluation of Test Items. *Kay, L. W.* 63
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Correlates of Criminal Behavior.

The study here reported has attempted to demonstrate the applicability of the bisected variable tetrachoric method as an instrument for research in a part of the confusing domain of criminology. The results that have been obtained have convinced the writer, at least, that such an approach has great potential value.

It seemed at the outset that simply to establish an intercorrelation table between the various traits might shed light on the problem of linkage among the forces

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producing psycho-social conflict and resulting in arrests for criminal behaviour. In a sense this belief has been supported by the findings. But in another sense we have succeeded in raising more new questions than we have been able to answer old ones. Further development of the present data should provide results of even more interest than those already suggested. Such development might advantageously consist of reorganization or grouping of the variables so that those showing congruent profiles are juxtaposed. This will not only effect a more logical arrangement in that related items will be brought together, but it will also facilitate interpretation by rendering smoother and more easily read correlation profiles.

It is not unreasonable to surmise that a factor analysis of all or part of the set of variables might help greatly to reduce some of the complexities that are now present in the statistical raw data, i.e. the correlation table. It is evident from the fashion in which the profiles tend to form clusters that many of them are operationally very similar to each other. Discovery of what Tyron calls " operational unities "—general components which act as if they were unitary determiners of nominally different characteristics—should tend greatly to simplify the problems connected with our large table by reducing the number of " factors " with which we have to deal. There is, for instance, clearly some unitary determiner which causes the correlations for the four mental tests, school achievement, and diagnosis of intelligence defect all to act in a similar fashion in relation to all of the other variables in the table. " Estimated poor risk " and " prison sentences " and possibly other traits also can be combined into a single operational unity for purposes of further simplification.

Our method of inquiry has plainly indicated one profound generalization. This is that criminality is not an isolated phenomenon, but that it is inextricably a part of the total social organism. Symptom treatment of the type now prevalent—punitive imprisonment, legislative verbiage, increased police forces, etc., can of themselves accomplish no fundamental cures for " Crime." This can arise only from far-reaching adjustments of our entire social structure. If the present attempt serves only to demonstrate in some small measure a few of the many influences that contribute to the uniqueness and individuality of every criminal, and if it thereby serves to modify some of the stereotypes which obscure our thinking in regard to criminal behaviour, it will not have been without justification.

(Author's abstr.)

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Remarks About the Space-time System of Animals. *Hediger, H.* . . 241
The Relation Between Mathematical and Musical Ability. *Révész, G.* . 269
*The Significance of F. A. Carus and G. H. v. Schubert for the Psychology of the Dream. *Bossard, R.* 281
*Self-observations During Mescaline Intoxication. *Fischer, R.* 308

The Significance of F. A. Carus and G. H. v. Schubert for the Psychology of the Dream.

The usual claim that we owe the first decisive step towards an analysis of dreams to Freud is unjustified. It undervaluates the contributions of the philosophers Carus and Schubert, who lived about 100 or 75 years respectively before Freud. These men recognized, among other things, the symbolism of dreams and their relations to mythology and poetry. K. F. MUENZINGER (Psychol. Abstr.).

Self-observations During Mescaline Intoxication.

The effects of 0·6 gm. of mescaline are described. Color hallucinations were observed similar to those described by other authors. The state of euphoria, which lasted a few hours, gave way to a psychosis of 6–7 hours' duration, characterized by intensified suggestibility and fears of death.

K. F. MUENZINGER (Psychol. Abstr.).

TIDSKR. PSYKOL. PEDAG.

VOL. I. 1942.

Constitutional-psychological Viewpoints on Mental Defects in School Children. *Lindberg, B.* 12
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VOL. XI. 1944.

Recollection of Facts: Suicidal Attempt of a 9-year-old Girl. *Brantmay, H.* 81
The Affective Life and Psychoanalysis. *Flournoy, H.* 97

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1. Psychiatry.

Rehabilitation of British Industry's Neurosis Cases. [*J. Rehabilit.*, **12**, *No.* 4, 33–5, 35, (1946).]

The first Industrial Rehabilitation Center established in England in 1943 in one year treated satisfactorily 580 men and 460 women, many of whom were medically and psychiatrically difficult, usually because of occupational and social maladjustment. Each patient received psychiatric interviews with intelligence and aptitude tests. Workshops and daily physical training were provided, with communal activities every evening. A 2-week training course for 30 trainees is to be established for industrial medical and lay workers, sponsored by 150 industrial firms. A research department is being planned to investigate the causes of breakdowns in industry. F. A. COOKSLEY (Psychol. Abstr.).

Schizophrenia in Children. [*Ohio St. med. J.*, **42**, 1248–54 (1946).]

The author presents 7 cases of schizophrenia in children. The symptoms by which schizophrenia in children may be diagnosed when other disorders are ruled out are: Seclusiveness associated with irritability if seclusive activities are interfered with; excessive day-dreaming; bizarre behavior; diminution of interests and preoccupation with interests common to younger children; sensitivity to criticism, often associated with violent outbursts; and a reduction in physical activity. Prognosis in the 7 cases cited does not appear too favorable. Recent reports, however, indicate that up to 50 per cent. of schizophrenic children may show improvement. Treatment is primarily aimed at helping these children to improve their personal and social relationships. The treatment can best be carried out in a hospital-school-institutional setting. F. C. SUMNER (Psychol. Abstr.).

Psychogenic or Hypothalamic Amenorrhea. [*Med. Clin. N. Amer.*, **30**, 1103–14 (1946).]

