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The Role of X-Ray in the Study of Local Atrophic Lesions of the Brain.

Unilateral atrophic cerebral lesions occurring early in life frequently produce cranial asymmetry that may easily be detected in plain skull radiographs. This asymmetry consists in ipsilateral decrease in size of the cranial chamber and often increased size of the paranasal sinuses and mastoid air cells. Such examinations should never be omitted in the study of the epileptic patient.

In many cases of post-traumatic epilepsy ordinary skull radiographs reveal no localizing information, but tears and deficiencies of the dura tend to produce characteristic changes, and occasionally point out the exact site of a previous skull injury.

Carefully performed encephalography should be undertaken in almost all cases in which focal cerebral atrophy is suspected. The general region where the epileptogenic lesion will be found is frequently shown by this method. Occasionally a focal atrophic lesion may be present, although encephalography is negative. This is rare, and usually a normal encephalogram is a strong contraindication to craniotomy unless the other evidence available is very convincing.

The exact site of a focal epileptic lesion can usually not be determined by radiographic examinations alone, although the general region can be ascertained in most instances. Careful correlation of the clinical, electrographic and radiographic findings is essential.

Cerebral arteriography is occasionally a helpful procedure in the diagnosis of focal epilepsy, particularly when aneurism or hemiangioma is suspected. (Authors' abstr.)

Clinical and Electroencephalographic Studies.

1. One hundred cases with organic brain disease and delta activity in the electroencephalogram were studied for correlations of the psychiatric status with the electroencephalogram and anatomical localization.

2. This investigation showed that disturbances such as memory defect, mental retardation, dullness, inability to concentrate, overactivity and slight euphoria can occur without any delta activity in the electroencephalogram. They may be present also with a small amount of delta activity. Higher amounts of delta activity are associated with the syndromes of clouded consciousness and facetiousness. The delta activity was more equally distributed over the brain in cases with sleepiness and clouding of consciousness than in cases with facetiousness. The latter showed a relatively high amount of delta activity over both frontal lobes and a smaller amount over other regions.

3. Facetiousness is associated with dysfunction, not afunction, of both frontal lobes with a smaller degree of dysfunction of other parts of the hemispheres. The electroencephalographic results in this respect are in good agreement with the fact that facetiousness was most frequently found in lesions restricted to the frontal lobes and not invading other parts of the hemispheres.

4. The degree of correlation between the electroencephalogram and the psychiatric symptoms was higher than the degree of correlation between the anatomy of the lesion and the psychiatric symptoms. Electroencephalography promises to be of further assistance in the correlation between disturbances of cerebral mechanisms and behavior, particularly in the differentiation between such psychic disturbances as are associated with a pure loss of cerebral tissue and such psychic disturbances as are associated with dysfunction of the remainining cerebral tissue. (Author's abstr.)

Electroencephalography in Behaviour Problem Children.

The EEGs of the 20 best behaved boys in a junior high school class of 131 boys were compared with the tracings of the 20 most troublesome boys in the class. These represented extremes from the point of view of behaviour and adjustment in a given situation. The age range of the

two groups was the same (13–16½ years). Choice of boys over 13 years of age made comparison easier because adult patterns are then already established, and consideration of normal year to year variations of tracings in children below this age was thus made unnecessary. Social, economic and cultural background was similar in the two groups, thus eliminating an important variable found in the groups compared in all previous studies by other authors. The boys in the most troublesome group were behaviour problems at home and in the neighbourhood, as well as in the school situation. The boys in the so-called normal group presented no difficulties of behaviour in school, home or neighbourhood. There were 12 abnormal tracings in the first group and 11 in the second. Intelligence level did not in itself have any influence on the nature of the tracings.

The EEGs of the 10 best behaved and least delinquent boys in an institution for delinquent boys and the 10 most chronic delinquents with the most severe and chronic types of behaviour disorder were similarly compared. Four of the former and 9 of the latter 10 boys showed abnormal tracings.

Results of comparison between intelligence, efficiency of performance and personality with type of EEG were also similarly contradictory, confusing and difficult to interpret. Individual case studies illustrated these contradictions and discrepancies over and over again.

The most consistent incidence of abnormal EEGs was found in the most poorly behaved institution group, in the group with the severest and most chronic disorders of behaviour. This would suggest that the finding of an abnormal cortical electrical pattern may be indicative of a physiological disturbance which influences behaviour adversely. However, the very frequent presence of abnormal rhythms and patterns of the same kind found by us and by other observers in children without behaviour disorders, and of normal and abnormal tracings in apparently similar types of behaviour problem children, make it difficult to interpret the significance of the findings in the individual case. The EEG is, of course, valuable in the detection of hidden focal lesions and of cryptic epilepsy. The most that can be said at present for the value of other findings of dysrhythmia in behaviour problem children is that they may be regarded as a probable additional unfavourable personal factor, among many other factors, adversely influencing behaviour. Studies and results to date do not warrant further interpretation or clinical application in diagnosis, therapy or prognosis. (Authors' abstr.)

Age and Electroencephalographic Abnormality in Neuropsychiatric Patients.

The EEGs of 1,593 neuropsychiatric cases are analyzed and the tracings are classified as "normal" or "abnormal." "Abnormality" is defined as activity with a predominant frequency outside the range of 8 to 12 per second or a tendency to change greatly with overbreathing. This criterion is applied to all records regardless of age or clinical condition. "Abnormal" records are further classified as slow, fast, and mixed slow and fast.

The percentage of "abnormal" records found in the various neuropsychiatric conditions varies from 22 per cent. in alcoholic psychosis to 54 per cent. in senile and arteriosclerotic disorders. The order is as follows: Alcoholic psychosis, 22 per cent.; schizophrenia, 23 per cent.; psychopathic personality and behavior disorders, 31 per cent.; manic-depressive depressed, 31 per cent.; psychoneurosis, 34 per cent.; manic-depressive manic, 42 per cent.; psychosis with mental deficiency, 50 per cent.; involutional psychosis, 51 per cent.; senile and arteriosclerotic psychosis, 54 per cent. A control group primarily between 20 to 30 years of age has 10 per cent. abnormal EEGs.

Involutional psychosis and manic-depressive depressed conditions are conspicuous because of a large amount of fast activity, whereas senile and arteriosclerotic psychosis, psychosis with mental deficiency, and psychopathic personality and behavior disorder are associated with a large amount of slow activity.

The very wide range over which the various neuropsychiatric conditions are distributed makes it necessary to study the incidence of electroencephalographic abnormality as a function of age. When this is done, the relationship between percentage abnormality and age is found to be a hyperbolic curve with greatest abnormality in youth and old age, and least abnormality between 25 and 45 years. The changes of incidence of electroencephalographic abnormality with age are so great that the factor of age cannot be neglected in the evaluation of the EEG. Furthermore, marked variations of more specific types of electroencephalographic abnormality with age are also found. For example, the incidence of slow activity falls rapidly with increasing age, from 20 per cent. under 15 years to 5 per cent. at age 45 to 55; and beyond this the incidence of slow activity rises. On the other hand, a rapidly rising incidence of abnormal fast activity occurs with increasing age, from 4 per cent. under 15 years to 20 per cent. at age 45 to 55, with a probable decline beyond 55 years.

The electroencephalographic findings in the various neuropsychiatric conditions are largely explained by changes associated with age. This makes it necessary to readjust our previous ideas of normality and abnormality in the classification of EEGs so as to take into full consideration the major changes and trends associated with age. In this regard, the present review of a large and diversified group of cases covering a wide age range will provide preliminary standards of comparison, and may be useful as a guide to further study along the same lines.

(Author's abstr.)

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Effects of Stimulation and Lesion of the Median Longitudinal Fasciculus in the Monkey.

Experimental stimulation of the mesial fibers of the median longitudinal fasciculus in the monkey causes ocular adduction. Destruction of these same fibers results in paralysis of adduction and nystagmus in the abducted eye on attempted lateral gaze. This is similar to the ocular syndrome described clinicopathologically in man. Vestibular function is unaffected.

On the basis of these observations, it appears that the ascending fibers in the median longitudinal fasciculus probably represent the terminal portion of the corticobulbar pathway for horizontal conjugate movements of the eyes. This hypothesis has been supported by observations made on a series of stimulations through the reticular substance, the vestibular nuclei and their emerging fibers. (Authors' abstr.)

Effect of Insulin Hypoglycemia on Glycogen Content of Parts of the Central Nervous System of the Dog.

In the determinations of the glycogen contents of the various parts of the central nervous system of nine dogs, subjected to intense hypoglycemia of various durations, it was observed that the decreases in glycogen concentration did not take place in a haphazard fashion, but occurred in a definite order, which, with the exception of the cerebral cortex, had a rostral to a caudal progression. The concentrations in the caudate nucleus and the corpora quadrigemina decreased first, followed by those in the cortex, the thalamus, the cerebellum and the medulla. The values for the cord were never significantly below the normal. These concentrations were correlated with the allocations of the symptoms of hypoglycemia. (Authors' abstr.)

Photic Driving.

Modification of the spontaneous electrical activity of the cerebral cortex of cat, dog, monkey and man may be produced by intermittent photic stimulation of the retina, so that the electroencephalogram obtained from the occipital cortex may take on a frequency synchronous with that of the flicker. The effect is augmented by increasing the intensity of the luminous flux, with a maximum at approximately 80 foot-candles. The driving is more pronounced when the photic stimulus is at the blue end of the spectrum than when it is at the red end. The cortex of the macaque monkey may be made to follow a flicker with a frequency of 34 per second, but the optic nerve and the lateral geniculate body will follow frequencies of 62 and 59 cycles per second respectively. Lesions of the visual pathways impair photic driving.
(Authors' abstr.)

Post-Traumatic and Histamine Headache.

Twenty-two patients with a history of headache following injury to the head received 0·1 mgm. histamine base (0·275 mgm. of histamine diphosphate) intravenously.

Headaches were produced by this injection, which in 13 patients were identical with the post-

traumatic headaches in character and location and in 3 patients were strikingly similar. In 2 patients headache failed to develop.

The prompt decrease in systolic blood pressure after the injection of histamine was followed by a secondary rise which was nearly as great (22 and 18 mm. of mercury respectively). This rise was probably due to a response of the sympathetic nervous system produced reflexly by the primary changes incident to the injection of histamine.

Headache appeared as the blood pressure was rising.

The majority of the patients with histamine headache obtained some (occasionally striking) relief by sitting upright. This is inconsistent with reports in the literature that lowering of the intracranial pressure of the cerebrospinal fluid aggravates histamine headache.

It is possible that the injection of histamine activates the physiologic mechanism which is involved in the production of some types of post-traumatic headache.

The possibility that the injection of histamine may influence favorably the symptom of post-traumatic headache is suggested by results in some patients. (Authors' abstr.)

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Experimental Production of Focal Epilepsy.

1. In a series of five monkeys an " effective " substance placed directly on the motor cortex resulted in the production of chronic Jacksonian and generalized seizures for periods extending over two years after operation.

2. The presence of a unilateral focus for the discharge of abnormal potentials in the region of the applied disk was demonstrated in the electroencephalogram for many months after the operation. This focus corresponded with the clinical manifestations of seizures. From previous histopathologic studies of similar material the foci did not appear to be the result of specific tissue damage, but seemed to indicate an actual physiologic zone of hyperexcitability.

3. Electrical stimulation of the frontotemporal regions with " threshold voltages " produced unilateral responses which substantiated the clinical and electroencephalographic observations. (Authors' abstr.)

OCTOBER.

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Head Injury: A Study of Patients with Chronic Post-Traumatic Complaints.

In a comparison of 68 patients with persisting complaints after head injury and 22 subjects observed after injury who had not presented themselves because of complaints, attention was given to the type of headache, the presence of items in the previous personality background suggesting instability, the severity of injury, the reports of electroencephalographic and pneumo-encephalographic abnormalities, certain ratings of " instability " and " disability " as determined by the Rorschach method, and situational factors which seemed relevant to the presentation of complaints.

The greatest difference between the patients and the controls lay in the presence of situational factors which might have produced or aggravated psychoneurotic symptoms. This was true for every type of headache. It was also evident that patients with localized headache showed less evidence of previous neurotic background and more evidence of cerebral damage from the injury. This evidence included electroencephalographic records and Rorschach " disability " ratings, with the ratings for severity of injury and pneumo-encephalographic changes tending in the same direction, although less significantly. Except for a few patients with hemicranial headache, somewhat resembling migraine, patients with all other types of headache, especially those of bizarre and generalized distribution, showed previous personality instability similar to that of psycho-neurotic patients and evidence of " instability " in the Rorschach test resembling that found for neurotic patients. The evidence for patients complaining of symptoms other than headache also tended to resemble that for neurotic patients.

A follow-up study of 82 patients with post-traumatic symptoms previously treated in this institute indicated that the long-term results with spinal or with cranial subdural insufflation have been no better than the results following pneumo-encephalographic treatment, and that for none of these patients could the influence of other factors be ruled out. The results in a few patients treated by a direct operative procedure suggest a limited application of such measures in carefully selected cases.

Studies of the postural vascular responses did not indicate any effect in patients with head injury which differed from that in psychoneurotic patients or in patients convalescing from other illness, nor have they given any lead to treatment other than to suggest the value of exercises for hardening and relaxation.

The concept of mechanisms presented here involves a relation between physical and psychologic factors, and emphasizes the need of considering the person as a whole in the prevention and cure of post-traumatic symptoms. (Authors' abstr.)

The Electroencephalogram Associated with Epilepsy.

The electroencephalograms of 100 patients with recurrent epileptic seizures could be classified with considerable accuracy according to the classification of Jasper and Kershman, which is based on the localization of the discharge. The results of the study are in keeping with the hypothesis that most epileptic discharges (over 65 per cent.) apparently arise as local or focal disturbances in the brain. There appears to be a distinct correlation between the location of the electrical abnormality and the type of clinical seizure suffered by the patient, as described by Jasper and Kershman.

It appears that high voltage abnormal waves in the electroencephalograms of epileptic patients commonly (in over 50 per cent. of the 65 patients from whom such waves were recorded) take on a rhythmic 3 to 6 per second pattern for brief, or more prolonged, periods. This seems to hold true regardless of whether the waves originate in a focal cortical discharge or in a deeper disturbance. When these 3 to 6 per second slow potentials are of medium voltage and occur relatively infrequently, or are confined to " silent " areas of the brain, there may be no associated symptoms. If they are of high voltage and involve large areas or regions, such as the left temporal lobe, there may result a variety of manifestations, such as " psychomotor " attacks, " psychic equivalent or variant " states or of episodes of " amnesia," as described by Gibbs, Gibbs and Lennox. At times an apparently similar type of electrical abnormality is seen in the records of behavior problem children, as reported by Jasper and associates, or is associated with periods of mental dullness, as observed by Putnam and Merritt. It seems that the electrical pattern or abnormality in all epileptic patients with this slow rhythmic type of disturbance is essentially the same, but is non-specific, and that the variability in the associated symptoms depends largely on the location and intensity of the discharge.

This hypothesis seems to explain why so-called psycho-motor electrical patterns (3 to 6 per second rhythmic slow waves) may be seen in patients who have no history of " psychomotor " clinical manifestations, and yet may be associated with such attacks in other persons.

In the present study all patients with a history of episodes classified as of " psychomotor," " psychic equivalent or variant " or " amnesia " type also had focal, *petit* or *grand mal* seizures.

Evidence indicates that in a high voltage epileptic discharge high frequencies do not necessarily produce " overactivity " or slow frequencies " underactivity." This observation, as recorded here, applies only to the abnormal waves associated with epilepsy.

In the formation of the slow waves (random or rhythmic in the electroencephalograms of epileptic subjects) it is suggested that, although the periods of activity of the neurons are more or less synchronous (are simultaneous—show hypersynchrony), the resulting composite impulse

discharges which presumably contribute to the slow potential changes are asynchronous and often of high frequency. In the case of fast waves (at least when rhythmic), on the other hand, the periods of activity of the neurons, as well as the impulse discharges, may be synchronous. (Author's abstr.)

The Electroencephalogram Associated with Chronic Alcoholism, Alcoholic Psychosis and Alcoholic Convulsions.

In a study of the clinical histories and electroencephalograms of 157 patients with chronic alcoholism with and without psychosis, including patients with convulsions due to chronic alcoholism, the following observations were made:

The incidence of electroencephalographic abnormality in patients with chronic alcoholic disorders increases with age.

Persons with chronic alcoholism without psychosis, irrespective of the duration of drinking, show essentially nothing of significance in the electroencephalogram.

Chronic alcoholism with psychosis is in general associated with an incidence of electroencephalographic abnormality which is higher than normal. In patients with alcoholic psychosis the presence of confusion or hallucinations is frequently associated with electroencephalographic abnormality, and the disappearance of hallucinations or confusion is often accompanied by a change toward a more normal electroencephalogram.

No evidence of paroxysmal dysrhythmia was found in 5 patients with pathologic intoxication, although 3 of the 5 patients had abnormal electroencephalograms.

Of the patients with chronic alcoholism with psychosis, the highest incidence of electroencephalographic abnormality was found among those with deterioration or Korsakoff's syndrome. No specific electroencephalographic pattern was found in a group of four patients with Korsakoff's psychosis.

A relatively low incidence of electroencephalographic abnormality (17 per cent.) was found in a series of 24 patients with "rum fits" (with a negative family history and a negative past history of epilepsy and with seizures occurring only in association with alcoholism). On the other hand, a relatively high incidence of electroencephalographic abnormality (75 per cent.) was found in a large series of patients with idiopathic epilepsy with onset of seizures in the same age range as that of the patients with "rum fits."

In spite of the occurrence of seizures, patients with "rum fits" do not have the inborn epileptic predisposition observed in persons with idiopathic epilepsy.

An abnormal electroencephalogram may be of aid in predicting the duration of illness in patients hospitalized for chronic alcoholism. (Authors' abstr.)

The Hypothalamus and Affective Behavior in Cats: A Study of the Effects of Experimental Lesions, with Anatomic Correlations.

Lesions destroying the immediate region of the ventromedial hypothalamic nuclei in cats result in loss of favorable response to friendly treatment and handling, and in change from a friendly behavior pattern to one of malevolence and savageness, to a marked or an extreme degree. Attempts to produce this result by means of other lesions failed. Efforts to modify this behavior pattern by lesions or ablations of higher regions of the brain have also thus far essentially failed. The details of the mechanisms controlling or permitting the change are obscure. (Author's abstr.)

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Changes in Primary Mental Abilities with Age.

1. A total of 126 11-year-old, 117 13-year-old and 103 15-year-old boys were given the Chicago Tests of Primary Mental Abilities. These tests measured six mental abilities or components: number, verbal understanding, space, word fluency, reasoning, and memory. The three age-groups were approximately equivalent in the distribution of their general intelligence scores as determined by group tests.

2. There were statistically significant increases with age in the mean scores of the six components.

3. There was a consistent tendency for variability of scores in each component to increase with age.

4. An analysis of the data in terms of the percentage of overlap of scores obtained in the three age groups revealed the following: (*a*) The greatest amount of change through these age levels was in word fluency; (*b*) reasoning and verbal meaning were next in order of amount of change; (*c*) memory, space and number exhibited the least amounts of change.

5. An analysis of the intercorrelations among the six primary mental abilities led to several findings. The memory factor was very little related to the other factors at any age from 11

to 15, and showed no consistent change in this respect within this age range. With this exception there was a consistent decrease in the intercorrelations among the six abilities as age increased. The correlations of each one of the mental components with the other five combined showed the same decrease in correlation with age. When all of the intercorrelations were averaged, the decrease with age was quite clear-cut.