Because of psychologic disturbances the hypothalamus may through loss of normal nerve impulses fail to release luteinizing hormones from the anterior pituitary gland which are necessary for the production of estradiol. A non-estrogenic hormone may then inhibit the follicle stimulating hormone required for menstruation. Diagnosis is made by ruling out physical causes and by discovery of an earlier psychic shock. As emotional stress is eliminated, the condition may disappear. Other cases may require psychoanalysis, with reassurance that there is no organic disease. The woman who is maladjusted, perhaps unconsciously, is more difficult to treat. The theory that release of luteinizing hormones from the anterior pituitary system is affected by nervous stimuli from the hypothalamic-pituitary nervous system has been experimentally proved.

F. A. COOKSLEY (Psychol. Abstr.).

2. Biochemistry, Physiology, Pathology.

Retromammillary Inhibition of Cortically Induced Movement. [*Proc. Soc. exp. Biol., N.Y.*, **63**, 76–8 (1946).]

The authors discovered a rostral midbrain area in the cat which, when stimulated while cortically-induced movement was in progress, inhibited these movements. Although the same areas in monkeys were similarly studied, no inhibitory responses were observed. C. P. STONE (Psychol. Abstr.).

Identification of the Substances which Produce a Positive Wassermann Test in the Cerebrospinal Fluid. Lipides with Antigen Properties. Prunell, Alfredo (Hospital Vilardebo, Montevideo). [*Arch. soc. biol. Montevideo*, **13**, 33–65 (1946) (*English and French summaries*).]

The luetic antibody is obtained from the cerebrospinal fluid (I) of luetic patients by the following modification of the Takata reaction: Incubate at 37° for 15–20 minutes the mixture of 3 c.c. (I) with 0·30 c.c. of a mixture (II) of 5·6 c.c. M/15 KH_2PO_4 and 94·4 c.c. of M/15 Na_2HPO_4, and with 0·30 c.c. 0·5 per cent. $HgCl_2$. Cool, centrifuge, and decant. Treat the precipitate thrice with 10 c.c. water and

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5 minutes' centrifuging. Add 3 c.c. 0·85 per cent. physiological salt solution to the precipitate, bring to pH 6 with 0·01 N HCl and warm to 40° until completely dissolved. Add (II), diluted to one third, until pH 6·7. The antibody is precipitated at pH 7·4. By fractional precipitation with $(NH_4)_2SO_4$ it is shown to consist of a euglobulin and a pseudoglobulin. The isoelectric point of the reagin is 5·8. The results of the Wassermann, Lange, and Kahn reactions are the same with these globulins as with the original luetic (I). Only 0·0004 gm. of the incompletely purified globulin-antibody (III) give a positive Wassermann test. (III) shows colloidal properties in dialysis. No substance with a bearing on the method of complement fixation appears in the dialyzate. The lipides extracted from luetic (I) have antigenic properties like those extracted from heart muscle. Procedure for preparation: Evaporate 12 c.c. centrifuged luetic (I) at 37°, add 6 c.c. absolute EtOH, stir for 30 minutes, incubate at 37° for 24 hours, centrifuge and evaporate by an air current. To the residue add a few drops of water and 3 c.c. 0·85 per cent. physiological salt solution. This emulsion effects a positive Wassermann test of the same intensity as a solution of 1 per cent. Bordet antigen.

F. FROMM (Chem. Abstr.).

Magnesium in Normal and Pathologic Cerebrospinal Fluid. Castells, C., and Gherardi, J. [*Arch. soc. biol. Montevideo*, **13**, 23–5 (1946).]

In the cerebrospinal fluid of 6 normal persons 1·40–3·6 mgm. per cent. Mg were found by Youngberg's modification of Denis's method (*C. A.*, **25**, 1857). In 9 cases of epilepsy, tabes, dementia precox, hydrocephalus, and manic-depressive psychosis the same Mg level was found. F. FROMM (Chem. Abstr.).

Lysozymic Activity of Human Cerebrospinal Fluid. Caselli, Patrio, and Tolone, Salvatore (*Univ. Naples, Italy*). [*Boll. soc. ital. biol. sper.*, **22**, 539–40 (1946).]

Normal human cerebrospinal fluid was dialyzed to destroy the inhibiting activity and was then shown to exert lytic activity against *Micrococcus lysodeikticus*. Some pathological fluids manifested this activity without dialysis.

HELEN LEE GRUEHL (Chem. Abstr.).

Antilysozymic Activity of Human Cerebrospinal Fluid. Caselli, Patrio, and Tolone, Salvatore (*Univ. Naples, Italy*). [*Boll. soc. ital. biol. sper.*, **22**, 537–9 (1946).]

The antilysozymic activity of the fluid was tested against normal ovalbumin and normal blood serum. Normal cerebrospinal fluids exerted a marked inhibitory effect on the lysozymic activity of these substances. Pathological fluids with a moderate protein content exerted a definite but less marked inhibiting effect. This activity was thermostable and was reduced by lowering the pH to the acid range. It disappeared on dialysis. HELEN LEE GRUEHL (Chem. Abstr.).

Relation Between the Chemical Composition of Spinal Fluid and the Course of Birth. Makar'ev, F. A. [*Akusherstvo i Ginekol., No.* 3, 54–5 (1946).]

Rapidly progressing course of birth is characterized by a high K-ion level in the spinal fluid and a lower level of Ca and Mg. which characterizes a higher tone of the sympathetic centers. The process of slow birth is accompanied by low K level, and higher levels of Ca and Mg. G. M. KOSOLAPOFF (Chem. Abstr.).

Convulsions Produced by Fetal Anoxia: Experimental Study. Fender, Frederick A., Neff, William B., and Binger, Grace (*Standford Univ. School of Med., San Francisco*). [*Anesthesiology*, **7**, 10–13 (1946).]

Nervous tissue is more sensitive to O deprivation than any other type of body tissue. This tends to be most marked at the highest neurologic levels. Cases are reported of 2 pups born of mothers which had been deprived of normal O supply shortly before delivery. Both pups developed a convulsive state, one five and one six weeks after birth. It is felt that anoxia played a role in the development of this state. It is further believed that fetal and neonatal anoxia in human beings may play a major part in the development of epilepsy.

RUTH BERGGREN (Chem. Abstr.).

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The Production of Electricity by Nerve. [*Science*, **104**, 569–70 (1946).]

Results from experiments on the effect of biological substances on the "oil-cell" model of the nerve impulse are discussed as evidence supporting the theory that the electrical nerve impusle is a phase-boundary potential produced by acetylcholine in contact with nerve lipoid. F. A. MOTE (Psychol. Abstr.).

Effect of Hyperventilation on Carotid Sinus Reflexes and Tone of the Vasomotor Center. Heymans, C., Pannier, R., and van Ostende, A. (Univ. Gand, Belgium). [*Arch. intern. pharmacodynamie*, **72**, 430–9 (1946).]

Hyperventilation, alkalosis and acapnia in dogs cause no fall in blood pressure, nor do they depress the reflexes from the carotid sinus or the central vasoconstrictor tone. M. L. C. BERNHEIM (Chem. Abstr.).

Indophenol Oxidase of the Central Nervous System. III. Indophenol Oxidase of Various Portions of the Nerves of the Human Fetus. Pesce, Vito Stefano (Univ. Bari, Italy). [*Boll. soc. ital. biol. sper.*, **22**, 646–7 (1946); *cf. C. A.*, **41**, 491f.]

The indophenol oxidase activity was lacking in the human fetal nervous system up to the 5th month of development. After that period it was present in varying degrees in the different portions of the nervous system. It was present in greater amounts in the gray than in the white matter.

HELEN LEE GRUEHL (Chem. Abstr.).

Indophenoloxidase of the Central Nervous System. IV. Action of Biogenic Amines on the Indophenoloxidase Activity of the Nervous System. Mitolo, Michele. [*Biol. ital. biol. sper.*, **22**, 651–4 (1946); *cf. C. A.*, **41**, 1302i.]

Experiments on chickens, guinea-pigs, rabbits, rats and dogs showed that the injection of biogenic amines in intoxicating but sublethal doses caused a diminution in the indophenol oxidase activity of the nervous system. This diminution was very marked with adrenaline and less marked but definite with histamine, triethanolamine and the other amines studied.

V. Action of Barbiturates on the Indophenoloxidase Activity of the Nervous System. Ruccia, Domenico. [*Ibid.*, 654–6.]

Barbiturates, administered in high doses to rats and rabbits, induced a definite diminution in the indophenoloxidase power of the nervous system.

HELEN LEE GRUEHL (Chem. Abstr.).

Diphasic Action of Chemical Mediators of Nervous Impulse. Peruzzi, Pietro (Univ. Pisa, Italy). [*Boll. soc. ital. biol. sper.*, **22**, 426–7 (1946).]

In perfusion experiments on isolated guinea-pig heart, adrenaline in a concentration of 10^{-11} sometimes exerts a stimulating action, sometimes has no effect, and sometimes exerts an inhibiting effect. Acetylcholine exerts a stimulating action in a concentration of 10^{-7} and an inhibiting effect in a concentration of 10^{-6}.

HELEN LEE GRUEHL (Chem. Abstr.).

Chemical Mediators in the Sympathetic Nervous System. West, G. B. [*Pharm. J.*, **158**, 6–7 (1947).]

A discussion of sympathin I and sympathin E and their relationship to adrenaline and noradrenaline. H. M. BURLAGE (Chem. Abstr.).

New Problems of Muscle and Nerve Physiology. von Muralt, Alexander (Hallerianum, Bern, Switz.). [*Arztl. Monatsh.* (*Schwarzenberg, Switz.*), **2**, 923–34 (1946).]

A review in which the relationships between chain reactions and muscular activity are discussed, as well as the electric and chemical viewpoints in nerve physiology. J. M. LITTLE (Chem. Abstr.).

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Disturbances of Neuromuscular Excitability During Alimentary Imbalance and Avitaminoses. XII. Application of Chronaximetric Methods to the Study of Members of the Vitamin B Complex in the Rat. Lecoq, Raoul, Chauchard, Paul, and Mazoue, Henriette (Sorbonne, Paris). [*Bull. soc. chim. biol.*, **28**, 305–14 (1946); *cf. C. A.*, **40**, 6129[8].]

XIII. Correction of the Disturbances of Chronaxia in B Complex Avitaminosis in the Pigeon and Its Relation to Dietary Balance. [*Ibid.*, 314–22; *cf. C. A.*, **40**, 3804[4], 5116[5].]

XIV. Role of the Principal Vitamins in the Maintenance of the Acid-base Balance of the Body. [*Ibid.*, 595–600.]

Discussion based on 8 previous papers. Vitamins C and D have an anti-alkalosic action; A, E and the B complex are antiacidosic. Carotene has no action in either direction (in rats).