6. An analysis of the data in terms of expressing the differences between means of components at these ages in standard deviation units of the 11-year group revealed the following: (*a*) That the six mental components exhibited small differences in changes from 11 through 15 years; (*b*) that word fluency, reasoning and verbal meaning showed the most progress, space, number and memory the least; (*c*) that the growth curves for word fluency and reasoning tended to level off slightly after 13 years; (*d*) that in general, the growth curves for the six components were more alike than different.

7. The performance of the extremes of intelligence in each age group was subjected to analysis in order to determine the extent to which general intelligence level influenced the changes with age in the six components. It was found that with the exception of the memory component, changes with age in the primary mental abilities were not noticeably influenced by the general intelligence level of the subjects as indicated by intelligence tests. (Author's abstr.)

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Mental Changes after Bilateral Prefrontal Lobotomy.

The authors found from a study of 20 patients who had had lobotomies performed that there was no consistent picture of general mental impairment. In five of the patients there was a decline of from 11–22 points on the Binet I.Q., in one a gain of 18 points and in six others a slight gain. Most of these changes are outside the ordinary variation of test scores and do not agree with Kisker's findings. However, the authors agree with Kisker that " from a therapeutic point-of-view, intellectual changes are relatively unimportant." Doing rather inefficient work in the community is vastly preferable to doing better work inside a prison, or no work at all in a mental hospital.

In the reversed digit memory span test the tendency for those who scored initially at a high level is to come down, while those who scored low initially tend to improve. In the word association and vocabulary tests those whose psychotic condition interfered with performance before the operation tended to improve, while those with initial high performance tended to show some impairment. Lack of initiative and inferior planning ability are most closely related to poor performance on the maze test, though impulsiveness, or its converse, irresolution, as well as suggestibility and nervousness are also responsible for errors. A noteworthy symptom is inability successfully to divide or alternate attention between two activities.

The more careful the patient is on the maze test the more likely he is to fall into error. A pause in the motor activity of drawing whilst attention roves in search of a tentative solution is an indication of careful planning. The swift alternation of attention while keeping an end in view requires a brain well organized with rich interconnecting subcortical neural pathways. Out of 17 cases, only two showed any gain in maze I.Q. after psychosurgery. The average loss of test age amounted to approximately two years. The authors found a similarity between the maze performance of feebleminded and lobotomized patients. They regard the effect of the operation as disruption of inter-regional co-ordination.

There is a strong tendency for the lobotomized patients to make stereotyped reactions, when failure has already resulted. The repetition of errors after lobotomy can be ascribed to lack of initiative, an unwillingness or tardiness to try new approaches to a problem.

Eleven of the 20 patients had improved to a greater or less degree. Three criminally insane were improved, and one was discharged as being no longer a menace to the community.

G. W. T. H. FLEMING.

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A Study of Anxiety in Young Children by Means of a Projective Technique.

One may fairly conclude from this investigation that the projective technique described in this report succeeds (*a*) in revealing many different anxiety areas in the experience of little children, the more important areas in a normal group proving to be parent-child relationships, social relationships, and daily routines ; (*b*) in demonstrating a close relationship between pattern of anxiety and type of behavioral adjustment in both normal and clinical groups ; (*c*) and in showing that the normative approach to a projective study of anxiety in little children is of the greatest value in the interpretation of individual differences.

It is the experimenter's opinion that this technique, with modifications as suggested in the preliminary evaluation, would be a useful one for teachers in nursery schools, in kindergartens, and lower primary grades. It seems to be useful both for therapy and diagnosis. Through this projective technique the child is allowed to express his thoughts and feelings freely. It often happens that children are burdened by ideas and desires which they cannot, for lack of words, or will not, for fear of punishment or ridicule express. This specific procedure may present an appropriate avenue of expression to the child and thus provide a means of catharsis. It will also help the teacher to locate quickly and easily those areas in which the child's fears and

anxieties lie, if present. It seems reasonable to suppose, on the basis of data already found through using this technique, that where there are severe behavioral difficulties which are not due to disease, there is also a great deal of anxiety which is closely connected with these same difficulties.

The report illustrates clearly the surprisingly large number of unhappy, anxious responses to specific picture situations, characteristic of the so-called normal typical child.

In using a procedure of this sort, care must be taken not to attach too much importance to the anxiety score as such. It is in a careful, detailed analysis of each individual record that its value lies. Neither the total score nor the individual responses are of value in and of themselves. Each record must be studied as a whole. Here, as is so often the case, the whole is a great deal more than the mere *sum* of the parts. It is through a synthesis of the content of the report as a whole rather than through interpretation of two or three scattered responses that something of the inner world of the individual may be obtained, and an approximate pattern of anxiety may be located. (Authors' abstr).

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Vocabulary and Mental Deterioration in Senile Dementia.

The general purpose of this investigation was to study the relationship of various kinds of vocabulary functioning to mental deterioration of the type senile dementia, and to determine whether or not a given set of tests, namely, those devised by Capps, offers a valid and reliable index of deterioration. The subjects used in this study consisted of fifty patients, male and female, of the type senile dementia simplex, all residents of the Fairfield State Hospital in Newtown, Connecticut. All possible controls of mental capacity, education, age and background were maintained. The investigator grouped the patients as least, mild, and most deteriorated. This method is far from satisfactory, but was the only possible means of differentiation among the group. A group of five different types of vocabulary tests were used. These tests seemed to measure not only a knowledge of word meaning and usage, but also possibly related aspects of mental functioning.

The results show that there is a reliable, consistent, and progressive reduction in the mean scores of the synonym and antonym tests associated with the groups of subjects which had the greater amount of mental deterioration.

Since the factors of education, background, mental capacity and age were controlled as well as possible, it is felt that these could not have had any significant influence on the test scores and that, therefore, the impairment was principally, if not entirely, due to mental deterioration.

Vocabulary functioning has long been recognized as a close associate of the development of intelligence and general mental functioning; these studies tend to indicate that vocabulary functioning is also closely related to the deterioration of mental functioning.

Not only do each of the separate vocabulary tests show a progressive impairment in the ability to deal with word meanings, but they also reflect an impairment in related aspects of mental functioning.

Previous findings have indicated that the vocabulary test score tends to remain relatively constant and unchanged in deterioration as opposed to non-vocabulary test scores. On the basis of this premise, the " Efficiency Index " has been set up by Babcock (I), which is said to measure accurately the degree of mental deterioration. This study shows, however, that vocabulary functioning does not remain constant; on the contrary, these tests involving vocabulary functioning have served as means of discriminating among deteriorated patients and have given measures of deterioration.

The synonym and antonym tests are offered as a reliable and valid measure of mental deterioration in senile dementia. These tests should be of aid in classifying patients.
(Author's abstr.)

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Measurement of Chronic Psychotic Over-activity by the Norwich Rating Scale.

A rating scale has been designed for the recording by the nursing personnel of the behaviour of patients on disturbed wards.

A reliable index of general over-activity may be obtained by combining the scores from the single-trait scales of activity, aggressiveness, destructiveness, and talkativeness into single composite scores.

Although the scale is constructed as a battery, any of the traits may be rated separately in cases where the trait in question is the only one of interest.

The results obtained indicate that the Norwich Rating Scale is more reliable than the usual rating scales for personality traits.

The results indicate that the scale can be used profitably for the study of individual patients or groups of patients.

Further clinical application of this scale is now being carried out on similar groups of disturbed patients in whom prolonged diminution of over-activity is being therapeutically attempted.

(Authors' abstr.)

VOL. XXXI.

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The Incidence of Sibling and Parental Deaths in the Anamnesis of Female Schizophrenia.

The results of the present study on female schizophrenics confirm those on males only in part. While a trend is, as before, demonstrated for schizophrenics to have more sibling deaths in their anamnesis than do manic-depressives, a comparison with general paretics is not possible here and, when made with normals, turns out negative. As previously noted, there is a possibility that the former data on males were unrepresentative; that the records on the female psychotics are incomplete; or that there is actually a sex difference which reflects itself in the somewhat higher incidence of schizophrenia in males. Parental deaths occur significantly more often in schizophrenics than in normals, but are interestingly found to trend more toward the paternal side for male schizophrenics and toward the maternal one for the females. But the

results must in general be held inconclusive until more extensive research on much larger groups has been achieved. The efficacy of such studies would obviously be increased if instead of relying upon existing case histories, which may or may not contain the needed information, as was true in the present inquiry, the data were gathered with specific objectives *ab initio* well defined. The findings do, however, amply demonstrate the feasibility of statistical studies of psychodynamic factors in mental disorder when the analysis is concentrated upon life happenings which are both universal and momentous. (Authors' abstr.)

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*Test Constancy and Variation in the Mentally Ill. *Rabin, A. I.* 231
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Test Constancy and Variation in the Mentally Ill.

Sixty State Hospital adult patients of miscellaneous diagnosis and of wide age range were re-examined by means of the Wechsler-Bellevue Intelligence Scales after a mean interval of 13·45 months.

The results obtained indicate a high degree of correlation between the test and retest findings (r=·84). The obtained coefficient compares favorably with the ones obtained on normal adults with different tests, and shows the comparative stability of the test results in patients as well as the high degree of reliability of the scale itself.

A small but consistent gain in the total score as well as in the individual scores of the subtests was observed. A greater increase in score may be noticed in the performance portion of the scale. The recency of the retest is directly related with the magnitude of the gain. Comprehension, Block Design, and Digit Symbol subtests show the greatest and most significant positive changes after a brief interval.

The intra-test patterns measured by means of average deviations from the total test mean does not change appreciably from the test to the retest period.

Further analysis of the results and their correlation with psychiatric and clinical changes as well with the diagnosis is desirable and will be the subject of a future paper.

(Author's abstr.)

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The Neurological Complications of Haemophilia.

The literature relating to the nervous system complications of haemophilia is reviewed. Three cases of haemophilia with neurological complications are recorded: spontaneous cerebral haemorrhage, chronic arachnoiditis from previous subdural and subarachnoid haemorrhage; paralysis of the left femoral nerve and paralysis of the left femoral nerve with massive haemophiliac pseudotumour of the left ilium. S. M. COLEMAN.

Desoxycorticosterone in Epilepsy.

The parenteral injection of desoxycorticosterone acetate was found to afford early protection in experimental epilepsy induced in mice by convulsive doses of cocaine hydrochloride. In two epileptic patients moderate doses, suitable for prolonged administration, failed to show any beneficial effects. S. M. COLEMAN.

Cushing's Syndrome.

Seven cases of Cushing's syndrome with autopsy reports on four are described. The views expressed are in support of the hypothesis that Cushing's syndrome is a hyperadrenocorticalism. S. M. COLEMAN.

Progressive Lenticular Degeneration.

A case of progressive lenticular degeneration, strikingly like those described by Wilson, with asymptomatic hepatic cirrhosis has been followed over a period of nearly three years. Variations in handwriting are shown, alterations in motor symptoms are described and progressive personality changes noted. The diagnosis, made during life, was confirmed by autopsy.

A brief account is also given of a case of known hepatic cirrhosis with the striatal syndrome as a late manifestation. The clinical similarity in these cases tends to confirm the theory that the hepatic condition is probably primary. S. M. COLEMAN.

Cystic Hydrops of the Pineal Gland.

Six cases of cystic hydrops of the pineal body are reported, one of which apparently caused sudden death. Two were associated with mental disorder with death from the suicidal ingestion of poison. Two more reached the age of 60, and collapsed suddenly while apparently in good health. In one of these arterio-sclerosis of the coronary arteries was sufficient to account for a sudden demise of this kind, while the other case remains controversial. The sixth case had a clinical history similar to other reported cases and died under anaesthesia during an exploratory craniotomy. S. M. COLEMAN.

Anorexia Nervosa or Simmonds' Disease?

The following points are considered helpful in differentiating between Simmonds' disease and anorexia nervosa: Instances in young unmarried women are to be considered as anorexia nervosa until proved otherwise. Occurrence in the male sex favours a diagnosis of pituitary cachexia. Occurrence in women with the onset following parturition, particularly if the delivery was associated with much haemorrhage, is strongly suggestive of a true pituitary lesion. Onset following an acute, severe infection suggests true pituitary disease. Loss of axillary and pubic hair occurs much more frequently in Simmonds' disease. Improvement following psychotherapy or adequate food-intake favours a diagnosis of anorexia nervosa. The use of the insulin tolerance test and the urinary 17-ketosteroid assay seem promising. S. M. COLEMAN.

Wartime Ocular Neuroses.

The incidence of these disorders is enormously increased by the psychic trauma of war. They take colour from the combat situation, but the ocular manifestations are the same as those seen in peace time. S. M. COLEMAN.

Obsessive Neuroses.

Obsessive neuroses are important because they provide an intermediary link between the neuroses and the psychoses. The case of a young Army officer is presented. In this case, as in other similar patients, there is a fixation on an anal-sadistic level with severe castration anxiety. Obsessive neuroses tend to develop in very imaginative children who are brought up in families where there is a great deal of strife and tension, so that the children are without any assurance as to the love of either parent for them. Such children resort to fantasy to compensate for this lack of love. They develop unusual ideas about the world around them, and such ideas tend to dominate their psychic life even after they grow up. S. M. COLEMAN.

JUNE.

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*Homosexuality, Transvestism and Psychosis. *Liebman, S.* 945
*The " Placing-into-Mouth " and Coprophagic Habits. *Arieti, S.* 959

Prevention of Subconvulsive Reactions.

Modifications in the techniques for both metrazol and electric shock therapy are suggested to insure *grand mal* reactions with initial and subsequent treatments. High initial doses and increase in subsequent doses based on the duration of the " latent period " are recommended. For metrazol, the initial dose suggested is 8 to 11 c.c. intravenously, with subsequent increase of 0·1 c.c. for each second of the latent period in excess of 3 to 5 seconds. For electroshock with the Offner apparatus, the initial dose suggested is 500 m.a. for 0·3 second, adding 10 m.a. in subsequent treatments for each second of " latent period." S. M. COLEMAN.

New Therapy in Dementia Praecox.

Facing the high mortality (80 per cent.) of schizophrenic cases of manifest tuberculosis, it seems possible that thrombi consisting of tubercle bacilli are the cause of the syndrome. It is suggested that the essential factor of shock therapy is the sudden fall and rise of the blood pressure, which aim may be better achieved by direct physiological methods—inhalation of amyl nitrite followed by intravenous injection of adrenalin in sugar-saline-solution.

S. M. COLEMAN.

Homosexuality, Transvestism and Psychosis.

The case reported is that of a definitely hereditarily tainted individual who was reared in a foster home completely removed from his siblings. In this peculiar home situation he became overtly homosexual, transvestitic and psychotic. S. M. COLEMAN.

" Placing-into-Mouth " and Coprophagic Habits.

This " placing-into-mouth " habit, commonly observed in regressed schizophrenics, is compared with similar observations on healthy one- to two-year-old children, and with observations reported by Kluver and Bucy in monkeys after bilateral removal of the temporal lobe. The hypothesis is advanced that such responses are not due to any visual agnosia, but are the expression of a certain level of development at which complex apperceptions elaborating visual stimuli are not yet possible. S. M. COLEMAN.

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Effects of Convulsive Shock.

In curare protected convulsive shock, this study reveals a great variability of the circulatory and respiratory apparatus, both from individual to individual and from treatment to treatment in the same patient. Regarding blood-pressure there is in the clonic phase a rapidly alternating access and recession. These must play a very important role in any brain damage which results from such treatments, since they would place an undue burden upon the adaptive capacity of the intracranial fluid mechanism as well as directly on the vessel walls. Rapid and extreme changes in the pressure effects may also occur in the post-seizure phase. Hence the muscular contractions are not the only source of these phenomena. S. M. COLEMAN.

The Central Nervous System in Diphtheria.

During the height of the illness, a toxic delirium or actual diphtheritic encephalitis may occur. During convalescence, myocardial damage, associated with mural thrombi, is not

uncommon. Occasionally these cardiac thrombi produce cerebral embolism and a resultant hemiplegia. A clinicopathological study of a case of diphtheritic hemiplegia is presented.
S. M. COLEMAN.

Unusual Types of Anosognosia.

Anosognosia, the condition in which an individual is unaware of his own disease, is a defect in the body image. In this article two unusual cases are reported. The first is a case of anosognosia for hemiballismus. The second gave the opportunity of observing the consecutive development of anognosia for blindness, lack of awareness for auditory sound agnosia, allaechesthesia, anosognosia for left hemiplegia and autotopagnosia. A study of these cases helps to shed light on the common meeting-ground of organic and functional disturbances of the nervous system, the symptoms being closely akin to those experienced by many patients with functional nervous disorders.
S. M. COLEMAN.

The Absolute and the Unconscious.

The difference between Freud and America may be grasped in the difference between the 19th century's biological and necessarily pessimistic theory of the immutable endowments of the human mind, and the American outlook, which has been, from the outset, pedagogically aimed, orientated upon milieu, based on sociology and history, and has always pointed towards optimism.
S. M. COLEMAN.

Pathophysiology of the Infant and Adult.

The hypothesis that the somatic visceral expression of psychosomatic disorders resemble the physiological states of infancy, either as an exaggeration or an accentuation, is presented. With interference in the harmonious functioning of a hierarchy, regardless of etiology of the noxious agent, a reversion or regression to a lower level of functioning in the hierarchy is found.
S. M. COLEMAN.

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*Acute and Chronic Parietal Lobe Ablations in Monkeys. *Peele, T. L.* 269
*Inhibition of Activity in Single Auditory Nerve Fibers by Acoustic Stimulation. *Galambos, R., and Davis, H.* 287
*The Supernormal Period in the Recovery Cycle of Motoneurons. *Hoff, H. E., and Grant, R. S.* 305

Relation of Cerebral Cortex to Spasticity and Flaccidity.

Observations on the state of spasticity or flaccidity have been made in monkeys and chimpanzees following cortical ablations.

1. Primary removal of the various cortical areas has confirmed observations made by previous investigators.
   (*a*) Removal of area 6 (including area 4s) was followed by moderate paresis, which is spastic in nature.
   (*b*) Removal of area 4 or of the anterior lip of the central sulcus was followed by paresis without spasticity.
   (*c*) Removal of the post-central gyrus or of the posterior lip of the central sulcus caused flaccidity, transient and with some paresis. Symptoms were more marked in the chimpanzee than in the monkey.
2. Successive removal of various of these combined areas caused changes as follows:
   (*a*) The abolition of areas 4, 4s and 6 either together or seriatim in any sequence resulted in immediate spastic paresis.
   (*b*) The addition of the postcentral gyrus to ablation of any areas producing spasticity

increased paresis. Spasticity was usually increased in the monkeys, although this was not as marked. In the chimpanzees, after a short initial period of marked flaccid paresis, definite spasticity appeared.

(*c*) Combined lesions of area 4 and the postcentral gyrus result in spasticity.

(*d*) The addition of any contra-lateral motor area to a primary lesion causing spasticity increased this spasticity.

(*e*) Removal of an entire hemisphere secondary to ablation of areas 4 and 6 in the monkey augmented the spasticity and paresis to greater degree than did ablation of the postcentral gyrus. (Authors' abstr.)

Acute and Chronic Parietal Lobe Ablations in Monkeys.

1. Removal of area 3, areas 1-2, area 5, and area 7 individually, or of areas 1-2, 5, and 7 in combination, from the parietal lobe of the macaque did not result in paralysis. A loathness for movement was present.

2. Removal of area 3 or of areas 1-2 affected the contralateral arm and leg equally; removal of area 5 affected the leg particularly, and of area 7, the arm particularly. The disturbances are described below. Such a differential localization of them might be inferred from the distribution of the parieto-spinal fibers, which have also been described.