XV. Avitaminoses A, C, D and E in the Pigeon. [*Ibid.*, 601–7.]

By chronaximetric methods it was shown that avitaminoses A and E result in chronic acidosis with some polyneuritic symptoms and that avitaminoses C and D cause symptoms of alkalosis. L. E. GILSON (Chem. Abstr.).

The Production of Experimental Pellagra by Adenine. Raska, Sigwin B. (Cornell Univ. Med. School, New York, N.Y.). [*Science*, **105**, 126–7 (1947).]

The physiological effects followed by death of one series of dogs which had included in their diet 400–500 mgm. adenine or free base mixed with $NaH_2PO_4.H_2O$ and of another group which were fed 300 mgm. adenine daily are described. These experiments show a direct relationship between purine metabolism and avitaminosis of which pellagra is the most frequent variety. Adenine probably combines with the constituents of vitamins or their precursors preventing their utilization, for many symptoms observed are those found in cases of extreme vitamin deficiency.
H. B. KLEVENS (Chem. Abstr.).

Observations on Pellagra in American Prisoners of War in the Philippines. Lewis, Charles F., and Musselman, Merle M. (Univ. Hospital, Ann Arbor, Mich.). [*J. Nutrition*, **32**, 549–58 (1946).]

Pellagra was observed in American troops living for 3 years on a deficient diet in Japanese prison camps in the Philippine Islands. Men developed pellagra while on a diet low in calories, high in carbohydrates, and lacking in animal proteins, fresh fruits and vegetables. It appeared in epidemic proportions after 6 months on a deficient diet. The signs and symptoms that were observed are described. The clear separation of certain dermal and neurological lesions according to specific vitamin lack was difficult. Processed foods, a crude yeast culture, and pure vitamin preparations were effective in controlling pellagra. Pure vitamin preparations were more effective when the diet was more adequate.
W. B. ESSELEN, jun. (Chem. Abstr.).

Histamine Contents of Various Nerves During Excitation. Ryvkina, D. E., and Bulatova, N. N. (Inst. Evolut. Morphol., Acad. Sci., Moscow). [*Byull. Eksptl. Biol. Med.*, **22**, *No.* 9, 32–5 (1946).]

In the animal species studied the histamine contents of the nerves decreased in the order: Phrenic, vagus and sciatic. In rodents (rats and rabbits) the nerve histamine concentration is greater than in cats and dogs. The irritation of nerves by an electric current of threshold strength leads to an increase in histamine concentration. Stronger currents lead to a histamine depletion. The histamine concentration remains unchanged during morphine narcosis whether threshold or stronger currents are used. H. A. WEGNER (Chem. Abstr.).

Reciprocal Action Between Thiamine, Acetylcholine and Cholinesterase. Knipst, I. N. (M. V. Lomonosov Univ., Moscow). [*Byull. Eksptl. Biol. Med.*, **21**, *No.* 3, 19–20 (1946).]

The experiments were carried out in two series. In the first series the response of the rectus muscle of a frog's abdomen to acetylcholine alone and with thiamine

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was studied. The muscle was divided into two parts. On one part progressive concentrations of acetylcholine were used, on the other the same concentrations of acetylcholine with the addition of several concentrations of thiamine. The highest concentrations of thiamine depressed the response of the muscle to acetylcholine, the lowest concentrations stimulated it, and the middle concentrations depressed it in some cases and stimulated it in others. In the second series the response of the same muscle to cholinesterase was studied. The addition of thiamine to this esterase always inhibited its hydrolyzing action on acetylcholine, the degree of inhibition depending on the concentration of thiamine and on the fact whether true or pseudocholinesterase was used. J. DAVIDSON (Chem. Abstr.).

Titrimetric Determination of the Cholinesterase Activity of Blood. Scoz, G., and Michele, G. De (*Univ. Naples*). [*Boll. soc. ital. biol. sper.*, **19**, 7–8 (1944).]

Add 0·1 c.c. of whole blood to 3 c.c. of dilute Na barbital buffer of pH 8. Place in a thermostat at 40° for 10 minutes, then add 1 c.c. of a solution containing approximately 33 mgm. of acetylcholine chloride. Incubate 3 hours at 40° and titrate to pH 8 with 0·02 N NaOH. A blank determination without blood must be made to determine how much acetylcholine is hydrolyzed by the buffer solution during incubation. L. E. GILSON (Chem. Abstr.).

Nerve Conduction after Inactivation of Cholinesterase. Boyarsky, L. L., Tobias, Julian M., and Gerard, R. W. (*Univ. of Chicago*). [*Proc. Soc. Exptl. Biol. Med.*, **64**, 106–8 (1947).]

Frog sciatic nerve, exposed to diisopropyl fluorophosphate in a suitable concentration in peanut oil and for a time sufficient to inactivate its cholinesterase, can still conduct impulses with entirely normal action potentials. Cholinesterase is not essential for nerve conduction. L. E. GILSON (Chem. Abstr.).

Acetylcholine Formation in B_1 Avitaminosis in Man. Anosov, N. N. [*Byull. Eksptl. Biol. Med.*, **21**, *No.* 3, 16–19 (1946).]

Acetylcholine formation was tested by the action of the blood from avitaminosis B_1 patients on isolated organs. Arterial blood taken 30 minutes after administration of 2 mgm. of eserine was placed in a test tube containing enough eserine to make a concentration of 1 : 100,000, and was tested on the eserinized abdominal muscle of a frog and small intestines of a mouse and cat. Observations were made on 4 patients with mild, and 18 patients with acute, avitaminosis. In no case did the blood of the patients show any acetylcholine action. The parenteral administration of eserine caused an accumulation of acetylcholine in the blood and also caused the restoration of the functions and mechanisms, especially the sensitivity and functions of the vegetative nervous system, which were disturbed by the depressed formation of acetylcholine in the blood. J. DAVIDSON (Chem. Abstr.).