3. Hypotonia was consistently found for as long as a year, but was not present equally in all contralateral muscles, the proximal muscles being more hypotonic. Of those affected in the upper limb, the elevators and abductors of the shoulder, the external rotators of the arm, the extensors of the forearm, the flexors of the wrist and fingers, and the adductors of the fingers were most hypotonic. In the leg, the flexors and extensors of the thigh were about equally affected; the external rotators of the thigh, the dorsiflexors of the foot, and the extensors and adductors of the toes were more hypotonic than their antagonists. The mechanisms underlying this hypotonia have been discussed. Hypotonia probably also accounted for "the paretic posture" at rest and indirectly for ataxia and slowness of movement. Ataxia was not present when the macaques controlled movement by vision.

4. Tendon reflexes were permanently altered by an increase in threshold, a slowness of execution, and an increase of excursion.

5. Appreciation of tactile and painful stimuli was impaired initially after all ablations and for nine months after postcentral lesions. Localization of these stimuli was persistently impossible after all ablations.

6. Proprioceptive placing and hopping and tactile placing were absent immediately after all ablations; the two former reappeared after three weeks, but larger displacements were required. Tactile placing never returned to normal after postcentral lesions, and though it returned after ablation of area 5 or area 7 there was a slowness of response and some uncertainty in its direction. Postcentral gyri appeared essential for tactile placing, and shared with extraparietal cortex the mechanisms involving proprioceptive placing and hopping.

7. The postcentral gyrus appeared essential for the recognition of painful and tactile stimuli; all parietal areas were necessary for the localization and discrimination of these stimuli.

8. Muscle atrophy and hyperpathia were observed in one animal as chronic results of removal of areas 1, 2, 5 and 7 together. (Author's abstr.)

Inhibition of Activity in Single Auditory Nerve Fibers by Acoustic Stimulation.

Further studies by micro-electrodes of the nerve impulses in single auditory-nerve fibers in cats show that the spontaneous discharge which occurs in some fibers in silence can be stopped by certain tones or noises. The tones which inhibit fall into one or more clearly-defined "inhibitory areas" for each fiber, analogous to the "response area" which comprises the tones which excite. For some fibers the inhibitory tones are higher in frequency than the excitatory tones, for others they are lower. Some fibers have inhibitory areas both above and below, while still others fail to show inhibition by pure tones.

The discharge excited by an adequate tone or noise also can be reduced or abolished by the simultaneous presentation of a second tone or noise. In this case the inhibitory areas may encroach upon and overlap the response area. Thus, by simultaneously presenting appropriate second tones which prevent rather than produce discharge in the auditory nerve, it is possible markedly to restrict the range of tones which can excite a given fiber.

The inhibitory action of low tones upon the activity aroused by high tones is much more widespread than the corresponding inhibitory action of high tones upon low tones. A tone as much as five octaves below a high-frequency excitatory tone may inhibit the discharge excited by the high tone.

The mechanism of the inhibition is unknown. Mechanical and electrical factors in the middle and inner ear appear to be excluded as an explanation, nor does it appear to have a reflex basis. It is suggested that nerve fibers underlying the organ of Corti connect widely distant parts of that structure, and that they serve to reduce the excitability of regions distant from the one set in motion by the inhibitory stimulus.

The function of the inhibition is obscure, but it seems probable that in the case of "masking" it plays an important role. The tones which inhibit single nerve-fiber activity in the cat have the same general distribution as those which, in the human subject, are known to be particularly effective as masking tones. (Authors' abstr.)

The Supernormal Period in the Recovery Cycle of Motoneurons.

1. An analogy between the phenomenon of spontaneous "doubling" in the rhythmic discharge of soleus and triceps motoneurones and bigeminus rhythm in the heart leads to the suggestion that a supernormal period exists in the recovery cycle of these neurones.

2. Procedures known to enhance supernormality in peripheral tissue, namely, acidity and administration of veratrine, increase the frequency with which spontaneous doubling appears, make possible the establishment of "double" rhythms, and permit "tripling" and even perhaps "quadrupling." With veratrine as many as six discharges in rapid series have been counted. Cooling also increases doubling.

3. The various phenomena observed may be explained best by the assumption that the neurones studied recover from a propagated discharge *via* supernormality.

4. The immediate usefulness of supernormality may be to permit the rapid development of muscular tension at the start of reflex activity.

5. The possibility is opened for the existence in the central nervous system of a type of temporal summation, based on threshold lowering following a subliminal stimulus (the second phase of summation). (Authors' abstr.)

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The Chemotherapy of Intracranial Infections. IV. The Treatment of Pneumococcal Meningitis by Intrathecal Administration of Penicillin.

The effects of intrathecal administration of penicillin in Type I pneumococcal meningitis have been studied in 96 experiments on dogs.

This method of therapy, even with small dosage, was found to reduce the mortality rate and prolong the survival time.

The beneficial effects of intrathecal therapy were markedly increased by the addition of the intravenous administration of penicillin, since secondary infection of the blood stream was invariably present and lobar pneumonia frequently developed if intravenous therapy were not employed. (Authors' abstr.)

MARCH.

*A Study of Gnosis, Praxis and Language following Section of the Corpus Callosum and Anterior Commissure. *Akelaitis, A. J.* 94
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*The Treatment of Painful Phantom Limb by Removal of Post-central Cortex. *Gutiérrez-Mahoney, C. G.* 156

A Study of Gnosis, Praxis and Language following Section of the Corpus Callosum and Anterior Commissure.

Bilateral seizures can occur even after sectioning the corpus callosum and the anterior commissure. Following complete section of the corpus callosum, there was no disturbance in visual, auditory or tactile gnosis; praxis and language were unimpaired. Orientation was intact. Interhemispheral fibres occur in commissural pathways other than the anterior commissure and corpus callosum, and play a prominent part in the connections between the dominant and subordinate hemispheres. The author found an improvement in emotional status typical of that following bilateral prefrontal lobotomy. G. W. T. H. FLEMING.

The Physiological Basis of Concussion.

Analysis of the clinical manifestations of concussion in the cat, dog and monkey show that they are the result of intense excitation of the central nervous system at the moment of the blow to the head.

At the moment of concussion a marked electrical discharge occurs within the central nervous system. In the vinethenenovocaine anesthetized animal the cortical activity is increased in frequency following the initial discharge (after-discharge) for 10 to 20 seconds, then decreases until there is little spontaneous activity (extinction). Within several minutes the electroencephalogram becomes practically normal again.

At the moment of a blow on the skull a sudden increase in pressure at the site of impact occurs with pressure waves being transmitted throughout the intracranial cavity.

It is concluded that these mechanical forces produce a breakdown of the polarized cell membranes of many neurones in the central nervous system, thus discharging their axones. This intense traumatic excitation is followed by the same electroencephalographic, chemical and clinical phenomena which characterize intense stimulation of the nervous system by electrical, chemical or other agents. (Authors' abstr.)

The Treatment of Painful Phantom Limb by Removal of Post-Central Cortex.

Phantom limb is a disorder which has an organic basis—a divided peripheral nerve from which stimuli originate and are transmitted through higher levels to conscious registration. The painful phantom can be stopped by interruption of the sensory chain leading to consciousness. Since the peripheral (lower level) pathways are multiple it is simpler to interrupt the chain at the intermediate level by removal of the corresponding part of the post-central cortex. This has been effective in a patient whose operation was done more than two years ago.

(Author's abstr.)

MAY.

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*Intelligence following Prefrontal Lobotomy in Obsessive Tension States. *Watts, J. W., and Freman, W.* (discussion, p. 344) 291

Dark Adaptation, Negative After-images, Tachistoscopic Examinations and Reaction Time in Head Injuries.

1. Light threshold after dark adaptation, latency period for onset of negative after-images, apperception after tachistoscopic exposure, and visuo-motor reaction time were determined in a series of 25 patients with recent head injuries, in 32 patients suffering from prolonged post-traumatic syndromes, and in 25 control subjects.

2. The influence of age, I.Q., severity of the injury, presence of neurological signs, time elapsed since the injury, and personality features on the outcome of these tests are analyzed and discussed.

3. A lengthening period for the onset of negative after-images could be demonstrated for patients with recent head injuries. The acute cases with persistent signs of brain damage had a significantly longer latency period than acute cases without such signs. Apperception after tachistoscopic exposure proved valuable in acute cases, but was not associated with the presence of persistent neurological signs. Light threshold after dark adaptation and reaction time did not show significant differences between acute and chronic patients.

(Author's abstr.)

Paralysis in Flexion and Tremor in the Monkey following Cortical Ablations.

1. Simultaneous bilateral removal of areas 4s and 6 or of area 6 produced paresis in flexion in four mangabey monkeys.

2. This was associated with reflex grasping and with increased resistance to passive manipulation in all extremities, greater on extension than on flexion.

3. Tremor, coarse and present on movement, occurred as the result of this purely cortical lesion.

4. It is suggested that the reflex flexion pattern is an extrapyramidal release phenomenon, and that it is functionally related to the pattern of reflex grasping. (Authors' abstr.)

Intelligence following Prefrontal Lobotomy in Obsessive Tension States.

1. In forty-five patients with obsessive tension states there was no significant intellectual or emotional deterioration.

2. Disability was not due to the peculiar ideas, but to the emotional charge associated with the ideas.

3. Before prefrontal lobotomy 17 per cent. were usefully employed, and at the present time 67 per cent. are leading useful lives.

4. Pragmatic intelligence is improved by prefrontal lobotomy in individuals disabled by obsessive tension states. (Authors' abstr.)

SEPTEMBER.

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Histologic Studies of the Brain following Head Trauma. IV. Late Changes: Atrophic Sclerosis of the White Matter.

The pathologic alterations in the brains of seven patients surviving head injuries for variable periods of time up to 17 years have been analyzed.

We have been concerned not with the focal changes associated with cerebral cicatrix, but rather with seeking an explanation of diffuse cerebral atrophy noted following many forms of head injury.

Attention is called to the evidence of stasis in the smaller blood vessels, and the associated edema and perivascular hemorrhages, notably in the white matter. We believe that as a result of these circulatory alterations hypoxia develops. In the cases described the circulatory disturbances have been relatively longer lived, and as a result diffuse gliosis of the white matter has developed, since the characteristic reaction of glia to sustained oxygen want of moderate degree is gliosis. That some loss of neuronal elements occurs is true, but the changes are relatively greater in the white matter, which is less well equipped to withstand vascular insults.

The resultant pneumoencephalographic changes are discussed and an explanation sought for them. Diffuse atrophy is thought to be a more significant factor than focal cicatrix in the production of ventricular wandering. (Authors' abstr.)

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The Mental Changes Due to Frontal Lobe Damage.

A critical discussion of the published cases with surgical destruction of one or both frontal lobes (lobotomy) or parts of them (lobectomy) comes to the result that in all cases where, according to the extension of the lesion, changes were to be expected, mental changes occurred. They correspond to those changes which the author has named "impairment of abstract attitude." Whether they come to the fore depends :

1. Upon the tasks which are set before the patient. Deviations from the norm are not seldom overlooked in behaviour in everyday life, because for the solution of these tasks the abstract attitude often does not play an important role. Wherever the patient is confronted with such tasks he fails also in everyday life.

2. Upon the test methods which one applies. Merely such tests which can be solved only by performing the abstract attitude are suitable for revealing the defect.

3. The changes observed in frontal lobe lesions support the idea that there is a particular high mental attitude which may be damaged by lesions of the frontal lobes. It can be impaired also by affections of other parts of the cortex and in diffuse lesions of the latter.

4. The disagreement between authors about the mental changes in frontal lobe lesions is due to differences of the methods of investigation and, with that, evaluation of the facts, anatomical as well as psychological. (Author's abstr.)

Porphyrins, the Nervous System, and Behavior.

The fluorescence spectrum of the white matter of the nervous system shows a well-defined emission band with a maximum at about 625 mμ. This band is absent in the cortex, which exhibits a continuous fluorescence spectrum, and in the meninges of the brain and spinal cord.

The 625 mμ. emission band has been found to be present in the white matter of 19 species of mammals and birds, including man. It has been found to be absent in seven species of amphibians and reptiles. It is to be assumed that the fluorescence spectrum indicates the presence of one of the fundamental constituents in the white matter of the mammalian and avian nervous system.

The 624 mμ. emission band appears under the influence of exciting light of $\lambda < 470$ mμ. and disappears rapidly under the influence of light.

Under the experimental conditions used, an emission band in the red region remains present in white matter (taken from the brain or spinal cord of freshly killed animals) after boiling in distilled water, after immersion in liquid nitrogen, after several weeks in darkness, and after irradiation with 200 r or 2,000 r of X-rays.

The 625 mμ. emission band is present in the white matter of live animals. Lethal doses of central nervous system poisons or of other compounds (metrazol, mescaline, bulbocapnine, carbon monoxide, etc.) do not cause the disappearance of this band.

Spectrochemical evidence indicates the present of coproporphyrin in the white matter. The evidence is derived from data on solubility, specific HCl number, and fluorescence spectra in different solvents. In addition, varying amounts of protoporphyrin are present.

The fluorescence spectrum as exhibited by white matter appears to be one of Dhéré's Type I.

Spectroscopic data indicate that the post-natal development of the nervous system is characterized by an "ascending porphyrinization." The 625 mμ. emission band is not present at birth. It appears first in the spinal cord and last in the cerebrum. It is definitely present in the spinal cord of rats 20 to 23 days of age and in that of ducks approximately eight weeks of age.

The fluorescence spectra of the cranial nerves exhibit striking differences. For example, the 625 mμ. emission band is present in the optic nerve, but absent in the oculomotor nerve. Similar differences are indicated for other cranial nerves. It seems particularly significant that the optic nerve should contain one of the most remarkable photodynamic substances ever discovered. The 625 mμ. band cannot be detected in spinal nerves or in the sympathetic and spinal ganglia.

The intensity of the 625 mμ. emission band may vary markedly in different animals and in different regions of the same animal. In most mammals the band appears to be less intense in the corpus callosum than in other fibre masses.

The regions of the brain in which the absorption bands of the cytochromes are clearly present are those regions in which the emission bands of porphyrins are absent.

Light may reach the white matter of the brain and especially the optic nerve at illumination levels encountered by mammals and birds in their normal environment.

The biological significance of porphyrins is considered in relation to comparative and developmental data.

Previously published data indicate two lines of evidence to suggest that porphyrins may play a decisive role in altering and influencing psychic functions: (*a*) the appearance of nervous and mental symptoms in cases of so-called acute porphyria; (*b*) the results which have been obtained by using hematoporphyrin as a therapeutic agent in the psychoses.

The results reported in the present study, if related to certain facts and considerations in the literature, suggest the possibility that certain neurological and psychiatric disorders may be due to or associated with a "cerebral porphyria," or a disturbance of the metabolism of certain pyrrol compounds in the nervous system.

Three lines of research demand immediate attention: (*a*) a spectroscopic, spectrochemical, and chemical study of brains and spinal cords of patients with various neurological and psychiatric disorders to determine the distribution, amounts and kinds of porphyrins present in the nervous system; (*b*) a study of various neurological and psychiatric disease groups to determine the effects of such factors as are known to influence the porphyrins or the pyrrol metabolism of the organism; (*c*) microscopic examination, including the use of fluorescence microscopy and the application of microspectroscopic techniques of the nervous tissues of patients from various neurological and psychiatric disease groups, to determine the possible presence and distribution of porphyrins and related pigments in the nervous system.

The hypophysis differs strikingly from the brain and spinal cord by exhibiting a special affinity for porphyrins introduced into the body, although normally it contains no appreciable amounts of porphyrins. (Author's abstr.)

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The Effect of the Administration of Sodium Bromide to Pregnant Rats on the Learning Ability of the Offspring. III. Three-table-test.

1. The 3-table-test which measures nervous processes of a higher order than those required for maze-learning has been used to detect functional damage in rats produced by the prenatal administration of sodium bromide.

2. Four groups of Wistar albion rats were used: the control group made up of offspring of normal mothers, and three experimental groups composed of rats whose mothers had been dosed with 40, 80, and 120 mgm. per kgm. of body weight per day of sodium bromide, respectively, from the third through the twentieth day of gestation.

3. Using as criteria Maier's formula for the number of animals "passing" the test, and also the error scores and the time scores, all of the bromide groups made poorer scores than the control. In general, on the basis of error and of time scores, the differences between the control and the bromide groups were significant, but this was not true of the differences among the bromide groups.

4. The standard deviations of the groups computed on both the error and time scores show that the control group is less variable than the bromide groups.

5. All of the groups were free from abnormal amounts of bromide at 60 days of age and probably long before, hence, the 3-table-test applied at 106 to 124 days serves as a measure of the persistence of the damage as well as a quantitative evaluation. (Authors' abstr.)

A Study of the Reliability of the Goodenough Drawing Test of Intelligence.

The Goodenough Drawing Test of Intelligence was given to 136 third and fourth grade children on two occasions a week apart. Each drawing was scored three times by well-trained examiners, twice by the same scorer, and once by a different scorer.

Data were thus secured for the study of the reliability of the scale from the following aspects: (*a*) the scorers' agreement with themselves when rescoring the same drawings, (*b*) the scorers' agreement with each other on the scoring of identical drawings, (*c*) the children's consistency of performance over an interval of one week when scorer was constant, and (*d*) the odd-even method. The first three types of analysis are presented according to the correlational technique and also by tabulations of obtained differences in raw scores. In general the results indicate that:

1. In spite of a composite scorer self-consistency correlation of + ·94, and in spite of the fact that scorers' inconsistencies tend to cancel in the treatment of group data, discrepancies in the same examiners' rescoring of identical drawings amount to as much as a year or more of normal age in 12·4 per cent. of the cases.

2. The average interscorer correlation obtained when two examiners scored identical drawings was + ·90. Even with as high an agreement coefficient as this, discrepancies in scores assigned to identical drawings by two different scorers, who had had identical training on the test, amounted to a year or more of mental age in 25·3 per cent. of the cases.

3. The correlation between scores on two drawings done a week apart by the same children when both drawings by each child were scored by the same person was + ·68. Under these conditions mental age changed one year or more in 41·7 per cent. of the cases.

4. The odd-even reliability of the scale was + ·89 when corrected with the Spearman-Brown Prophecy formula.

5. Although the many advantages of this scale are recognized, the present study indicates the need for caution in the use of the scale for individual diagnosis, because of the subjectivity of the scoring, and because of the frequency of marked variability in individual performance over short intervals, and the possibility of individual variation from time to time being affected by immediately preceding activities, affective states, and mental content.

(Author's abstr.)

An Experimental Study of Bromism.

Serum bromide levels averaging 142 mgm. per 100 c.c. were achieved in the course of four weeks of bromidization in 78 normal subjects through the administration of 50 mgm. of sodium bromide per kilogram of body weight. The dosage was adjusted from time to time to assure levels between 100 and 200 mgm. per 100 c.c. In 20 psychotic patients a mean level of 134 mgm. per 100 c.c. was reached after six weeks of medication.

The normal subjects showed no symptoms of either bromide psychosis or intoxication, but merely the effects of sedation. This was manifested largely in sounder and increased sleep and in some loss of concentration consequent upon the relaxation brought about in sedation. These subjective findings were borne out by objective psychological tests. These findings must be restricted to normal subjects and to the bromide concentrations observed in this study. True bromodermas were observed in two subjects only.