Effect of Organ Extracts and Their Fractions on Acetylcholine Synthesis. Torda, Clara, and Wolff, Harold G. (*Cornell Univ. Med. Coll., New York, N.Y.*). [*Am. J. Physiol.*, **148**, 417–23 (1947).]

The results indicate that blood serum and animal tissues contain substances that increase acetylcholine synthesis and also decrease it. Human blood serum and water extracts of various animal tissues contain substances that increase acetylcholine synthesis. These substances are in part nondialyzable (proteins, lipoproteins) and in part dialyzable, many of them heat-stable and organic. Ether extracts of serum and various tissues contain factors that decrease acetylcholine synthesis. For some of the depressor effects fatty acids are responsible.
E. D. WALTER (Chem. Abstr.).

Anaerobic Synthesis of Acetylcholine. Lipton, M. A., and Guzman Barron, E. S. (*Univ. of Chicago*). [*J. Biol. Chem.*, **166**, 367–80 (1946).]

The brain enzyme which synthesizes acetylcholine anaerobically is soluble and can be extracted from acetone-dried preparations. Citrate, *cis*-aconitate, or acetoacetate must be present, and probably yield an " active " acetate, which acetylates choline. Adenosine triphosphate, K, and a coenzyme from boiled yeast or animal tissues are also necessary for the synthesis. M. L. C. BERNHEIM (Chem. Abstr.).

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Action of Histamine, Acetylcholine and Peptone on the Sympathectomized Dog. Bennati, D., and Bacq, Z. M. (*Inst. Physiology, Montevideo, Uruguay*). [*Arch. intern. pharmacodynamie*, **72**, 397–404 (1946).]

Sympathectomized and vagatomized dogs are more sensitive to small doses of acetylcholine and histamine than vagotomized dogs with enervated carotid sinus. Sympathectomized dogs do not recover completely from peptone shock.

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

Presence of Choline Acetylase in Striated and Cardiac Muscle. Nachmansohn, David, Berman, M., and Weiss, Michael S. (*Columbia Univ.*). [*J. Biol. Chem.*, **167**, 295–6 (1947).]

Choline acetylase was demonstrated in breast, skeletal and cardiac muscle. The amounts were smaller than in brain tissue.

JULIA O. HOLMES (Chem. Abstr.).

3. Pharmacology and Treatment.

Effect of Dimethylaminoethyl Benzhydryl Ether Hydrochloride (*Benadryl*) *on Permeability of Meningeal Capillaries. Gelvin, E. Philip, Elias, Herbert, and McGavack, Thomas Hodge* (*N.Y. Med. Coll., New York, N.Y.*). [*J. Pharmacol.*, **89**, 101–5 (1947); *cf. C. A.*, **40**, 6665[8].]

Repeated administration of benadryl to hospital patients with various disorders caused no change in the permeability of the meningeal capillaries to fluorescein and no significant change in the chemistry, cytology, pressure, or dynamics of the spinal fluid.

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

Mechanism of the Action of Calcium by Suboccipital and Intravenous Administration. Amiragova, M. G. (*Shtern Inst. of Physiol., Moscow*). [*Byull. Eksptl. Biol. Med.*, **21**, *No.* 4, 53–6 (1946).]

On intracranial and on intravenous administration of Ca in dogs there is a liberation in the cerebrospinal fluid and in the blood of a substance of sympathomimetic character. In the study of the metabolism of the vegetative centers it is necessary to use the blood obtained from the sinus through the torcular Herophili.

H. A. WEGNER (Chem. Abstr.).

Pharmacological Action of Dibenzylmethylamine (566 *Labaz*). *Heymans, C., Dallemagne, M. J., and Bacq, Z. M.* (*Univ. Gand, Belgium*). [*Arch. intern. pharmacodynamie*, **72**, 233–48 (1946).]

Dibenzylmethylamine is not sympathomimetic, but sensitizes the animal to adrenaline and to hypertensive reflexes of sinocarotid origin. It is a diuretic, and stimulates respiration centrally. It is a very active stimulant for the psychic and motor cerebral centers. It is a powerful local anesthetic, but causes much local edema, and so is unsuitable for surgical use.

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

Action of Prostigmine, Eserine, Diisopropyl Fluorophosphate and Atropine on the Central and Peripheral Transmission of Nerve Impulses. Heymans, C., Pannier, R., and Verbeke, R. (*Univ. Gand, Belgium*). [*Arch. intern. pharmacodynamie*, **72**, 405–29 (1946).]

Prostigmine, eserine, diisopropyl fluorophosphate and atropine injected into a dog head by means of the crossed-circulation technique do not modify the reflex or direct excitability of the respiratory or cardiovascular centers. Diisopropyl fluorophosphate sensitizes these centers to the action of eserine and prostigmine.

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

A New Pharmacological Action of Cocaine. Anticonvulsant Action. Gutierrez-Noriega, C., and Zapata Ortiz, V. (*Inst. nacl. higiene salud publica, Lima*). [*Rev. med. exptl.* (*Peru*), **4**, 59–100 (1945).]

Subconvulsive doses of cocaine were antagonistic to metrazole in dogs, mice and guinea-pigs. A similar antagonism to strychnine was observed with mice

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and in certain chloralosed dogs, but not with unanesthetized dogs. In curarized dogs there was no synergism or antagonism in hypertensive reactions, but in many cases cocaine abolished the hypertensive reactions associated with metrazole convulsions. H. L. WILLIAMS (Chem. Abstr.).

Role of the Sympathetic Nervous System in Changes of Subordinate Conditions in the Central Nervous System Under the Action of Morphine. Zukusov, V. V. [*Farmakol. i Toksikol.*, **9**, *No.* 1, 8–12 (1946).]

The influence of morphine (I) on summation of impulses was tested in rabbits after extirpation of the superior cervical ganglia. Electric impulses were employed at 0·5, 1 and 2 v. They were intensified by injecting adrenaline (II), pervitin (III), benzedrine (IV), ephedrine (V), or sympathol (VI) into an ear vein. Extirpation of the ganglia increased the capacity of the central nervous system to summate impulses, and decreased the constancy of the effect of (I) on summation. Sympathomimetic amines tend to restore the lost summation capacity. This effect is parallel to the relative activity of the drug as a stimulant to the central nervous system. The effect of (I) is indirect, not through the sympathetic nervous system. Urethan has a similar effect. The intensification activity of the tested amines is indicated by the dose, per kgm. of body weight, for impulses of 1 v., as follows: (II), 5; (III), 0·0001; (IV), 0·0003; (V), 0·0025; (VI), 0·006 (unit not stated). JULIAN F. SMITH (Chem. Abstr.).

The Effect of Benzedrine on Mental or Physical Fatigue in Soldiers. Somerville, Walter (*Exptl. Sta., Suffield, Alberta*). [*Can. Med. Assoc. J.*, **55**, 470–6 (1946).]

Benzedrine in 15 mgm. doses over a period of 17 hours did not significantly enable 50 soldiers to return better performances over an obstacle course than did placebo pills; nor did 35 mgm. show any appreciable effect in the last 24 hours of a 56-hour physically fatiguing exercise on 50 subjects. When given to 73 officers in 40 mgm. doses in the last 34 hours of a 72-hour test on staff problems, no significant effect was shown over inert control substances. There was no evidence that benzedrine tended to prevent sleep. No side effects of any significance were noted. G. H. W. LUCAS (Chem. Abstr.).

A Comparison of Amphetamine Sulfate with Other Stimulants of the Central Nervous System in Morphine Respiratory Depression. Handley, Carroll A., and Ensberg, Dorrence L. (*Baylor Univ. Coll. Med., Houston, Texas*). [*Anesthesiology*, **6**, 561–4 (1945).]

The results of this study on 14 human subjects indicate that amphetamine sulfate is the most effective drug of the 5 stimulants studied in antagonizing morphine respiratory depression. Amphetamine is also more prompt in acting than the other 4 agents. Average percentage increases in minute volume above the depressed levels were as follows: Amphetamine 102, nikethamide 37, ephedrine 30, metrazole 21, and caffeine 17 per cent. RUTH BERGGREN (Chem. Abstr.).

A New Lethal Dose of Curare, with Some Observations on the Pathology Produced by Large Doses. Cole, Frank (*Univ. of Minnesota, Minneapolis*). [*Anesthesiology*, **7**, 190–7 (1946).]

The anoxic lethal dose of intocostrin in the dog is 0·065 c.c. per lb. body weight. The anoxic lethal dose is unaffected by cyclopropane-O anesthesia. The death of one dog after administration of a sublethal dose indicates the possibility of a cumulative effect of curare. The use of curare on succeeding days may be associated with a heightened effect of the drug. An unidentified anti-curare effect was encountered with a technique including tracheal intubation, cyclopropane-O anesthesia, pentothal induction, and the administration of the curare with saline solution through rubber tubing. The deaths of 2 dogs show that the animal is in a dangerous condition on emergence from deep curarization. There is a nonanoxic lethal dose of curare. Dogs can make complete recoveries, with artificial respiration, after receiving 0·33 c.c. intocostrin per lb. body weight. The lethal dose of intocostrin in dogs, in the presence of continuous artificial respiration is about

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20 times the anoxic lethal dose. Large doses of curare appear to affect the cardiovascular system. No clinical evidence of brain damage could be found (other than that due to anoxia) attributable to large doses of curare. Bloody diarrhoea was a constant finding in the later experiments. Prostigmine does not appear to be a perfect neutralizing agent for large doses of curare. The safest and proper method of terminating the effects of a very large dose of curare is continuous artificial respiration until the animal has recovered completely.

RUTH BERGGREN (Chem. Abstr.).

Antagonism Between Sulfanilamide and Certain Vitamins with Respect to the Nervous System of the Rat. Lecoq, Raoul, Chauchard, Paul, and Mazoue, Henriette (Sorbonne, Paris). [*Compt. rend. soc. biol.*, **140**, 279–80 (1946).]

Daily injection of sulfanilamide prolonged nerve chronaxia and shortened muscle chronaxia. These changes are similar to those seen in chronic alkalosis and they were prevented by administration of *p*-aminobenzoic acid, nicotinic acid, riboflavin, or ascorbic acid. They were not modified by thiamine, adenine, pantothenic acid, or pyridoxine. L. E. GILSON (Chem. Abstr.).

Potassium versus Biotin in the Treatment of Progressive Paralysis in Dogs. Smith, Susan Gower (Duke Univ., Durham, N.C.). [*Proc. Soc. Exptl. Biol. Med.*, **63**, 339–41 (1946).]