Of the 20 psychotic subjects only two showed evidence of mild intoxication, while the others showed only sedation and even some clinical improvement. On the whole, psychotic subjects of the type studied here may be somewhat more susceptible to bromide effects than normal subjects showing even somewhat higher bromide levels than the patients.

A group of 28 psychotic patients was given 75 to 100 mgm. of sodium bromide per kilogram body weight daily for six to eight weeks. These patients reached a mean serum bromide level of 228 mgm. of 100 c.c., with a maximum of 310 mgm. In this group 57 per cent. of the subjects showed some signs of bromide intoxication, such as ataxia, fixed pupillary reactions to light, and

very marked drowsiness. There was, however, no considerable exacerbation of the psychotic symptoms.

The indications of the experimental study are that normal individuals are not liable to develop toxic symptoms at serum bromide levels between 100 and 200 mgm. per 100 c.c., and that mental hospital patients with long hospitalization are only slightly more susceptible to bromide effects at comparable levels. At bromide levels between 200 and 200 mgm. per 100 c.c., however, mental patients of the same type show definite signs of intoxication, but little if any exacerbation of their psychotic symptoms. (Authors' abstr.)

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1. Biochemistry, Physiology, Anatomy, Pathology, etc.

Study of the Chemistry of the Blood and Cerebrospinal Fluid in Air Concussion. Zakharov, N. V. [*Klin. Med.* (*U.S.S.R.*), **21**, *No.* 10/11, 55–7 (1943).]

Electrolyte distribution is changed. The K/Ca coefficient is lowered. The K content drops with relatively constant Ca level. Sugar, Cl, residual N and cholesterol remain essentially normal. G. M. KOSOLAPOFF (Chem. Abstr.).

Modification in the Correlation between Na and Cl in the Cerebrospinal Fluid, Blood and Urine in Closed Injury of the Skull. Abramtseva, Z. M. [*Klin. Med.* (*U.S.S.R.*), **21**, No. 10/11, 47–52 (1943).]

Generally there is observed the shift of Na/Cl coefficient showing a degree of retention of Na. In blood the coefficient is generally decreased. In cases of strong Na retention there is decrease of Na elimination in urine. Hypertension may be explained on this basis as being due to swelling and edema of the brain tissue with disturbance of the Na content.
G. M. KOSOLAPOFF (Chem. Abstr.).

A Method for Determining Cerebrospinal Fluid Protein by the Photoelectric Colorimeter. Cipriani, Andre, and Brophy, Doris. [*J. Lab. Clin. Med.*, **28**, 1269–72 (1943).]

A simple and rapid method for the determination of protein in 1 c.c. of fluid is presented. A miniature attachment for the Evelyn photoelectric colorimeter for the use of small pyrex test-tubes is described. False high results with colored specimens are averted by corrections made with the use of a blank of water and spinal fluid. H. W. ROBINSON (Chem. Abstr.).

A Colloidal Cu Reaction in the Cerebrospinal Fluid in Uremia. Linder, Geoffry C. [*Am. J. Clin. Path.*, **14**, 380–5 (1944).]

The cerebrospinal fluid from some cases of uremia gives a characteristic and unusual type of reduction when tested for sugar with the qualitative Benedict reagent or Fehling's solution. The Cu_2O remains in colloidal solution instead of being deposited as a precipitate. This "colloidal Cu" reaction is due to the presence of creatinine in the fluid in a concentration exceeding 5 mgm. per 100 c.c. of fluid, and this will occur only when the blood creatinine exceeds 10 mgm. per cent. Very rarely the same reaction is found in turbid meningitic fluids. The substance responsible has not been identified, but it is not creatinine or lactic acid. A positive colloidal Cu reaction is of the gravest prognostic import. JOHN T. MYERS (Chem. Abstr.).

The Effect of Anoxia on the Pressure of the Cerebrospinal Fluid and on the Rate of Absorption of Normal Saline Solution from the Subarachnoid Space of Dogs under Ether Anesthesia. Bedford, T. H. B. [*J. Physiol.*, **102**, 334–40 (1943).]

There is no appreciable deviation from normal. H. L. WILLIAMS (Chem. Abstr.).

The Relation between the Pandy Test and Total Protein Content of Spinal Fluid. Madonick, M. J., and Savitsky, Nathan. [*J. Lab. Clin. Med.*, **29**, 542–5 (1944).]

The relationship between the Pandy test and the total protein in spinal fluid was determined. Records of 1,000 neurologic admissions to a hospital were examined with reference to this relation. Fifty-nine had negative Pandy tests with a total protein of 50 mgm. per 100 c.c. or over. Eighty-three had a positive Pandy reaction with a total protein of 100 mgm. per 100 c.c. or over. It was observed that about half the cases began to show a positive Pandy test when the protein level was 70–75 mgm. per 100 c.c. The results indicate that a negative Pandy may exist with a total protein above 50 mgm. per 100 c.c. The data support those investigators who claim the total protein may be increased despite a negative Pandy reaction. Three tables contain the experimental results obtained, and the literature on the subject is critically reviewed.
R. J. ALLGEIER (Chem. Abstr.).

The Determination of the Protein in Cerebrospinal Fluid by the Biuret Method. Andersch, Marie A. [*Am. J. Clin. Path., Tech. Sect.*, **8**, 43–6 (1944).]

The Kingsley biuret method (*C.A.*, **34**, 125[9]) for plasma proteins is applied to spinal fluid. To 1·0 c.c. of biuret reagent (to 500 c.c. of 42 per cent., CO_2-free NaOH add 100 c.c. of 3 per cent. $CuSO_4$), add 2·0 c.c. of spinal fluid. Read within 10 minutes in a photo-electric colorimeter and compare with a calibration curve prepared from standard protein solution. The method is accurate for protein concentrations from 100–500 mgm. per cent. It can be applied directly to xanthochromic fluids. JOHN T. MYERS (Chem. Abstr.).

A Note on the Measurement of Protein in Cerebrospinal Fluid by the Biuret Method. Sunderman, F. Wm., and Schmidt, Pauline. [*Am. J. Clin. Path., Tech. Sect.*, **8**, 47–8 (1944).]

Results with the Kingsley method (*C.A.*, **34**, 4093[7]) compare well with the determination of total N and non-protein N by the Pregl method. JOHN T. MYERS (Chem. Abstr.).

Interdependence of Biological and Physicochemical Properties of the Cerebrospinal Fluid and Man's Emotional State. Lokshina, E. S., and Efimov, V. V. [*Byull. Eksptl. Biol. Med.*, **14**, No. 1, 11–15 (1942).]

There exists a close relationship between the functional condition of the central nervous system and the composition and properties of the cerebrospinal fluid. In many cases of severe depression there are observed in the fluid lowering of surface tension, changes in biological activity of a parasympathomimetic character. The opposite mental state is accompanied by predominance of biological activity of sympathomimetic character.

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

The Phosphatase Content of Normal and Pathological Cerebrospinal Fluid. Albers, D. [*Fermentforschung*, **17**, 1–7 (1942); *Chem. Zentr.*, **1**, 2208 (1943).]

Cerebrospinal fluid from normal persons or from those with disease not involving the brain, spinal cord or meninges shows either none or a very small quantity of alkaline phosphatase (β-glycerophosphate; pH = 8·9; 24–72 hrs., 37°). The inflammatory diseases of the central nervous system behave differently. The majority of cases of epidemic and tuberculous meningitis show a considerably stronger enzyme activity. In meningitis serosa not arising after an infectious disease, the enzyme content is slight, with one exception. The phosphatase content is generally normal in disease of the brain and spinal cord in which the serosa membranes are not involved. J. MAX LITTLE (Chem. Abstr.).

Decrease of Surface Tension of the Cerebrospinal Fluid by Inactivation and by the Presence in it of the Lipoprotein Molecular Complexes. Efimov, V. V. [*Byull. Eksptl. Biol. Med.*, **14**, No. 1, 108–11 (1942).]

On inactivation and boiling, the surface tension of cerebrospinal fluid (in man and dog) is usually lowered, especially on the benzene interface. It is possible that the fluid contains lipoprotein molecular complexes analogous to those found in blood serum.

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

Surface Tension of the Cerebrospinal Fluid, Blood and Brain Metabolites at the Air and Liquid Interfaces. Efimov, V. V., and Lokshina, E. S. [*Byull. Eksptl. Biol. Med.*, **13**, No. 5/6, 40–3 (1942).]

The interfacial tension between cerebrospinal fluid and benzene is lower than the surface tension in air. Surface tension can be used to study changes in cerebrospinal fluid.

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

Thorotrast in Neurologic Diagnosis. Freeman, Walter, Schoenfeld, Herbert H., Watts, James W., and Groh, Robert H. [*Trans. Am. Neurol. Assoc.*, **67**, 89–91 (1941).]

During 7 years' clinical experience the authors have found stabilized ThO_2 suspension (Thorotrast, I) useful as a contrast agent for X-ray examination of the nervous system (ventriculography, cerebral angiography, myelography, and visualization of brain abscesses and cysts) in cases in which air has proved unsatisfactory. In normal persons (I) is eliminated from the cranium in 4 hours and produces only mild inflammation. Because (I) has a high specific gravity and is freely miscible with cerebrospinal fluid, it penetrates to the dependent part of the ventricular system and gives an unusually clear picture of the aqueduct of Sylvius and the 4th ventricle. In persons with ventricular obstruction, severe suppurative ependymitis is produced by (I) remaining in the ventricle; such a reaction was fatal to one patient. Severe reactions have been prevented by withdrawing (I) immediately upon completion of roentgenography. Patients observed up to 3 years after ventriculography have shown no evidence of progressive granulomatous process consequent to the initial ependymitis. Myelography with (I) has proved useful in demonstrating protruded intervertebral disks; approximately 90 per cent. of 10 c.c. of (I) injected can be recovered by spinal drainage. If (I) is injected in small amounts and allowed to remain in the subarachnoid space, the colloidal suspension is broken down, and ThO_2 particles are deposited in the pia arachnoid and carried along the perineural lymphatics. Meningography and neurography with (I) have been employed only to a limited extent; their clinical value is not yet proved. MARION HORN PESKIN (Chem. Abstr.).

The Sensitivity of the Respiratory Center of H-ion Concentration. Banus, M. Garcia, Corman, Harvey H., Perlo, Vincent P., and Popkin, Geo. L. [*Am. J. Physiol.*, **142**, 121–30 (1944).]

The ability to compensate for a gradually increasing acidosis due to intravenous injections of HCl or lactic acid was tested in anesthetized dogs deprived of their chemoreceptor reflexes by denervation of the carotid sinus region and by section of both vagus nerves.

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

Specificity in the Effects on Brain Metabolism of Two Differing Neurotropic Viruses. Nickle, Margaret, and Karat, Herman. [*J. Exptl. Med.*, **80**, 247–55 (1944).]

Brain tissue with the virus of Western equine encephalomyelitis shows specific differences in metabolism from brain tissue infected with the virus of poliomyelitis. With added glucose (I) concentration of 121 mgm. per cent. O utilization of poliomyelitic brain (II) is significantly below normal and that of encephalitic brain (III) is not; with added (I) concentration of 217 mgm. per cent. O utilization of (III) is significantly below normal and that of (II) is not. With lactate-(I) as the substrate, O utilization of (II) is below normal and that of (II) is not. With pyruvate-(I) as substrate, neither (II) nor (III) differs significantly from normal in O consumption. With succinate-(I) as substrate, O utilization of (II) is significantly above that of the normal control in the 1st hour. With added (I) concentration of 37·5 mgm. per cent. anaerobic metabolism of (III) is significantly below the normal, whereas that of (II) is not; with added (I) concentration of 229·5 mgm. per cent. the anaerobic metabolism of both (II) and (III) is significantly below the normal.

C. J. WEST (Chem. Abstr.).

Action of KCl on the Nerve Endings of Skeletal Muscle. Udenich, N. A. [*Byull. Eksptl. Biol. Med.*, **17**, *No.* 1/2, 44–8 (1944).]

Action of KCl (0·015–0·02 per cent. solutions) causes a definite change in activity of neuromuscular specimens. The magnitude of muscular contraction on individual stimuli gradually drops. The irritability threshold rises only toward the state of non-conduction between nerve and muscle. Duration of refractory state up to complete absence of conduction does not change and, in some experiments, is shortened.

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

Water Metabolism in Relation to Convulsions. II. The Specific Gravity of the Blood and the Blood Serum. Stone, Theodore T., Arieff, Alex J., and Luhan, Joseph A. [*Trans. Am. Neurol. Assoc.*, **68**, 177–9 (1942). *See C.A.*, **36**, 6637[1].]

MARION HORN PESKIN (Chem. Abstr.).

Experimental Studies on Brain Edema. Penfield, W., Prados, M., and Strowger, B. [*Trans. Am. Neurol. Assoc.*, **69**, 106–8 (1943).]

When one hemisphere of the cat brain is exposed to air for several hours and the wound then closed, the electroencephalogram shows depression of cortical activity for a few days, and the brain tissue undergoes hemorrhagic changes and edema. These effects are prevented by intramuscular injection of 2–5 c.c. adrenal cortex extract one hour before exposure of the brain, and again after closure of the wound and during the following days, or by administration of anterior pituitary corticotropic extract.

MARION HORN PESKIN (Chem. Abstr.).

Certain Peculiarities of Metabolism in Epilepsy. Palladin, A. V., Soreni, D. T., and Khaĭkina, B. I. [*Byull. Eksptl. Biol. Med.*, **17**, *No.* 1/2, 31–4 (1944).]

Epileptics show wide fluctuations of blood sugar. In most cases loading with sugar produces a normal "loading curve" or a two-phase loading curve. When seizures coincided with the curve rise, it was observed that the curve drops immediately before the seizure and rises rapidly immediately after the seizure. N metabolism is shown to be disturbed after a seizure and sometimes before one; it is shown by the rise of residual N (blood). Intravenous introduction of ammonium carbonate solution to cause a seizure leads to a paradoxical drop of residual N and urea (blood) during and immediately after a seizure. The cerebral permeability barrier to N fractions either disappears or is greatly lowered in seizure.

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

Effect of Diathermy on Brain Metabolism: Changes Produced on Sugar, Lactic Acid and pH of Arterial and Venous Blood of the Brain in Paretic Patients. Looney, Joseph M., and Borkovic, Embrie J. [*J. Lab. Clin. Med.*, **28**, 983–7 (1943); *cf. C.A.*, **36**, 2931[6].]

There was no change in sugar utilization and an increase in pH. The lactic acid arteriovenous difference is reversed, so that during the period of continued temperature elevation, lactic acid is produced. There is no increase in brain metabolism during diathermy.

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

Sex Hormones and Nerve Function. Chauchard, Paul. [*Ann. d'endocrinol.*, **4**, 133–4 (1943); *Chem. Zentr.*, **2**, 1721 (1943).]

Chronaximetric measurements on guinea-pigs are reported. After intraperitoneal injection of 2–4γ of folliculin, 100γ testosterone or 500γ progesterone per 500 gm. of animal the chronaxie phenomena are influenced almost at once. Therefore one is dealing with a direct influence on the nerve cells. All three hormones have a depressive action on the brain. Similar activity is also obtained with provitamin D_2 and desoxycorticosterone. The conditions in pregnancy require investigation.

IVAN A. WOLFF (Chem. Abstr.).

Photochemical Experiments on Single Nerve Fibers. Hutton-Rudolph, M. [*Helv. Physiol. Pharm. Acta*, **1**, C15–19 (1943).]

Exposure of an internodal piece of a single motor nerve fiber in frogs to ultraviolet rays lowers the rheobase to 50–200 mv. (controls 100–500 mv.), reaching its lowest value after 2 minutes. This phase of hyperexcitability is followed by a rapid increase of the rheobase until the fiber becomes unexcitable after 11–15 minutes' exposure. Unexcitability occurs more rapidly if a node of Ranvier is exposed. This is prevented if the rays below 300 mμ. are filtered through a quartz cuvette with aneurin (1 : 100). Exposure to light above 300 mμ. has no effect on the rheobase. B. C. P. A. (Chem. Abstr.).

Effects of Desoxycorticosterone Acetate on Water and Electrolyte Content of Brain and Other Tissues. Ziegler, Mildred, Anderson, J. A., and McQuarrie, Irvine. [*Proc. Soc. Exptl. Biol. Med.*, **56**, 242–4 (1944); *cf. C.A.*, **38**, 5257⁹.]

Young rats were given daily subcutaneous injections of 1 mg. of desoxycorticosterone acetate (in sesame oil) for 1–6 weeks. The K of the brain and skeletal muscles decreased about 20 per cent. while the Na increased very slightly. Heart muscle K was not affected, but liver K decreased about 30 per cent. There was no significant change in the water content of the tissues examined. Whether or not the antiepileptic effect of the hormone, previously reported, is in any way related to the decrease in brain K is not known.

L. E. Gilson (Chem. Abstr.).

Site of Action of Indole in the Central Nervous System. Feinberg, I. M., and McCulloch, W. S. [*Proc. Soc. Exptl. Biol. Med.*, **56**, 193–4 (1944).]

Experiments with dogs and cats show that intravenously injected indole can act on many portions of the central nervous system, but that the characteristic motor seizure produced is of subcortical and sometimes of spinal origin. L. E. Gilson (Chem. Abstr.).

The Nature of Synaptic Transmission in a Sympathetic Ganglion. Eccles, J. C. [*J. Physiol.*, **103**, 27–54 (1944).]

Eserine has little or no action on the synaptic potentials which single or double preganglionic volleys set up in the curarized stellate ganglion cells. The synaptic potentials produced by preganglionic tetani are changed in only one respect by eserine—the addition of a very prolonged potential built up during the stimulation, and, on cessation of stimulation, long outlasting (by several seconds) the decaying phase of the normal synaptic potential, which can still be observed superimposed on it. Eserine has no appreciable action on the ganglionic after-potentials set up by antidromic stimulation, but, as in the curarized ganglion, it greatly lengthens the superimposed synaptic potential set up by preganglionic stimulation. Hence, summation is observed with much slower rates of stimulation, and there is a greatly prolonged (10 seconds or more) and intensified after-discharge with even less than 1 second tetanization. Analysis of the synaptic potential, according to the local-potential theory, shows that the eserine effect is due to the production of a prolonged transmitter action without modifying the "peak" and "tail" transmitter actions normally present. This prolonged action is due to acetylcholine, which is rapidly removed by cholinesterase normally. The properties of the "tail" action show it to be due to a substance liberated by preganglionic stimulation, but not removed by cholinesterase. On the other hand, the brief "peak" action accords well with the direct electrical excitatory effect produced by the action currents of the preganglionic impulses.

H. L. Williams (Chem. Abstr.).

Metabolism of Phosphate and Carbohydrate in Extracts of Human Muscle and Brain. Greville, G. D., and Lehmann, H. [*J. Physiol.*, **102**, 357–61 (1944).]

The following four reactions have been shown to take place in cell-free extracts of human muscle: Adenosine triphosphate → adenosine diphosphate and phosphate, glycogen and phosphate → hexose monophosphate, hexose diphosphate ⇌ 2 triose phosphate, and adenosine triphosphate (adenosine diphosphate) and creatine ⇌ adenosine diphosphate (adenylic acid) and creatine phosphate. Specimens were obtained of human normal voluntary muscle during operations under spinal anesthesia for various surgical conditions, and included rectus abdominis, oblique abdominis, pyramidalis and cremaster. All four reactions were demonstrated in at least two specimens. Three samples of normal brain tissue, mainly cortex from the frontal lobe, two during prefrontal leucotomy and one during the removal of an intracranial tumor, yielded extracts which exhibited the last two reactions. A single sample of uterus sufficiently free from fibroid degeneration to be used was used to demonstrate the presence of the third reaction. These data are thought to constitute the first report of these reactions in human voluntary muscle, brain cortex and uterus muscle extracts.

H. L. Williams (Chem. Abstr.).

The Effect of Temperature and Ions on the Impedance of Unstriated Muscle and its Relation to Permeability and Excitability. Singh, Inderjit, and Singh, Mrs. Sunita Inderjit. [*Proc. Indian Acad. Sci.*, **19B**, 130–46 (1944).]

The electrical resistance of dog and frog stomach muscle and frog rectus abdominis was

determined by a Wheatstone bridge. Ag and Pt electrodes were used. Those factors found to decrease resistance were: increasing temperature; anions in increasing order, Cl, Br, NO_3, I, SCN; high ionic concentration. Factors which increased resistance include: compression; H ions; cations in increasing order, Li, Na, NH_4, K, Ca. Permeability is diminished in smooth muscle by Ca, H ions, and the previously listed anions. The resistance and permeability of smooth muscle are greater than those of striated muscle. A. EDELMANN (Chem. Abstr).

Dextrose Tolerance Tests after Cerebral Injury. Roth, H. [*Schweiz. med. Wochschr.*, **73**, 865–7 (1943).]

Elevated dextrose tolerance occurred among 45 patients with cerebral injuries. The usual number of tests performed on each patient was four. This disturbed carbohydrate metabolism is considered an impairment of sympathetic nervous centers. The degree of elevation of blood-sugar level did not parallel the severity of the cerebral lesion. A normal blood-sugar tolerance curve, provided the tolerance test is made not later than the third day, was considered as ruling out a traumatic cerebral lesion. The duration of the elevated tolerance levels, rather than the height of the curve, indicated the severity of the lesion. MAURICE M. RATH (Chem. Abstr.).

Etiology of the Migraine Syndrome. Pfeiffer, Carl, Dreisbach, Robert H., Roby, Charles C., and Glass, Howard G. [*J. Lab. Clin. Med.*, **28**, 1219–25 (1943).]

Data are presented which justify separation from the so-called "common headache" of two new types, namely, relaxation headache and "caffeine-withdrawal headache." The former is accompanied by a decreased blood volume, and the latter by an increase in the "effective arterial blood volume." No consistent blood-electrolyte changes occur with relaxation or migraine headache. The migraine syndrome is accompanied by relative hemoconcentration. B. C. P. A. (Chem. Abstr.).

Chemical Steps in the Metabolism of Alcohol by Brain in vitro. Dewan, John G. [*Quart. J. Studies Alc.*, **4**, 357–61 (1943).]

Minced cow brain *in vitro* formed AcH (I) and AcOH (II) from EtOH (III). The oxidation of (III) to (I) in brain, as in liver, is probably catalyzed by a specific dehydrogenase plus a series of enzymes, two of which contain nicotinic acid and riboflavin. (I) can then be directly oxidized to (II) by aldehyde oxidase and/or may be subjected to dismutation to (II) and (III) by the aldehyde mutase of Dixon and Lutwak-Mann (*C.A.*, **31**, 8569[1]; **33**, 6353[7].)

MARION HORN PESKIN (Chem. Abstr.).

Phosphoaminolipides of Brain Tissue. Fractionation and Estimation of Choline-containing Substances. Carayon-Gentil, Mme. A., and Corteggiani, E. [*Bull. soc. chim. biol.*, **24**, 89–96 (1942); *Chem. Zentr.*, **2**, 1742 (1943).]

Extract 100 gm. of fresh brain pulp three times with Me_2CO at 6° for 2–5 hours; use a total of 900–1,000 c.c. of Me_2CO and add 1 gm. of $MgCl_2$ to each of the first two portions of solvent. The extract contains the free choline. Powder the dry tissue residue and extract 6–8 hours with petroleum ether, b. 30–5°, in a Soxhlet apparatus. This extract contains the lecithin and cephalin. Extract the residue next with MeOH-$CHCl_3$ mixture (3 : 1) in a Soxhlet apparatus. The extract contains the sphingomyelin. Hydrolyze each of the three extracts by boiling with alcohol HCl and estimate the choline in each by the method of Mentzer (acetylation and estimation of the acetylcholine formed by its action on leech muscle). For purpose of calculation the molecular weight of lecithin is taken as 791 and that of sphingomyelin as 832. Fresh beef brain contained, according to this procedure, 6–29 mgm./gm. of free choline, 8–15 mgm./gm. of lecithin and 5·8–6·3 mgm./gm. of sphingomyelin. L. E. GILSON (Chem. Abstr.).

Action of Ca Galactogluconate upon the Medulla and Spinal Cord. Frommel, E., and Wolfermann, A. [*Schweiz. med. Wochschr.*, **72**, 1205–7 (1942).]

Simultaneous injection of Ca galactogluconate prevented epileptiform convulsions in guinea-pigs produced by injection of 0·20 to 0·35 gm. coramine per kgm. body weight. Administered after the respiratory center in rabbits had been stimulated by coramine or depressed by morphine, Ca galactogluconate had no effect. MAURICE M. RATH (Chem. Abstr.).

Effects of Administered Pregnenolone on Fatiguing Psychomotor Performance. Pincus, Gregory, and Hoagland, Hudson. [*J. Aviation Med.*, **15**, 98–115, 135 (1944).]

Each of five healthy male students exhibited improved performance scores upon the Stevens serial co-ordination meter when 57 mgm. Δ^5-pregnenolone was administered orally daily for seven days during the tests. Oral cortin, injected progesterone and placebo administration were not accompanied by such score improvement. Seven instructor pilots tested on the Hoágland-Werthessen pursuit meter were given alternately placebos, 50 mgm. pregnenolone daily and placebos. A significant improvement in absolute score, in decrement measures and in "emergency performance" occurred during pregnenolone administration.

MAURICE M. RATH (Chem. Abstr.).

The Nature of Myasthenia Gravis. Stoerk, Herbert C., and Morpeth, Elvira. [*Science*, **99**, 496–7 (1944).]

No significant differences in the amount of acetylcholine synthesized were obtained regardless of whether thymus or serum from patients with myasthenia gravis were added to the medium (minced rat brain). Likewise no significant differences in the amounts formed were obtained in Locke solution or in human serum. E. D. WALKER (Chem. Abstr.).

Comparative Studies of the Rates of Oxidation and Glycolysis in the Cerebral Cortex and Brain Stem of the Rat. Chesler, Annette, and Himwich, Harold E. [*Am. J. Physiol.*, **141**, 513–17 (1944).]

An attempt is made to estimate the calcium obtainable aerobically and anaerobically by the brain. E. D. WALTER (Chem. Abstr.).

Influence of the Cerebellum on the Sugar Content of the Blood. Wiggers, K. [*Arch. néerland. physiol.*, **27**, 304–25 (1943).]

On removal of the uvula cerebelli the amplitude of the variations in the fasting blood-sugar level increases. Glucose given *per os* increases the blood-sugar content more markedly in animals, in which the uvula has been removed, than in normal animals. Thus, in contrast to Kaplan's results (*cf. C.A.*, **36**, 7099[7]), the influence of the cerebellum on sugar metabolism is localized. This influence is of a regulatory nature and differs from that of the labyrinth. Excitation of the latter and of its nuclei causes a change in the fasting blood-sugar level, which is not modified by electrical stimulation of the cerebellum. Microscopic examination also confirmed the assumption that the influence of the cerebellum on the blood-sugar level is localized in the uvula. T. LAANES (Chem. Abstr.).

Naturally Occurring Porphyrins in the Central Nervous System. Klüver, Heinrich. [*Science*, **99**, 482–4 (1944).]

The fluorescence spectrum of the white matter of the central nervous system, in numerous animals, shows an emission band at 630–620 mμ., with a maximum at about 625 mμ. It is suggested that the porphyrins may play a role in neurological and psychiatric disorders. E. D. WALTER (Chem. Abstr.).

Ameboid Motion and Secretion of Motor End Plates. III. Experimental Histopathology of Motor End Plates Produced by Quinine, Curare, Prostigmine, Acetylcholine, Strychnine, $PbEt_4$, and Heat. Carey, Eben J. [*Am. J. Path.*, **20**, 341–94 (1944); *cf. ibid.*, **18**, 237–89 (1942).]

The aurophilic granules of Kühne, the secretion of which is correlated with ameboid motion of motor end plates, may be increased in quantity by curare and quinine. These chemicals also block neuromuscular transmission and cause the aurophilic epilemmal and hypolemmal axons to undergo acute dilatations. The secreted granules of Kühne may be decreased in number and even completely by prolonged chemical stimulation, such as that produced by strychnine, NaCN, CO_2 and exhausting muscular exercise. The terminal expansions of the hypolemmal axons of the end plate may undergo direct transformation into the secreted granules of Kühne, without the presence of the intervening clear space, by sudden stimulation with either prostigmine or acetylcholine after the end plate has been blocked by the local action of curare. Heat produces a sudden expansion of the end plate and a dispersal of the granules of Kühne that together produce perturbations in the pattern of the cross striations of the muscle fiber. $PbEt_4$ produces a sudden and explosive transmission of an abnormal quantity of aggregates of aurophilic granules which results in massive radiations, distortion and increased staining capacity of the end plates for Au, as well as abnormal distortions of the related cross striations of the muscle fiber to these abnormal end plates. F. B. SEIBERT (Chem. Abstr.).

Action of Phosphate Injections into the Brain of Mice. Biocca, E. [*Arquiv. biol.* (*São Paulo*), **27**, 21 (1943) (*English summary*).]

Intracerebral injection of Sörensen buffer solution of phosphates (pH 7–7·5) produces in mice a generalized and prolonged contraction of muscles, sometimes followed by death. F. FROMM (Chem. Abstr.).

The Autolysis of Brain Infected with Rabies. Ionescu, Dimitrie. [*Zentr. Bakt. Parasitenk., I Abt.*, **151**, 21–5 (1943).]

At 18° in the dark, rabic brain retains its virulence for four months. The Negri bodies remain but the brain cells disintegrate. Autolysis is slower than with normal brain. At 37° in the dark, at a pH of 7·1, virulence was retained for nine days and the Negri bodies were larger than before autolysis. JOHN T. MYERS (Chem. Abstr.).

Water, Nitrogen and Electrolyte Concentration in Brain (of Dog). Eichelberger, Lillian, Richter, Richard B., and Roma, Michael. [*J. Biol. Chem.*, **154**, 21–9 (1944).]

Analytical data are reported on brains from 22 normal dogs, 5 in each of which the right and left cerebral hemispheres were analyzed separately, 5 from which portions of fresh brain and

ether-extracted portions of the same brain were analyzed, and 12 from which serum, hemispheres and cerebellums were analyzed. The dogs were adult, but of unknown age, and were maintained on an alternate meat and dog-chow diet for 3–4 weeks before blood samples were removed and collected under oil, and before the brain was removed following nembutal anesthesia. The right and left hemispheres from the same animal gave the same analytical results, expressed as units per kgm. of fresh hemisphere: Total H_2O 761·3 gm., total N 18·9 gm.; Cl 36·71, Na 51·0, K 95·6, Ca 1·07, Mg. 5·63 millimoles. The cerebellum with brain stem gave the following mean average results: Total H_2O 745·0 gm., total N 19·1 gm.; Cl 35·19, Na 50·8, K 92·7, Ca 1·07, Mg 5·40 millimoles. Because the analyses of the hemispheres and the cerebellum following extraction of the dried tissue with ether and petroleum ether gave low concentrations of Cl, Na and K, the analytical results were not expressed in terms of fat-free tissue. The data on serum for comparison were: Total H_2O 923·6 gm., Cl 108·8, Na 141·4, K 4·66, Ca 2·47, and Mg 0·95 millimoles. H. L. WILLIAMS (Chem Abstr.).

Physicochemical Changes in the Brain Accompanying Electrically Induced Convulsive Discharge. Spiegel, E. A., Spiegel-Adolf, M., and Henny, G. C. [*Trans. Am. Neurol. Assoc.*, **68**, 174 (1942).]

Marked leakage of ions from surviving frog brain in Ringer solution occurred during faradization and one minute after. This effect was absent or minimal in control tests on brains killed by $CHCl_3$ or by heating. MARION HORN PESKIN (Chem. Abstr.).

Alcohol and Driving. Newman, Henry, Fletcher, Edwin, and Abramson, Mason. [*Quart. J. Studies Alc.*, **3**, 15–30 (1942); *cf. C.A.*, **35**, 200^8.]

Ingestion of 0·5–2 c.c. EtOH (as whisky diluted to taste with iced plain or carbonated water)/kgm. by 150 men and women had widely different effects, from person to person, upon vision, co-ordination, and practical operation of automobiles. When the blood alcohol was 150 mgm./100 c.c. or more, all subjects showed some impairment of performance, but the impairment was not always evidenced in every test upon a given subject. Hence the finding of 150 mgm. alcohol/100 c.c. blood could be taken as adequate proof of "intoxication" only in states such as Arizona, where "intoxication" is defined as any effect, however slight. Elsewhere, the blood alcoholic concentration must be considered as contributory evidence only.

MARION HORN PESKIN (Chem. Abstr.).

Carotid Sinus Syndrome with Hypoglycemia. Camp, Walter H. [*Med. Bull. Veterans' Admin.*, **20**, 339–40 (1944).]

Hypoglycemia may have some relationship to the cerebral type of carotid sinus syndrome.

RACHEL BROWN (Chem. Abstr.).

The Oxygen Metabolism of Monkey Brain in vivo. Schmidt, Carl F., Pennes, Harry H., and Kety, Seymour S. [*Am. J. Med. Sci.*, **207**, 813–14 (1944).]

In rhesus monkeys lightly anesthetized with nembutal supplemented by pentothal, cerebral blood flow was measured and arterial and cerebral venous blood samples were analyzed for O_2, CO_2, and glucose content. RACHEL BROWN (Chem. Abstr.).

Characteristics of the Normal Electroencephalogram. II. The Effect of Varying Blood-sugar Levels on the Occipital Cortical Potentials in Adults during Quiet Breathing. Brazier, Mary A. B., Finesinger, Jacob E., and Schwab, Robert S. [*J. Clin. Investigation*, **23**, 313–23 (1944); *cf. ibid.*, 303–12.] J. B. BROWN (Chem. Abstr.).

Inhibition of Nervous Transmission in Synapses and End-Plates by Thiamine. Unna, K., and Pick, E. P. [*J. Pharmacol.*, **81**, 294–300 (1944).]

Thiamine, 5–15 mgm./100 c.c., inhibits the action of nicotine on the isolated intestine of rabbits and guinea-pigs. Cocarboxylase has a similar effect. The sensitivity to nicotine is restored by washing. The effect is linked to the thiazole moiety of the thiamine molecule and appears to be analogous to the effect of certain sulfonamides. Thiamine also inhibits the action of nicotine in striated frog muscles. The effect of thiamine on the action of nicotine is not influenced by prostigmine. The processes involved in the inhibition of the nicotine action in synapses and in end plates at the myoneural junction are discussed.

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

Trigonelline and Its Relationship to the Pellagra Vitamin. Kühnau, J. [*Vitamine u. Hormone*, **3**, 74–88 (1942); *Chem. Zentr.*, **1**, 970 (1943).]

Experiments on the influence of trigonelline administration on nicotinic acid excretion have not yielded uniform results. In experiments *in vitro* with kidney tissue, a limited extent of demethylation could be demonstrated. A simple method for determining trigonelline in urine is described. Investigations carried out on man showed that in aneurine deficiency the administration of aneurine results in a rapid elimination of trigonelline (stimulation of methylation processes, displacement of nicotinic acid from its phosphoric acid compound).

G. J. SCHEFF (Chem. Abstr.).

Vitamin E in Neurology. Couperus, J. [*Z. Vitaminforsch.*, **13**, 193–207 (1943).]

In both normal subjects and neurological patients the tocopherol content of the serum was 0·33–1·12 mgm. per 100 c.c. It attained a maximum six hours after oral administration of 300 mgm. dl-*a*-tocopherol acetate and returned to normal in 24 hours. Free tocopherol did not appear in the serum after intramuscular injection. Tocopherol was not present in cerebrospinal fluid or urine; creatinuria, muscular dystrophy, and amyotrophic sclerosis were not influenced by its administration. J. S. HEPBURN (Chem. Abstr.).

Cerebral Impairment Due to Nicotinic Acid Amide Deficiency. Kuipers, F. C. [*Nederland Tijdschr. Geneeskunde*, **87**, 929–34 (1943); *Chem. Zentr.*, **2**, 432 (1943).]

Cases of pellagra are described which manifested themselves by neurological disturbances without any signs of dermatitis, diarrhea and dementia. BRUNO VASSEL (Chem. Abstr.).

Relationship between Nicotinic Acid and Thiamine. Valeri, Claudio Malaguzzi. [*Klin. Wochschr.*, **22**, 391–2 (1943); *Chem. Zentr.*, **2**, 432 (1943).]

The daily injection of 100 mgm. nicotinic acid and 5–12·5 mgm. thiamine into human subjects caused a marked decrease in the daily urinary nicotinic acid excretion, at times causing its complete disappearance. The administration of large doses of thiamine to rats decreased the nicotinic acid concentration of their livers. It is suggested that whenever a clinical need for nicotinic acid or thiamine therapy arises both be administered.

BRUNO VASSEL (Chem. Abstr.).

The Effect of Dietary Choline upon the Rate of Turnover of Phosphatide Choline. Boxer, George E., and Stetten, DeWitt, jun. [*J. Biol. Chem.*, **153**, 617–25 (1944).]

When a high-fat diet was supplemented with 50 mgm. of isotopic choline chloride per rat per day, the rate of replacement of phosphatide choline in the liver and carcass by labelled dietary choline (N^{15}), was found to be 3·9 mgm. per rat per day. Upon cessation of the choline supplement the isotopic choline concentration dropped more rapidly in the liver than the carcass. New, non-isotopic choline replaced the isotopic fraction at the rate of 1·3 mgm. per rat per day, while fatty livers developed. Choline deprivation decreased the rate of incorporation of new choline in the phosphatides without altering the quantity of phosphatide choline. It is suggested that fatty liver may be due to a change in rate of the incorporation into body phosphatide of dietary or newly synthesized choline. Methods of analysis and calculation are given and results are tabulated. E. R. NEWTON (Chem. Abstr.).

Vitamin B-deficient Animals and Poliomyelitis. Toomey, John A., Frohring, Wm. O., and Takacs, Wm. S. [*Yale J. Biol. Med.*, **16**, 477–85 (1944); *cf. C.A.*, **38**, 568[6].]

A diet low or high in vitamin B was ineffective in attempts to acclimate white rats to Flexner M V strain of poliomyelitis virus. In white mice inoculated with the Lansing poliomyelitis virus, overfeeding with B_1 vitamin rendered the mice more susceptible in the first transfer generation. No significant difference was observed in the second transfer generation.

G. H. W. LUCAS (Chem. Abstr.).

Effect of Added Thiamine on Learning. Harrell, Ruth F. [*Teachers' Coll., Columbia Univ. Contrib. to Education, No.* 877, 55 pp. (1943).]