In the paralysis previously described (*C. A.*, **39**, 5300[8]) restoration of K to the diet causes a return to a nearly normal state. Biotin is less effective; it appears to work indirectly, possibly by mobilizing K temporarily or having a synergistic effect when the K reserves are too low to operate alone.

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

The Mode of Action of Anticonvulsant Drugs on Electrically Induced Convulsions in the Rabbit. Barany, E. H., and Stein-Jensen, D. [*Arch. intern. pharmacodynamie*, **73**, 1–47 (1946).]

The convulsive threshold, seizure-pattern and post-convulsive stupor were studied in rabbits stimulated by short periods of 50-cycle a.c. With stimulus duration of 0·21, 1·0, and 4·0 second, the thresholds are 58, 28 and 23 milliamp. Variations of 10 per cent. in the threshold may occur. After a convulsion, the threshold returns to normal in about 1 hour, and it rises slightly after repeated convulsions. Phenobarbital, phenytoin, barbital, and bromide influence the threshold much more with 0·21 second than with 1·0 second, Na phenobarbital (10 mgm./kgm.) raises the threshold 96 per cent. at 0·21 second, but only 25 per cent at 1·0-second stimulation. All the drugs shorten the tonic phase of threshold convulsions, and usually shorten the total duration of the fit, and often atypical fits occur. The seizure-pattern, in normal rabbits, is independent of the stimulus duration and intensity. The tonic phase lasts about 15 seconds and the clonic about 4 seconds. After the drugs, the pattern is dependent on the stimulus. The duration of the post-convulsive stupor is reduced by phenytoin but not by the other drugs.

The Influence of the Electrode Arrangement in the Determination of Drug Action by Means of Electrical Convulsive Thresholds. Barany, E. H. [*Ibid.*, 189–92.]

Na phenobarbital (10 mgm./kgm.) causes a greater rise in the convulsive threshold if the test current is applied through electrodes in the conjunctival sacs rather than in the external auditory duets. M. L. C. BERNHEIM (Chem. Abstr.).

Action of Diallylbarbituric Acid (Dial) on the Electrically Induced Epileptic Fit. Barany, Ernst H., and Stein-Jensen, Erna (Univ. Upsala, Sweden). [*Acta Pharmacol. Toxicol.*, **2**, 264–7 (1946) (*in English*).

In rabbits, dial had a significant threshold-raising action when a 0·21 second electric stimulus was used, but not when the stimulus was prolonged to 1 second. The total duration of the convulsive seizure was shortened by dial.

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

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Action of Narcotics of the Barbituric Acid Group on the Course of Insulin Hypoglycemia. Andreeva, M. P. [*Byull. Eksptl. Biol. Med.*, **14**, *No.* 9, 45–7 (1942).]

Dial and medinal definitely alter the course of insulin-caused hypoglycemia. The symptoms of hypoglycemia are delayed and by the use of fractional introduction of medinal it is possible to reach a complete absence of convulsions, although the blood sugar drops sharply in the meantime. Finally, under such conditions, one dog failed to die, although its blood sugar was kept as low as 16 mgm. per cent. for 6 hours. G. M. KOSOLAPOFF (Chem. Abstr.).

Effect of Some Barbiturates on Tissue Cultures in vitro. *Pomerat, C. M., Drager, G. A., and Painter, J. T.* (*Univ. of Texas, Galveston*). [*Proc. Soc. Exptl. Biol. Med.*, **63**, 322–5 (1946).]

The technique of using hanging-drop tissue cultures of spinal cord taken from chick embryos on the 9th day of incubation for testing the inhibitory action of barbiturates on the outgrowth of nerve fibers is described. Total inhibition was obtained at 1 : 6400 concentration for seconal-Na and at 1 : 3200 for pentobarbital-Na and amytal-Na. For 14 other barbiturates the inhibiting concentrations ranged from 1 : 12,800 to 1 : 800. Fibroblast outgrowth from chick heart fragments *in vitro* was more resistant to barbiturates than fiber outgrowths from cord explants. L. E. GILSON (Chem. Abstr.).

Distribution of Barbiturates in the Human Body. Andrew, R. L., and Neubauer, L. G. (*Dominion Lab., Wellington, New Zealand*). [*Analyst*, **72**, 21–2 (1947).]

Analyses during over 20 years show that barbital, and phenobarbital are distributed quite uniformly in the liver, brain, kidney, lungs, intestine and thigh muscles, but may be considerably higher in the contents of the stomach and in the urine. W. T. HALL (Chem. Abstr.).

Chloroethylidene-methylene Narcosis. Rossiiskii, D. M. [*Byull. Eksptl. Biol. Med.*, **14**, *No.* 9, 36–45 (1942).]

Experimental narcosis with methylene chloride and ethylidene chloride were performed, on a qualitative basis, in comparison with $CHCl_3$ on dogs. Both substances are tolerated better than $CHCl_3$ and have a lesser period of excitation blood pressure and respiration during narcosis are not noticeably decreased. Numerous human cases are cited in which these substances and mixtures were used in a variety of operations with successful results. G. M. KOSOLAPOFF (Chem. Abstr.).

Blood Sugar and Pulse Reaction in Therapeutic Shock and in Experimental Increase of Affect. Wohlfahrt, Snorre (*Beckomberga Hosp., Stockholm, Sweden*). [*Monatsschr. Psychiat. Neurol.*, **108**, 121–56 (1943).]