The hypothesis that learning is so related to nutrition that an increase in learning tends to follow increase in thiamine intake was tested on human subjects. In an orphanage 74 children ranging in age from 4–20 years were divided into two groups such that the groups were as similar as possible in heredity, sex, early economic environment, age, size and intelligence as measured by intelligence tests. The membership of the groups was chosen by someone not connected with carrying out the experiment, and was unknown, during the experiment, to anyone administering the tests, tabulating the data, or dealing with the children, as well as to the children themselves. One group received 2 mgm. extra thiamine daily, in the form of a tablet; the other received a tablet identical except that it contained no thiamine. The daily content of thiamine in the regular orphanage diet was estimated at 0·9 mgm. The following 18 activities were tested: Addition, subtraction, multiplication, division, problems, mixed fundamentals in arithmetic (Thorndike), mixed fundamentals (Woody-McCalls), sums of ten, underlining 4's, underlining A's, completing designs, number span, code learning, reading, throwing 10 baseballs into a pocket, throwing 10 darts at a target, and strength of grip in right and left hand. These tests were carried out 9 times, once at the beginning of the experiment before the administration of the tablets, and 8 times thereafter in a period of six weeks. The two groups were found to be initially well matched in the performance of these tasks. At the end of the experiment the thiamine group was found to have made superior gains in every one of the 18 tests, the superiority varying from 7–87 per cent. among the various tasks. The average superiority in improvement of the thiamine group over the control group was about 27 per cent. Complete tables of data are given. MARJORIE ANCHEL (Chem. Abstr.).

Spontaneous Beriberi in the Monkey. Leblond, C. P., and Chaulin-Serviniere, J. [*Ann. inst. Pasteur*, **68**, 391–408 (1942); *cf. C.A.*, **36**, 4167[3].]

Twenty cases of a cardio-nervous malady were observed in a colony of *Macaca sylvanus*. The

clinical signs of polyneuritis, and cardiac failure, the verification at autopsy of degenerated peripheral nerves and the hydropericardium showed a deficiency in vitamin B_1 indicating beriberi to be the disease. Treating the animals with crystallized vitamin B_1 had a slight curative effect, but was not prolonged owing to the expressive degeneration and permanent lesions. It was found that when the vitamin B_1 deficiency was only partial, the same picture of beriberi appeared in the monkey. BENJAMIN PRESCOTT (Chem. Abstr.).

Histological Study of the Central and Peripheral Nervous System in Monkeys Experimentally Deprived of Vitamin E. Wechsler, Israel S., and Globus, Joseph H. [*Trans. Am. Neurol. Assoc.*, **68**, 179–80 (1942).]

Monkeys deprived of vitamin E for 2–18 months showed variable amounts of fat more or less diffusely distributed through the lower part of the brain stem (especially pyramids, medial lemniscus and restiform body), fat changes also throughout the spinal cord, and some fat in the subcortex, motor and sensory roots, and larger peripheral nerve roots. An old monkey on a normal diet showed presence of fat like that in the animals deficient in vitamin E. A young control exhibited no myelin degeneration. MARION HORN PESKIN (Chem. Abstr.).

Symptoms and Neuromuscular Lesions in Vitamine E Deficiency in Adult Rats. Monnier, M. [*Verhandl. Ver. schweiz. Physiol.*, **18**, 35–7 (1944); *cf. C.A.*, **38**, 7091⁷.]

The first symptoms were observed after 10½ months. Degenerative changes were found in skeletal muscles, often near the vessels. There was loss of cross-striation, necrosis, monocytic infiltration of the fibers, endo- and peri-mysial fibrosis, and fatty degeneration. After 14 months and longer there was motor ataxy, paresis of the hind limbs, disturbance of deep sensibility, sensory disturbances (loss of smell and hearing), exophthalmos and urinary incontinence. There was degeneration of the tracts of Goll and Burdach, of anterior and lateral horn cells, demyelination of peripheral nerves, and more pronounced degeneration of the skeletal muscles.

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

Fractionated Examination of the Carbohydrate Metabolism in Some Neurological Cases. Hammarsten, Greta, and Mindus, Erland. [*Acta Med. Scand.*, **118**, 201–16 (1943); *Chem. Zentr.*, **1**, 2106 (1943).]

The blood sugar and pyruvic acid after repeated glucose loading were determined in a case of polyneuritis caused by ileus, a case of acute confusion in myelopathy connected with achylia and liver cirrhosis, and in a case of facial neuralgia with relapsing colitis, in part with and in part without treatment with vitamin B. The pyruvic acid values were increased in all three cases. Treatment with vitamin B lowered the pyruvic acid values, but they did not become entirely normal until after further supplementary treatment with Mg salts. The relation of the avitaminoses B to neurological diseases is discussed. RUTH BERGGREN (Chem. Abstr.).

Biochemical Determination of Eserine by Its Anticholinesterase Action. Its Use in Materia Medica and Pharmacy. Vincent, D., and Maugein, A. [*Bull. sci. pharmacol.*, **49**, 165–7 (1942); *cf. C.A.*, **38**, 3680⁹.]

Leech muscle can be used for galenical preparations and for the natural drug. Other alkaloids having an anticholinesterase effect, although at a lesser degree, can be assayed by this method also. They are geneserine, dihydroxicodienone, codeine, morphine and heroin.

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

Serum Cholinesterase during Excitation of Abdominal Vagus. Huidobro, F., Croxatto, F., Croxatto, R., and Donoso, R. [*Anales acad. biol. Univ. Chile*, **3**, 67–73 (1939).]

In cats under dial, stimulation of the vagus below the origin of its cardiac branches for 2–5 minutes increases by 7–15 per cent. the cholinesterase activity of venous blood from the splanchnic area. In adrenalectomized cats the increase is 26–30 per cent. After atropine (1 mgm. per kgm.) stimulation of the vagus does not change the cholinesterase activity of blood.

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

Serum Cholinesterase and Pathological Conditions. Huidobro, F., and Croxatto, R. [*Anales acad. biol. Univ. Chile*, **3**, 91–103 (1939).]

The cholinesterase activity of serum of patients does not depend on age, sex, diet, exercise, temperature, pulse rate or blood pressure, but mainly on the general condition. In 96 per cent. the serum cholinesterase activity was decreased, and in 80 per cent. it varied with the general state. In 17 per cent. serum cholinesterase in patients was within the normal range.

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

Variations of Serum Cholinesterase During Muscular Contraction. Croxatto, H., Croxatto, R., Huidobro, F., and Salvestrini, H. [*Anales acad. biol. Univ. Chile*, **3**, 106–10 (1939).]

Stimulation of the sacral and lumbar plexuses in cats under dial increases cholinesterase activity of blood from the hind limbs. Direct stimulation of a muscle decreases the cholinesterase activity of the blood from the hind limbs. These phenomena are not due to stimulation of sympathetic fibres. B. C. P. A. (Chem. Abstr.).

Theory of Cholinesterase Inhibition. Zeller, E. A. [*Verhandl. Ver. Schweiz. Physiol.*, **21**, 43–4 (1942).]

There is a linear relationship between speed of reaction and anti-cholinesterase concentration in a system containing large quantities of acetylcholine, compared with the anticholinesterase concentration. The curve becomes parabolic when the concentration of the latter is increased and follows the equation $y = ax^b$ (y = enzyme inhibition, x = anticholinesterase concentration, a and b = constants). This relationship held for the following anticholinesterases: Sulfanilamide, pyrazolone, morphine, procaine, percaine, eserine. The inhibition with increasing choline concentraton was greater than expected. Human brain and guinea-pig serum cholinesterases were less inhibited by the same concentration of an anticholinesterase than human serum cholinesterase; the constant b is smaller in the first two cases than in the latter.

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

Changes in Serum Cholinesterase during Sympathetic Stimulation. Croxatto, R., and Huidobro, F. [*Anales acad. biol. Univ. Chile*, **3**, 121–4 (1939).]

In normal or adrenalectomized cats there is no change in serum cholinesterasic activity during stimulation of splanchnic nerves. B. C. P. A. (Chem. Abstr.).

Changes in Serum Cholinesterase Following Excitation of Vagus in Neck. Croxatto, H. [*Anales acad. biol. Univ. Chile*, **3**, 125–32 (1939).]

In cats under dial (0·7 c.c. per kgm.) with vagi cut in the inferior thoracic region below the heart and lungs, stimulation of peripheral end of the vagi in the neck lowers serum cholinesterase by 26 per cent. If both vagi are intact and the blood from the coronary sinus is excluded, stimulation of the vagi in the neck increases the cholinesterase activity of the blood flowing from the jugular veins, and decreases that from the coronary sinus. Atropine abolishes and adrenalectomy does not modify the effect of vagal stimulation. The fall of serum cholinesterase is therefore due to the vagal effect on the heart. B. C. P. A. (Chem. Abstr.).

Changes in Cholinesterase Activity of Superior Cervical Ganglion after Section of Preganglionic Fibers. Croxatto, R., Huidobro, F., and Luco, J. V. [*Anales acad. biol. Univ. Chile*, **3**, 7–10 (1940).]

The cholinesterase activity of the superior cervical ganglion of cats is decreased by 40–60 per cent. 24–71 hours after section of the preganglionic fibers. Later the cholinesterase activity remains constant, being 20–40 per cent. below normal. B. C. P. A. (Chem. Abstr.).

Cholinesterase Activity During Nervous Stimulation. Croxatto, R., Huidobro, F., Salvestrini, H., and Luco, J. V. [*Anales acad. biol. Univ. Chile*, **3**, 11–14 (1940).]

After stimulation of the sciatic and vagus of the cat *in vitro* in serum, there is no change in the cholinesterase activity of the serum. After stimulation of the post-ganglionic cholinergic fibers to the iris, the aqueous humor has, as before stimulation, no cholinesterase activity. After stimulation of the preganglionic fibers to the superior cervical ganglion the cholinesterase activity of the latter is unaltered. B. C. P. A. (Chem. Abstr.).

Cholinesterase Activity of Serum During Stimulation of Motor Nerves. Salvestrini, H., Huidobro, F., and Luco, J. V. [*Anales acad. biol. Univ. Chile*, **3**, 15–29 (1940); *cf. C.A.*, **36**, 4530[8].]

In cats under dial, stimulation of the sciatic and crural nerves with currents of 240 cycles per second affects the cholinesterase activity of serum from the inferior vena cava. The serum changes follow variations of tension of the stimulated muscles; enzyme activity is greatly increased at the beginning of stimulation, rapidly falls, rises again, and eventually drops to a low value. Thus in the curve of the cholinesterase activity it is possible to recognize the five phases which have been described as characteristic of tensions recorded from muscles similarly stimulated. No changes of serum cholinesterase activity were observed in non-stimulated animals, or on direct stimulation of denervated muscles, or with curarized muscle.

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

Cholinesterase and Monoamine Oxidase in Human Brain. Birkhauser, H. [*Verhand. Ver. Schweiz. Physiol.*, **17**, 8–9 (1940); *cf. C.A.*, **37**, 2021[7].]

The acetylcholine quotient (c.c. of O taken up by 100 mgm. of tissue in 120 minutes) in adult human brain was for thalamus 2·9 (± 0·1; 23 cases), caudate nucleus 29·1 (± 1·2; 22 cases), putamen 38·1 (± 1·1; 18 cases), globus pallidum 10·0 (± 0·5; 15 cases), cortex 1·6 (± 0·08; 23 cases. The corresponding values for monoamine oxidase were in persons above 60 years 104 ± 8·7 (13), 93 ± 5·6 (13), 78 ± 9·2 (9), 63 ± 6·2 (7), 50 ± 3·1 (13); in subjects under 60 years, 90 ± 5·1 (6), 88 ± 4·3 (7), 73 ± 3·3 (7), 81 ± 5·1 (6), 47 ± 1·9 (7), in small infants for thalamus 38 ± 2·3 (4), caudate nucleus 24 ± 0·4 (4), and cortex 19 ± 2·9 (3). The cholinesterase values in 5 small infants were 4·8 (thalamus) and 16·8 (caudate nucleus).

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

Cholinesterase and Female Sex Hormones. Birkhauser, H. [*Verhandl. Ver. schweiz. Physiol.*, **18**, 15–16 (1941); *cf. C.A.*, **35**, 2574[4].]

A glycerol solution of estradiol dipropionate has no effect on the cholinesterase content of

rat liver *in vitro*. *In vivo*, estradiol increases the cholinesterase content of liver secondary to an increase in its acetylcholine content. The increase in uterine blood flow following administrations of estradiol is due to an increase in uterine acetylcholine concentration. The liver cholinesterase content of rats suffering from beriberi is diminished.

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

Effect in vitro of Curare Alkaloids and Crude Curare Preparations on True Cholinesterase and Pseudocholinesterase Activity. Harris, Meyer M., and Harris, Ruth S. [*Proc. Soc. Exptl. Biol. Med.*, **56**, 223–5 (1944); *cf. C.A.*, **35**, 4491[7].]

Five pure curare alkaloids and several impure curare preparations were investigated for effect on the activity of the true cholinesterase and pseudocholinesterase of serum. A very active substance which specifically inhibits the pseudocholinesterase was found in some of the preparations. It inhibited true cholinesterase slightly or not at all.

L. E. Gilson (Chem. Abstr.).

Variations in the Cholinesterase Activity of Blood Serum during Violent Muscular Exercise and in States of Hypoglycemic Shock. Huidobro, F., Guzmán, D., and Andia, M. [*Rev. med. y alimentación*, **6**, 38–40 (1943–44).]

Violent muscular exercise increases the cholinesterase activity of human serum by 15·4 = 1·2 per cent. in men and 21·8 = 2·1 per cent. in women. Hypoglycemic shock produces no regular change in the cholinesterase activity. H. L. Williams (Chem. Abstr.).

Traumatic Shock and Serum Cholinesterase. Mediator Role of Acetylcholine in the Pathogenesis of Shock. Frommel, Ed., Thalheimer, M., Herschberg, A. D., and Piquet, J. [*Helv. Physiol. Pharmacol. Acta*, **1**, 451–66 (1943) (*in French*).]

In unanesthetized guinea-pigs, bruising exposed leg muscles, bruising the exposed sciatic nerve, removal of a 2-cm. section of the sciatic nerve, and bruising the leg muscle after cutting the nerve, all caused serum cholinesterase (I) to drop to 40–70 per cent. of its normal level within 45 minutes. Return to normal required 4–16 days. Bruising the leg muscles while under Et_2O anesthesia caused the same drop in (I), but the return to normal required only 48 hours. Excision of the sciatic nerve while under Et_2O caused only a slight drop in (I), and excision after a very large dose of morphine caused no drop in (I). Local anesthesia with procaine causes a large drop in (I) before surgical intervention, and subsequent sciatic excision causes a further decrease. Recovery is slow. The first muscle trauma shock decreases the sensitivity to later repeated trauma. Trauma of muscles after application of a tourniquet produces no decrease in (I) until after the tourniquet is removed and circulation re-established. The drop in (I) is thought to be a secondary result of the shock and not the cause of the shock. The exact mechanism of the shock production is still uncertain. In all the above experiments there was no significant change in the ascorbic acid content of any of the organs of the guinea-pigs.

L. E. Gilson (Chem. Abstr.).

Relation Between the Serum Cholinesterase and the Serum Albumin. Faber, Mogens. [*Acta Med. Scand.*, **114**, 72–91 (1943); *Chem. Zentr.*, **2**, 724–5 (1943).]

Cholinesterase is precipitated from serum by $(NH_4)_2SO_4$ together with the albumin fraction. There is a close relationship between the two, as can be seen from studies on serum from patients with diminishing albumin content. Both substances are apparently produced by the same cells (cholinesterase is formed by the liver) and liberated into the serum. The protein content of the diet, which can produce variations in the serum albumin content, affects also in a similar manner the serum cholinesterase content. S. Morgulis (Chem. Abstr.).

The Cholinesterase of Human Blood. Schaller, Karl. [*Z. klin. Med.*, **141**, 565–89 (1942); *Chem. Zentr.*, **2**, 725 (1943).]

Studies on cholinesterase (I) of human blood according to Ammon's method were carried out in different diseases; and also *in vivo* experiments on the influence on (I) of physostigmine, aneurine, acetylcholine, adrenaline, atropine and forapine. Physostigmine and atropine inhibit, acetylcholine stimulates; aneurine in high concentration inhibits, in low concentration stimulates; adrenaline and forapine have no effect. The relation between serum Na and K and the activity of the blood (I) is discussed. Suggestions are made that determination of (I) can serve for differential diagnosis of icterus; also of the relationship between the reactions of (I) to parenteral administration of these different substances in different diseases. It is pointed out that red cells can serve both as reservoir and place of formation of (I).

S. Morgulis (Chem. Abstr.).

Muscular Activity and Cholinesterase. Croft, Phyllis G., and Richter, D. [*J. Physiol.*, **102**, 155–69 (1943).]

Serum cholinesterase activity is raised during muscular exercise in man, while the cholinesterase activity of blood corpuscles falls; some of the ali-esterase also passes into the serum during exercise. Serum cholinesterase activity is not raised by the administration of adrenaline, ergotamine or histamine, or by overbreathing, underbreathing, or re-breathing the expired air,

but it is raised during circulatory stasis due to the increase in serum proteins, and this rise is not related to that observed in muscular exercise. The mechanism of the exchange of cholinesterase between corpuscles and serum following exercise is suggested to be the elution of the adsorbed or combined enzymes by some chemical metabolite produced during exercise.

H. L. WILLIAMS (Chem. Abstr.).

Serum Cholinesterase in Diseases. Faber, Mogens. [*Acta Med. Scand.*, **114**, 59–71 (1943); *Chem. Zentr.*, **2**, 724 (1943).]

The variations in serum cholinesterase under normal and pathological conditions were determined in 400 persons. The differences, which are large even in normal people, are still greater in patients. Especially low values were observed in liver diseases, anemia, undernutrition and cancer. The determination of the cholinesterase level by itself is of no diagnostic value, but may contribute to a discovery of some general factor affecting the enzyme content.

S. MORGULIS (Chem. Abstr.).

Effect of Spinal Fluid from Patients with Myasthenia Gravis on the Synthesis of Acetylcholine in vitro. Torda, Clara, and Wolff, Harold G. [*Science*, **100**, 200–1 (1944).]

Human spinal fluid is a more favorable medium to further the synthesis of acetylcholine *in vitro*, with enzyme obtained from frog brain, than is serum. Since less acetylcholine was synthesized in the presence of spinal fluid from patients with myasthenia gravis than spinal fluid of control subjects, it is probable that at least some of the factors responsible for the decrease and increase of the synthesis of acetylcholine pass into the spinal fluid.

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

The Change in the Content of Acetylcholine of the Central Nervous System and Electrotonus. Raspopova, N. A. [*Bull. biol. med. exptl. U.R.S.S.*, **11**, 80–3 (1941); *Chem. Zentr.*, **2**, 921 (1943).]

Polarization with direct current decreases the content of acetylcholine of the central nervous system in the region of the anode, and increases the content in the region of the cathode.

GERTRUDE E. PERLMANN (Chem. Abstr.).

Formation and Functional Role of Acetylcholine in the Nerve Centers. Babskii, E. B., and Kirillova, A. A. [*Bull. Ekspti. Biol. Med.*, **17**, No. 1/2, 37–40 (1944).]

It is shown that in the central nervous system there is formed acetylcholine in amounts sufficient for physiological action. G. M. KOSOLAPOFF (Chem. Abstr.).

In vitro Investigations Concerning a Relationship between the Acetylcholine Content of Heart Muscles and their Innervation. Lissak, K., Toro, I., and Pasztor, J. [*Arch. ges. Physiol.* (*Pflugers*), **245**, 794–801 (1942); *Chem. Zentr.*, **2**, 437 (1943).]

No acetylcholine was found in 48-hour-old chicken embryos prior to transplantation nor after a 2–4-week incubation period after transplantation of the embryos. Acetylcholine occurred, however, in 3–16-day-old chicken embryo hearts. If these hearts were then incubated for a 2–3-week period the acetylcholine content disappeared again, together with the embryonic nervous sytem. Incubation of such a nerve-free, acetylcholine-free heart muscle preparation or incubation of a 48-hour-old chicken embryo with bone marrow caused the development of new nerve strands and a reappearance of acetylcholine. BRUNO VASSEL (Chem. Abstr.).

The Action of Acetylcholine, Choline and Adrenaline on the Central Nervous System, as Evidenced by Changes in Electrical Conductivity. Rolleri, Felicitas. [*Arch. ges. Physiol.* (*Pflugers*), **245**, 745–55 (1942); *Chem. Zentr.*, **2**, 438 (1943).]

The passage of a galvanic current through the spinal cord of the frog (*R. esculenta*) causes the formation of a substance which, when injected into frogs as a cord homogenate, increases the degree of galvanic excitability. It has been claimed that this substance is acetylcholine, choline or adrenaline. Injection of either of these three compounds into the lymph sacs of frogs produced equal effects, similar to those occurring when the cord suspension was injected. Evidence is presented that acetylcholine and choline stimulate by acting directly upon the central nervous system and not indirectly through a liberation of adrenaline. It is concluded that the substance formed by galvanic stimulation is, however, not identical with acetylcholine.

BRUNO VASSEL (Chem. Abstr.).

Chemical Mediator of Nervous Effects. Action of Acetylcholine and Its Enzyme in Controlling Nervous Activity. Mendel, B., and Henderson, V. E. [*Can. Chem. Process. Inds.*, **27**, 608–12 (1943); *cf. C.A.*, **38**, 5565[4].]

A review of the evidence for the existence of two separate cholinesterases: pseudocholinesterase, which is only active with high concentration of substrate and acts on many noncholine esters, and true cholinesterase, which acts at low substrate concentration and is specific for choline esters. The latter is responsible for the destruction of acetylcholine in the body. Methods for distinguishing the two forms and assaying them are also reviewed.

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

Effect of Adrenaline on the Synthesis of Acetylcholine. *Torda, Clara, and Wolff, Harold G.* [*Proc. Soc. Exptl. Biol. Med.*, **56**, 86–7 (1944).]

The synthesis of acetylcholine by the action of homogenized frog brain on human serum of spinal fluid containing added physostigmine and glucose is described. Adrenaline in concentrations of $1/10^8$–$1/10^5$ increased the synthesis by 40–150 per cent. above the control.

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

Effect of Vitamin B_1, and Cocarboxylase on Synthesis of Acetylcholine. [*Ibid.*, 88–9.]

In the synthesis of acetylcholine by the action of frog brain on human serum or spinal fluid both thiamine-HCl and thiamine pyrophosphate, in concentrations of $3/10^6$ M and $2/10^6$ M, respectively increased the synthesis by about 10 per cent. Higher concentrations decreased the synthesis. L. E. GILSON (Chem. Abstr.).

Mechanism of the Action of Acetylcholine. *Müsch, H. J.* [*Arch. exptl. Path. Pharmakol.*, **202**, 467–72 (1943).]

Denervated leech muscle was used. In addition to the known usual effects of acetylcholine and cholinesterase, it was observed that if the muscle is first treated with acetylcholine (1 : 10,000 in Ringer solution), then washed, subsequent treatment with cholinesterase (horse serum diluted with 2 volumes of Ringer solution) causes strong rhythmic contractions. The action of carbaminoylcholine.chloride is not modified by cholinesterase. L. E. GILSON (Chem. Abstr.).

Effect of Acetylcholine on Peripheral Muscle of Ciona intestinalis. *Cardot, H., and Porel, L.* [*J. Physiol. path. gen.*, **37**, 1617–21 (1939–40); *Chem. Zentr.*, **2**, 1109 (1943).]

Within the time in which a readily excitable peripheral muscle of *Ciona intestinalis* makes short contractions in response to a mechanical stimulus, no observable contraction is caused by acetylcholine unless the muscle has been previously exposed several hours to eserine. Then, if eserine exposure has been long enough, mere traces of acetylcholine cause contraction.

JULIAN F. SMITH (Chem. Abstr.).

New Concepts of the Voluntary and Involuntary Regulatory Mechanisms of Organs. Acetylcholine and the Sympathetic Nervous Control of the Adrenals. *Danielopolu.* [*Ann. d'endocrinol.*, **4**, 1–24, 69–86 (1943); *Chem. Zentr.*, **2**, 1552 (1943).]

The involuntary nervous control of the adrenals is controlled by means of two antagonistic efferent and two antagonistic afferent limbs. There is an additional sympathetic-parasympathetic control. The neurons of the preganglionic fibres of the sympathetic and parasympathetic neurons belong to one class of cells, while the postganglionic sympathetic neurons and the chromaffin cells of the adrenals comprise a second type of nerve cells. Only the latter type is the acetylcholine-requiring system. BRUNO VASSEL (Chem. Abstr.).

2. Pharmacology and Treatment.

Frequency and Duration of the Subjective and Secondary Effects of Benzedrine and Pervitin on Intensely Fatigued Persons. *Alwall, Nils.* [*Acta Med. Scand.*, **114**, 6–32 (1943) (*in German*).]

Some 700 soldiers (20–22 years) were fatigued by three nights of prolonged exertion with little sleep in the intervening days. Some were given dummy tablets, others tablets containing 20 or 30 mgm. of benzedrine or 18 mgm. of pervitin on the last (sometimes also second last) morning of the experiment. Benzedrine and pervitin both reduce or eliminate the subjective fatigued appearance and improve the spirits of the men. Benzedrine (20 mgm.) seems to be more effective after 36 hours of progressive fatigue. Pervitin (18 mgm.) is less effective than 20 mgm. of benzedrine, while 30 mgm. of benzedrine is better than either of the above. The infrequent secondary effects were of short duration. H. L. WILLIAMS (Chem. Abstr.).

The Action of Benzedrine and Pervitin on the Physical and Mental Ability of Intensely Fatigued Men. [*Ibid.*, 33–58.]

Benzedrine and pervitin improved the ability of some 1,400 soldiers, fatigued as above, to march. The subjective effect of 20 mgm. of benzedrine given on the third morning of the experiment seems to last at least 24 hours. Following a 20-mgm. dose of benzedrine the ability to do the Bourdon test and mathematical calculations is improved, but the variations in the results do not permit an optimal dose to be determined. The effect on the fighting ability cannot be stated. H. L. WILLIAMS (Chem. Abstr.).

The Effect of Benzedrine and Pervitin upon the Nervous System. *Koshtoyants, Kh. S., and Mitropolitanskaya, R. L.* [*Doklady Akad. Nauk. S.S.S.R.*, **39**, 216–18 (1943); *Compt. rend. acad. sci. U.R.S.S.*, **39**, 201–2 (1943) (*in English*); *cf. C.A.*, **34**, 1400^1, 4810^8.]

One 5 to 10 mgm. dose of pervitin (1-phenyl-2-methyl-aminopropane) given to hedgehogs and hamsters 1½ months before the end of hibernation caused a wakeful state and unusual motor activity for two to four hours, when the animal again fell asleep. Benzedrine (1-phenyl-2-aminopropane) was shown to have an inhibiting effect upon the enzyme cholinesterase. The

source of cholinesterase was equine serum in dilutions from 1 : 10 to 1 : 100,000. The serum in 1 : 10,000 dilution mixed with acetylcholine for 20 hours entirely eliminated the ability of the acetylcholine to cause contraction of the dorsal muscle of the leech. When benzedrine was added to the mixture a 1 : 100 dilution of serum was required to inactivate the acetylcholine. The effect was not altered by the concentration of benzedrine.

E. K. SLEATOR (Chem. Abstr.).

Physiological Stimulants (Benzedrine and Pervitin). Koshtoyants, Kh. S. [*Sovet. Med.*, **6**, *No.* 1/2, 8–11 (1942).]

A brief review. G. M. KOSOLAPOFF (Chem. Abstr.).

Comparative Anticonvulsive Action of 3, 5, 5-trimethyl-oxazolidine-2, 4-dione (Tridione), Dilantin and Phenobarbital. Everett, Guy M., and Richards, Richard K. [*J. Pharmacol.*, **81**, 402–7 (1944).]

"Tridione" has marked antagonistic action against the production of convulsions in mice by metrazole, strychnine, picrotoxin, thujone, cocaine and procaine and by electric shock in rats. Comparative experiments with phenobarbital and dilantin showed that tridione is more comparable to phenobarbital in its action, but produces less depression in effective doses.

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

Hydantoins in Treatment of Epilepsy. Boller, Werner. [*Schweiz. med. Wochschr.*, **78**, 699–707 (1943); *Chem. Zentr.*, **2**, 541–2 (1943).]

Clinical tests with 67 epileptics were made with 5, 5-diphenylhydantoin (Tacosal, Helvepharm) (I), its Na salt (Antisacer, Dilantin, Dintoina, Diphedan, Diphantoin, Epanutin) (II), its Ca salt (Helvepharm) (III), 5-phenyl-5-ethyl-3-methylhydantoin (IV), and its blend with phenylethylbarbituric acid (Hydantal) (V), 5-phenyl-5-ethyl-1, 3-dimethylhydantoin (VI), 5-cyclohexenyl-5-allylhydantoin (VII), and 5-phenyl-5-ethylthiohydantoin (VIII). Results in number of cases:

Drug.	Long freedom from attack.	Severe attacks halved in number.	Favourable effect.	Inert.	Harmful.
I	4	5	1	2	1
II	5	10	9	5	—
III	2	3	10	7	—
IV	—	—	—	—	—
V	10 (± ?)	11	11	10	—

Two cases with (I) and one each with (II) and (III) were inconclusive. In general, these drugs are all useful as antiepileptics and about equally potent, but their action is unpredictable and sometimes absent. Their freedom from hypnotic action is advantageous. The latent period preceding optimum effect is 2–5 weeks. The risk of side reactions necessitates medical supervision, but can be minimized by giving phenobarbital at the same time. Gastrointestinal side reactions can be avoided by giving the free acids instead of the salts. Severe neurological or psychological reactions or pronounced hypersensitivity may compel smaller doses or cessation of the drug, but treatment can be resumed after a few weeks. Because of high toxicity and lack of potency (VII) and (VIII) proved unsatisfactory. Effects of the specified hydantoins on the blood picture are discussed in detail. JULIAN F. SMITH (Chem. Abstr.).

The Mode of Action of the Na Salt of Diphenylhydantoin (Dilantin) in Epilepsy. Naffziger, Howard C., Aird, Robert R., and Strait, Louis. [*Trans. Am. Neurol. Assoc.*, **68**, 133–5 (1942).]

After intravenous injection of cocaine-HCl in convulsive doses in cats, the amounts of this compound found spectrochemically in the motor cortex were significantly higher in animals given Na diphenylhydantoin (I) than in controls. The authors infer that in experimental (drug) epilepsy, (I) may protect against convulsions, in part at least, by altering permeability of the cortical cells. MARION HORN PESKIN (Chem. Abstr.).

Physiological Studies of the Effects of Sulfonamide Compounds on the Brain of Macaca mulatta. Jasper, Herbert, Cone, Wm. V., Pudenz, Robert, and Bennet, Thomas. [*Trans. Am. Neurol. Assoc.*, **69**, 109–12 (1943).]

Microcrystalline sulfathiazole locally applied to the injured or uninjured monkey cerebral cortex produced local epileptiform spikes in the electroencephalogram and Jacksonian seizures increasing in severity and extent within a few hours; when 100 mgm. was applied at once the animals died in *status epilepticus*, or recovered after 4–6 days of generalized seizures. Upon intravenous administration, Na sulfathiazole produced restlessness at 10 mgm. per cent. free and 13 mgm. per cent. total sulfonamide in the blood, extreme excitement at 40 mgm. per cent. free and 60 mgm. per cent. total, epileptiform spikes at 60 mgm. per cent. free and 85 mgm. per cent. total, and generalized convulsions at an average of 88 mgm. per cent. free and 114 mgm. per cent. total. Microcrystalline sulfapyridine locally applied caused mild excitation of the injured cerebral cortex and did not affect the uninjured cortex. Marked cortical excitation was pro-

duced by intravenous injection of Na sulfapyridine to produce blood levels of 10–15 mgm. per cent. free and 20–30 mgm. per cent. total sulfonamide. Cortical activity was unaffected by local applications of microcrystalline sulfadiazine to the injured or uninjured cortex, or intravenous injection of Na sulfadiazine to produce blood levels of 107 mgm. per cent. free and 260 mgm. per cent. total sulfonamide. Depression rather than excitation of cortical activity was produced by microcrystalline sulfanilamide applied locally to the injured or uninjured cortex or injected in saline suspension intraperitoneally; fatal coma followed blood levels of 60–70 mgm. per cent. free and over 100 mgm. per cent. total sulfonamide after the intra-peritoneal injection. For clinical topical application to the brain, Jasper *et al.* recommend sulfanilamide and sulfadiazine, in sparing circumspect dosage, and condemn sulfathiazole and sulfapyridine. They have used a mixture of sulfanilamide (for rapid diffuse action) and sulfadiazine (for more prolonged and eventually more potent local antibacterial effect) in potentially and actually infected wounds of the human brain. MARION HORN PESKIN (Chem. Abstr.).

The Chemotherapy of Intracranial Infections. The Clinical and Pathologic Effects of the Intracranial Introduction of Sulfanilamide, Sulfathiazole and Sulfadiazine in Normal Dogs. Pilcher, Cobb, Meacham, W. F., Angelucci, Ralph, and Benz, Edmund. [*Trans. Am. Neurol. Assoc.*, **69**, 93–6 (1943); *cf. C.A.*, **38**, 164⁶.]

When placed on the cerebral cortex of normal dogs, in dosage of 10–66 mgm./kgm. through a dural incision which was subsequently closed, sulfathiazole (I) produced violent convulsions, sulfadiazine (II) caused convulsions in one animal only, and sulfanilamide (III) was non-convulsive. All the compounds were absorbed slowly into the cerebrospinal fluid and blood. Necropsy up to several weeks after implantation revealed (II) and (III) as soft pastes, (I) as a hard plaque, at the implantation site. (I) Markedly increased the lymphocyte content of the cerebrospinal fluid, (II) and (III) did not. (I) Crystals appeared in the dura mater of 9 to 26 dogs and in the pia mater of 4 dogs as long as one month after implantation; no (II) or (III) crystals were found in the dura or pia. Inflammatory, obstructive and reparative processes were less marked with (III) than with (I) or (II). When the drugs were placed in a cavity, 1 cm. in diameter resulting from excision of cortical tissue, convulsions occurred in only one dog given (I). No convulsions occurred when (I) was placed on the outer surface of the intact dura; if the dura was incised to a depth of 1 cm., convulsions occurred consistently. Violent, generally fatal, convulsions followed cisternal injection of two, or 20 per cent., suspension of microcryst. (I); (II) administered similarly was convulsive in only one of six experiments. (I) Should never be used in cranial wounds in which the dura is or has been opened, and other sulfonamides, if employed in these infections, should be administered cautiously in smallest effective dosage.

M. H. PESKIN (Chem. Abstr.).

Experimental Pharmacology of Post-encephalitic Parkinson's Disease. Loman, Julius, Myerson, Paul G., and Myerson, Abraham. [*Trans. Am. Neurol. Assoc.*, **67**, 201–3 (1941).]

The most effective combination of drugs for reduction of tremor and rigidity in Parkinson's disease (experiments made chiefly on one patient) was 0·3 mgm. hyoscine plus 20 mgm. amphetamine in a gelatin vehicle, given parenterally. Results with injection of single drugs were as follows: Adrenaline produced marked oscillating tremor of the affected side and increased the rigidity of the arm and leg. Twenty mgm. d-, l- or racemic amphetamine sulfate decreased rigidity and increased the sense of well-being, but did not affect spontaneous or adrenaline produced tremors. Paredrine increased rigidity, did not affect tremor. Propadrine, ephedrine, physostigmine and prostigmine did not affect rigidity. p-Methoxyamphetamine-HCl, ergotamine and neosynephrine decreased rigidity. " 3, 4-Methylenedioxyamphetamine " increased rigidity. Acetylcholine diminished rigidity and counteracted adrenaline effects. Mecholyl and furmethide affected muscle tone in a slightly unfavourable manner. Small doses of doryl favorably influenced affected muscles. Hyoscine diminished rigidity and tremor and prevented adrenaline action but had uncomfortable side effects. Atropine reduced rigidity less markedly than hyoscine and did not influence tremor. Syntropan had little if any effect on rigidity. Metrazole, caffeine and aminophylline affected neither rigidity nor tremor. Amphetamine in gelatine was effective in a patient with spasmodic torticollis. Hyoscine was the only drug benefiting a patient with familial tremor of the head and hands.

MARION HORN PESKIN (Chem. Abstr.).

Reversal of Action of Autonomic Drugs. Asher, L., and Scheinfinkel, N. [*Verhandl. Ver. Schweiz. Physiol.*, **18**, 14–15 (1941).]

Acetylcholine (10^{-7}–10^{-8}) produces relaxation of the dorsal muscle of the leech, if the muscle was previously treated for 10 minutes with cholic acids (0·025–0·05 per cent.), octyl alcohol (0·01–0·1 per cent.), or lecithin, increased rate and force of contractions of atropinized frog heart, and relaxation of frog lung. The substances reverse the action of adrenaline on frog stomach to an increase in motility and that on frog lung to relaxation. B. C. P. A. (Chem. Abstr.).

Nicotinic Acid Treatment of Pellagra in Children. Gershenovich, R. S., Maksudov, A. M., and Ioffe, Ts. G. [*Sovet. Med., No.* **13–14**, 29–32 (1940).]

A general discussion of nicotinic acid (I) therapy is presented with observations on pellagra in children. Biochemical analyses of blood and serum are given for four cases. The authors

conclude that (I) is an effective remedy for both severe and subclinical pellagra. (I) Is thought to function as an oxidative catalyst in oxidation—reduction systems involved in cellular metabolism. S. GOTTLIEB (Chem. Abstr.).

Action of Acetylcholine, Atropine and Eserine on the Central Nervous System of the Decerebrate Cat. Calma, I., and Wright, Samson. [*J. Physiol.*, **103**, 93–102 (1944).]

Intra-arterially injected acetylcholine (25–100γ) causes a discharge from the central nervous system, resulting in an increase of tone in the innervated quadriceps. A similar increase in tension was also observed in the quadriceps from which the knee-jerk was elicited. Atropine at first abolishes or diminishes the response to acetylcholine for a period of 45–50 minutes; later "spontaneous" changes in tone can occur. Eserine is excitatory to the central nervous system of the atropinized decerebrate cat in a number of cases, although its action is irregular and unpredictable. Attention is drawn to the striking differences in the action of these drugs in different species, in different preparations and under different anesthetics.

H. L. WILLIAMS (Chem. Abstr.).

The Action of Adrenaline on Transmission in the Superior Cervical Ganglion. Bülbring, Edith. [*J. Physiol.*, **103**, 55–67 (1944).]

Adrenaline modifies the transmission of impulses in the perfused superior cervical ganglion; the contractions of the nictitating membrane in response to stimulation of the preganglionic fibres are increased by adding to the perfusion fluid small doses of adrenaline, whereas they are decreased by large doses. The increase is observed only with submaximal stimuli at slow rates. The response to a dose of acetylcholine injected into the ganglion perfusion circuit is augmented by the presence of small quantities of adrenaline and depressed by larger quantities. During prolonged preganglionic stimulation, the venous perfusate collected from the ganglion contains an adrenaline-like substance in concentration sufficient to facilitate synaptic transmission when injected. The source of this material is suggested to be the chromaffin cells (Nebenzellen) found in the superior cervical ganglia. H. L. WILLIAMS (Chem. Abstr.).