Blood-sugar concentration (I) and pulse rate (II) were determined 30, 15, and 5 to 1 minute before, and 2, 5, 10, 20 to 25, 30, 40, 50, 60 and 70 minutes after, shock induced by metrazole (III), anoxia (N breathing) (IV), or electric stimulation (V). After maximum (III) shock (4 cases) (I) rose by about 75 mgm. per cent. and after usual (III) shock (3 cases) by about 25 mgm. per cent. The time at which the maximum (I) was reached varied from 5 to 60 minutes. When no shock (3 cases) followed (III), (I) did not change significantly, although (II) increased as much as when shock occurred. After (IV) shock (12 cases) (I) rose 9–52 mgm. per cent. The maximum was reached 5–20 minutes after the shock. There was no relation between amount of rise in (I) and intensity of shock or change in (II). After (V) shock (11 cases) (I) rose 21 to 44 mgm. per cent.; the maximum was reached at 5 to 50 minutes. There was no evident relationship between increases in (I) and (II). Nine patients accustomed to and expecting (III) shock were given 0·9 per cent. NaCl solution instead. (I) rose 9 to 34 mgm. per cent. with the largest increases in the patients showing the strongest affect. (II) also rose sharply in most instances. As controls 20 patients received a NaCl solution injection without any suggestion that it would cause shock. The average increase in (I) was 5 mgm. per cent. and the average (II) decreased. WARREN M. SPERRY (Chem. Abstr.).

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The Brain Changes Associated with Electrical Shock Treatment: A Critical Review. [*J. Lancet*, **66**, 363–9 (1946).]

That brain changes follow electrical shock treatment seems evident from a review of the literature, but it has not been proved whether they are transitory or permanent. Other complications make estimation difficult, but scattered cell loss and cell changes have been observed in experimental animals and to a less degree in man. The author believes this therapy should be used judiciously and sparingly and only in cases which can definitely profit from its application.

F. A. COOKSLEY (Psychol. Abstr.).

The Effect of Electric Shock on the Cerebrospinal Fluid. Finkelstein, B. A., and Loewenthal, M. (*County Health Inst., Konigsfeld, Switz.*). [*Monatsschr. Psychiat. Neurol.*, **107**, 315–24 (1943).]

Sugar, chloride, total protein, and the gold-sol and several other reactions were determined in the spinal fluids of 9 patients 3 to 5 minutes after electric shock, and in one patient 20 minutes after an epileptic seizure. No significant deviations from normal were observed. WARREN M. SPERRY (Chem. Abstr.).

The Action of Carbon Dioxide in Experimental Convulsions. Ozorio de Almeida, Miguel. [*Bull. acad. med.*, **130**, 365–7 (1946).]

The addition of CO_2 to the respiratory air causes disappearance of attacks of various forms of experimental epilepsy produced by the local application of strychnine to the motor cortex. The effect is directly on the motor centers and does not depend on changes in the pH. A. E. MEYER (Chem. Abstr.).

Humoral Changes During Electro-shock Epilepsy in the Curarized Animal. Soulairac, Andre (*Univ. Paris*). [*Compt. rend. soc. biol.*, **140**, 263–4 (1946).]

The hyperglucemia and decrease in alkali reserve produced by electric shock treatment cannot be due entirely to the intense muscular activity commonly provoked, since they are also produced by electric shock in rabbits paralyzed with curare or narcotized with $MgSO_4$. L. E. GILSON (Chem. Abstr.).

Duration of Action of Metrazole. Carlsson, Arvid, and Theander, Georg (*Univ. of Lund, Sweden*). [*Acta Pharmacol. Toxicol.*, **2**, 227–34 (1946) (*in English*).]

The duration of action of a single dose of metrazole (I) was determined in guinea-pigs with the aid of N_2O. After administration of Na diethylbarbiturate plus (I) a higher partial pressure of N_2O is required to obtain a certain degree of narcosis than after the barbiturate alone. This analeptic action against the barbiturate of a single subcutaneous dose of 150 mgm./kgm. of (I) persisted for more than 10 hours after the injection. (I) does not exert an analeptic action against N_2O.

A Depressant Component in the Action of Metrazole. [*Ibid.*, 268–74.]

In tadpoles and frogs the stimulant action of metrazole (I) is followed by depression. (I) appears to act as a depressant in guinea-pigs narcotized with N_2O. Repeated subcutaneous injections of (I) in doses of 35 mgm./kgm. produce convulsions at first, but if continued, have less and less effect (in both rabbits and guinea-pigs). This development of tolerance may indicate a secondary depressant action. L. E. GILSON (Chem. Abstr.).

Analeptics. Jacques, Andre (*Hotel-Dieu de Quebec, Quebec, Can.*). [*Laval Med.*, **11**, 760–82 (1946).]

A review, including caffeine, strychnine, lobeline, coramine, metrazole, picrotoxin, ephedrine, adrenaline, neosynephrine, paredrine, benzedrine, cobefrin, methedrine. H. L. WILLIAMS (Chem. Abstr.).

Stimulant and Depressant Effects of Metrazole in Sodium Diethylbarbiturate Depression. Carlsson, Arvid, and Theander, Georg (*Univ. Lund, Sweden*). [*Acta Pharmacol. Toxicol.*, **2**, 379–82 (1946) (*in English*).]

In guinea-pigs depressed with Na diethylbarbiturate the analeptic action of graded doses of metrazole appears to increase only up to a certain limit. Further increase in dosage sometimes results in a reduction of the analeptic effect.

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

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