Quantitative Studies on Alcohol Tolerance in Man. Influence of Ethyl Alcohol on the Sensory, Motor and Psychological Functions in Relation to the Blood Alcohol in Normal and Habituated Persons. Goldberg, Leonard. [*Acta Physiol. Scand.*, **5**, *Suppl.* 16, 7–128 (1943); *Chem. Zentr.*, **2**, 1381–2 (1943).]

The experiments were carried out on 11 total abstainers, 24 moderate and 14 heavy consumers of alcohol. The methods used are described. There is a linear relation for each individual between the symptoms and the blood-alcoholic content. Symptoms of intoxication appear at a blood-alcoholic level of 0·036 and 0·075 per cent., the results showing the existence of individual differences in the blood-alcoholic level and the toxic effect. The disappearance of symptoms occurs at the same blood-alcoholic levels, whether alcohol is taken alone or with food. By means of appropriate procedure it was established that with the same alcoholic consumption the total abstainers manifest the strongest and the heavy drinkers the weakest effect. These differences, however, cannot be accounted for by differences in alcoholic absorption or in disappearance of alcohol from the blood. The alcoholic habituation is a matter of increased tolerance (decreased degree of intoxication) due to a rise in the blood-alcoholic threshold of symptoms. S. MORGULIS (Chem. Abstr.).

The Effect of Urethan on Neuromuscular Irritability. Borgatti, G. [*Arch. ital. sci. farmacol.*, **12**, 117–28 (1943); *Chem. Zentr.*, **2**, 1383 (1943).]

Urethan in hypnotic doses does not produce any change in the irritability of the isolated sciatic-gastrocnemius preparation of the frog. However, in double this concentration there is first an increase followed by a decrease in reactivity. In *in situ* experiments an effect of urethan is not demonstrable in the frog, whereas in the guinea-pig a decrease of the irritability is observed which is explained by the decrease in body temperature produced by the hypnotic.

R. P. E. HOPF (Chem. Abstr.).

Effect of Picrotoxin on Electrical Excitability of the Respiratory Center. Wells, J. A., Fox, C. A., Rambach, W. A., Dragstedt, C. A., and Windle, W. F. [*Proc. Soc. Exptl. Biol. Med.*, **56**, 176–8 (1944).]

A technique is described whereby electrical stimulation of the respiratory center can be employed to determine directly the influence on the respiratory center of various drugs affecting respiration. Picrotoxin is shown to produce a marked and prolonged (over 7 hours) increase in the sensitivity of the inspiratory center of the cat to direct electrical stimulation.

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

Experimental Nerve Damage by Derivatives of Sulfanilamide. Böszörményi, Zoltán, and Mészáros, Antal. [*Wien. med. Wochschr.*, **93**, 390–1 (1943); *Chem. Zentr.*, **2**, 1823 (1943).]

Intraspinal injections of more or less dilute sulfapyridine and sulfathiazole derivatives caused in the rabbit immediate paralysis and liquefication of the spinal nerve substance, probably by alkaline effect. Intravenous injections did not cause toxic effects. After repeated oral adminis-

tration obtaining a sulfonamide concentration in the blood of 31 to 48 mgm. per cent. paralysis appeared after 14 days. The anatomical findings corresponded to a peripheral neuritis. Simultaneous administration of vitamin B_1 prevented the paralysis completely or assuaged it considerably. A. E. MEYER (Chem. Abstr.).

Polyneuromyosis after Sulfonamides. Auguste, C., Driessens, J., and Paris, J. [*Presse méd.*, **50**, 659–60 (1942); *Chem. Zentr.*, **2**, 1823 (1943).]

A case of meningococcus meningitis was treated with 6 intraspinal injections of the sulfonamide preparation 1162F and orally and intramuscularly with 693 M. & B., giving a total of 300 gm. Paresis of the lower extremities developed, making walking impossible. Treatment with strychnine and vitamin B_1 was without success. A. E. MEYER (Chem. Abstr.).

Caffeine-withdrawal Headache. Dreisbach, Robert H., and Pfeiffer, Carl. [*J. Lab. Clin. Med.*, **28**, 1212–19 (1943).]

In 55 per cent. of 38 trials on 22 subjects very severe headache was produced by sudden withdrawal of caffeine (2–12 grains daily). The headache is without scotomas, is slow in onset, central in origin, becoming generalized after 4–6 hours; it may be accompanied by nausea and vomiting. In migraine subjects the headache differs from their typical migraine headache. The blood studies indicate that a lowered serum Ca, an elevated serum P, and possibly an increase in blood volume accompany the headache. B. C. P. A. (Chem. Abstr.).

Effect of Sulfanilamides on Cerebral and Neuromuscular Actions. Macht, D. I. [*Exptl. Med. and Surg.*, **1**, 260–72 (1943).]

Rats were subjected to a modification of Watson's maze test, to tight-rope walking, and to climbing a vertical fixed rope, with food at the end of the journeys; sulfanilamide, sulfapyridine, sulfathiazole and sulfadiazine were intraperitoneally injected in doses of 5–200 mgm. Sulfanilamide had no effect on the behaviour of the animals. Sulfapyridine and sulfathiazole in doses of 50 mgm. and more markedly depressed, sulfadiazine (even in massive doses) stimulated, muscular performance. All the rats recovered in a few days, even after large doses of the drugs. B. C. P. A. (Chem. Abstr.).

Neurotoxic Action of Sulfanilamide Derivatives. Puhr, Lajos. [*Schweiz. med. Wochschr.*, **72**, 761–3 (1942); *Chem. Zentr.*, **2**, 1715 (1942).]

Sulfanilamide (I), sulfapyridine (II), sulfanilyldimethylsulfanilamide (III) and sulfamethylthiazole (IV) were administered orally in the form of tablets (0·33 gm. per kgm. body weight per day) to 60 gm. weight, 2-week-old White Leghorn cocks for 70 days. During the course of treatment two animals of each group died (8 test animals) (I), (II) and (III), and one animal of the (IV) treatment group. At the end of the experiment 3 of those given (I) and (II), 2 of those given (III) and 1 given (IV) showed signs of disease. The poisoning manifested itself in contraction of the toes, spastic and ataxic gait, emaciation and unwillingness to move. No pathological changes were found in the sciatic nerves of ill animals. The lateral columns of the spinal cord, on the other hand, and to a lesser degree the anterior and posterior columns showed considerable edema and destruction of the medullary substance. M. M. RATH (Chem. Abstr.).

Passage of Sulfathiazole through the Blood-Spinal Fluid Barrier in Various Forms of Meningitis. Andersen, A. Harrestrup, and Simesen, M. H. [*Acta Med. Scand.*, **114**, 104–26 (1943) (*in English*).]

It was confirmed that the ratio of sulfathiazole in the blood to the sulfathiazole in the cerebrospinal fluid was about 0·20 normally; 9 adults and 11 children averaged 0·17, with a range from 0·12 to 0·22. Ten cases of tuberculous meningitis yielded an average ratio of 0·42 (0·32 to 0·55), while 9 cases of secondary lymphocytic meningitis gave an average ratio of 0·18 (0·14 to 0·23). Cases (9) of primary lymphocytic meningitis were usually characterized by normal ratios. In cases of polyradiculitis and poliomyelitis there is slight, if any, increase in the ratio. If the ratio rises above 0·30 in cases of lymphocytic meningitis it is an indication that the meningitis is of tuberculous nature. H. L. WILLIAMS (Chem. Abstr.).

A Comparative Study of Acetylcholine and Bromocholine Bromides. Oettel, Hansjürgen. [*Arch. exptl. Path. Pharmakol.*, **202**, 314–25 (1943).]

The pharmacological action of bromocholine bromide is like that of acetylcholine bromide, but weaker and more prolonged. L. E. GILSON (Chem. Abstr.).

Action of Pervitin on the Central Nervous System of the Frog, especially the Spinal Cord. Wulff K. [*Arch. exptl. Path. Pharmakol.*, **202**, 449–58 (1943).]

Pervitin injected into the lymph sac has a paralyzing action. The stimulating action which pervitin exerts in man and mammals is lacking in frogs because the centres through which this action is produced are not present in the frog, due to its lower stage of cerebral evolution. In the frog the action is on the spinal cord. The threshold dose is approximately 0·005 mgm./kgm. and the lethal dose is about 1 gm./kgm. L. E. GILSON (Chem. Abstr.).

Central Stimulating Action of the Alkaloid Cathine. Brücke, Franz Th. v. [*Arch. exptl. Path. Pharmakol.*, **198**, 100–46 (1941); *Chem. Zentr.*, **2**, 637 (1943).]

For centuries a tea made from the branch tips of the shrub *Catha edulis* has been used as a stimulant by the Arabs. The leaves are also chewed. The effects are much like those of benzedrine, and the active principle cathine (katine) appears to be closely related to benzedrine.

L. E. Gilson (Chem. Abstr.).

Central Stimulating Action of Theophylline. Linke, H. [*Arch. exptl. Pharmakol.*, **202**, 481–7. (1943).]

Ingestion of 0·2 gm. theophylline considerably increased mental work ability, as determined by several tests, but had little or no effect on physical work capacity.

L. E. Gilson (Chem. Abstr.).

Effects of Nicotine on Mental and Physical Work Capacity of Man. Erdélyi, Robert. [*Arch. exptl. Path. Pharmakol.*, **202**, 488–92 (1943).]

Nicotine tartrate in oral doses of 6–9 mgm. appreciably increased mental ability and slightly increased manual dexterity. L. E. Gilson (Chem. Abstr.).

Concerning the Parasympathetic Action of Platyphylline. Kovyrev, L. G. [*Byull. Eksptl. Biol. Med.*, **11**, *No.* 1, 92–4 (1941); *Chem. Zentr.*, **2**, 925 (1943).]

Platyphylline is a parasympathetic substance like atropine. It interrupts the response to excitation in the parasympathetic nerve endings, decreases the muscarinic effects of acetylcholine and brings out its nicotinic effect. Other than these platyphylline acts similar to atropine on the vascular centers of the medulla oblongata. The activity of atropine is 20–30 times that of platyphylline. Benjamin Prescott (Chem. Abstr.).

The Action of Some Central Nervous System Depressants upon Water-Salyrgan Diuresis. Lehr, David, Terranova, Rosario, and Boyd, Linn, J. [*Urol. and Cutan. Rev.*, **47**, 661–9 (1943).]

The influence of morphine, aminopyrine, paraldehyde, chloral hydrate and some long- and short-acting barbiturates upon water- and water-salyrgan diuresis of albino rats was investigated. The course of pronounced water diuresis was not markedly enhanced in the presence of salyrgan; in some instances the mercurial diuretic inhibited the flow of urine. Suppression of water diuresis by hypnotics was significant only with dosages which were at least strongly hypnotic, if not anesthetic, and the duration of the antidiuretic effect never exceeded the period of pronounced central nervous system depression. Morphine and aminopyrine caused very strong inhibition of the urine flow without the production of sleep. The mechanism of antidiuresis and the role of peripheral factors in its development are discussed. Salyrgan was ineffective in abolishing oliguria from morphine and barbiturate poisoning, whereas it successfully counteracted the inhibition of water diuresis from paraldehyde, chloral hydrate and aminopyrine. The significance of these findings for human therapy was discussed.

Ruth Berggren (Chem. Abstr.).

Narcotic Action. [*Sereĭskiĭ, M. Ya.* [*Khirurgiya*, **10**, *No.* 8, 3–13 (1940).]

Effect of narcotics on the brain chemistry was studied on animals. Total N of the gray matter was somewhat increased, and a parallel increase was noted in the white matter after chloroform narcosis. P, non-protein N and amino N also increased. The lipoid fraction increased in both gray and white matter, the unsaturated phosphatides showing the greatest change, in confirmation of the known instability of unsaturated compounds. Cholesterol rise was approximately equal in gray and white matter. In the alcohol fraction increases were also noted, but not reported in view of certain deficiencies of the method of analysis. The increase of both total and non-protein nitrogen is due to accumulation of protein decomposition products resulting from poor circulation due to narcosis. C. S. Shapiro (Chem. Abstr.).

Hypnotic Effect of Rauwolfia serpentina: The Principle Underlying this Action: Its Probable Nature. Chopra, Ram Nath, Gupta, J. C., Bose, B. C., and Chopra, I. C. [*Indian J. Med. Research*, **31**, 71–4 (1943); *cf. C.A.*, **37**, 2819[8].]

In addition to the alkaloids ajmaline, serpentine and serpentinine, which together or singly are medullary stimulants, *Rauwolfia serpentina* also contains a principle with sedative and hypnotic properties. M. H. Power (Chem. Abstr.).

Intoxication by Marihuana. Angulo, Luis Muñiz. [*Rev. sanidad militar* (*Cuba*), **8**, 115–29 (1944).]

A comprehensive review. Among the subjects covered are description of marihuana, identification of intoxication by marihuana, symptoms of intoxication, differentiation from acute intoxication by alcohol, laboratory, and clinical aids to diagnosis, chronic intoxication, and terminology. The laboratory data obtained either by the Ghamraway reaction (p-dimethylaminobenzaldehyde) or Nicloux (K dichromate) for marihuana detected on the skin or teeth, or in the saliva, urine or blood are discussed. H. L. Williams (Chem. Abstr.).

Narcotic Excitation and Narcotic Paralysis. Seelich, Franz. [*Ergeb. Physiol., biol. Chem. exptl. Pharmakol.*, **44**, 425–72 (1941); *Chem. Zentr.*, **2**, 2386 (1942); *cf. C.A.*, **35**, 1514⁵.]
A critical discussion of old and new narcosis theories.
BENJAMIN PRESCOTT (Chem. Abstr.).

The Effect of Barbiturates on the Cholinesterase in Different Tissues. [*Ibid.*, 269–73.]
The prolonged administration of barbiturates causes a fall in the serum cholinesterase of guinea-pigs, though this is much less pronounced than in man. The fall is evident in the spinal cord and muscle also, but not in the brain. There is no evidence of a "deranged distribution," since the reductions started at approximately the same time in each of the examined tissues, and amounted to about 50 per cent. in spinal cord and muscle extracts, and 40 per cent. in serum. A single deep narcosis by one barbiturate did not alter the cholinesterase activity of the serum, brain, spinal cord or muscle of the guinea-pig. H. L. WILLIAMS (Chem. Abstr.).

An Effect of Barbiturates on Serum Cholinesterase. Schutz, P. [*J. Physiol.*, **102**, 259–68 (1943).]
Serum cholinesterase activity in the morning in fasting individuals was found to give the most characteristic and repeatable values for any particular individual. The activity was much reduced following prolonged administration of phenobarbital or phenylmethylbarbituric acid, while it appeared unaltered after a single large dose of these drugs. Some *in vitro* experiments, as well as the shape of the titration curves, indicate that the decrease is due to a true diminution of the quantity of enzyme present rather than to the action of either the competitive or non-competitive type of inhibitor. The average decrease was about 80 per cent., and is explained on the basis that the cholinergic system under the influence of narcotic produces a relatively lower quantity of acetylcholine, the need for enzyme diminishes, and the quantity of enzyme diminishes. Anaphylactic shock, leptazole convulsions, severe muscular exercise, over-ventilation, lack of sleep, etc., do not alter the cholinesterase content of serum, nor do single large doses of NaBr, caffeine or amphetamine. H. L. WILLIAMS (Chem. Abstr.).

An Evaluation of the Influence of Succinate and Malonate on Barbiturate Hypnosis. Beyer, Karl H., and Latven, Albert R. [*J. Pharmacol.*, **81**, 203–8 (1944).]
Na malonate and Na glutamate, under the conditions described, were without effect on the duration of pentobarbital hypnosis in mice and rats. The observation of other workers, that pentobarbital does not inhibit the oxidation of succinate by the succinoxidase system, was not confirmed. Though the intramuscular injection of Na succinate in mice and rats moderately diminished the duration of pentobarbital hypnosis, the succinate-barbiturate antagonism was not nearly so evident as others have reported. L. E. GILSON (Chem. Abstr.).

A Toxicological and Pharmacological Investigation of Na sec-butylethylbarbituric Acid (Butisol Na). Gruber, Charles M., Ellis, Fred W., and Freedman, Goldie. [*J. Pharmacol.*, **81**, 254–68 (1944).]
The toxicity, duration of action and other effects vary considerably with the species of experimental animal used. The compound is about twice as toxic as phenobarbital. Large intravenous doses produce marked slowing of respiration, or even permanent cessation, with the heart continuing to beat some minutes longer. Moderate doses produce a fall in arterial blood pressure owing to vasodilation, without change in cardiac rhythm. It depresses isolated intestine and uterus. Repeated administration produces no gross changes in the liver or other organs. No significant difference was found in the duration of hypnotic action in normal and nephrectomized dogs; hence it is assumed that the drug is destroyed somewhere in the body, and partly excreted in the urine only when given in excessive doses. L. E. GILSON (Chem. Abstr.).

A Case of Barbital Poisoning Treated with Pervitin. Postma, C. [*Nederland. Tijdschr. Geneeskunde*, **87**, 366–7 (1943); *Chem. Zentr.*, **1**, 2512 (1943).]
Report of a case in which favourable results were obtained by the administration through a stomach-tube of 81 and 90 mgm. pervitin on the first and second days respectively.
RUTH BERGGREN (Chem. Abstr.).

Action of Cardiazole on Experimentally Hyperthyroid Animals. Garcia, Cesar Garayar. [*Rev. med. exptl. (Peru)*, **11**, 367–82 (1943).]
There is an increased frequency and intensity of convulsive reactions in hyperthyroid guinea-pigs and an increased mortality. In dogs treated with thyroid extracts there were more intense convulsions and a decrease of about 30 per cent. in the minimum dose of cardiazole producing convulsions, while the vascular changes were more prolonged but not more intense than in the dogs not receiving thyroid extracts. When guinea-pigs received thyroid extract, desoxycorticosterone and cardiazole the mortality was not increased as when thyroid and cardiazole only were given. It is suggested that thyroid hormone sensitized the nervous system to cardiazole.
H. L. WILLIAMS (Chem. Abstr.).

The Prevention of Traumatic Complications in Convulsive Shock Therapy by $MgSO_4$. Alpers, B. J., and Yaskin, H. E. (*Trans. Am. Neurol. Assoc.*, **67**, 146–7 (1941).]
Patients subjected to metrazole (I) shock were protected from fractures by administration (dose and route not specified) of $MgSO_4$ (II) before (I). (II) Produced transient flaccid paresis

of skeletal muscles, similar to that caused by curare (III), softened the (I) convulsions, and in some instances abolished the tonic muscular contractions induced by (I). In the discussion A. E. Bennett declared (III) to be preferable to (II) because of more sustained effect and smaller volume of injected solution needed. Bennett also mentioned that the 1 c.c. of prostigmine employed as an antidote, if necessary, for (III), was easier to administer than the large volume of $CaCl_2$ needed intravenously to counteract adverse effects of (I).

MARION HORN PESKIN (Chem. Abstr.).

Electroencephalographic and Clinical Studies following Metrazole and Electrically-induced Convulsive Therapy of Affective Disorders. Levy, Norman A., Serota, Herman M., and Grinker, Roy R. [*Trans. Am. Neurol. Assoc.*, **67**, 10–13 (1941).]

MARION HORN PESKIN (Chem. Abstr.).

Action of Convulsant Poisons on Blood Sugar (11). *Kido, Matunosuke.* [*Kumamoto Igakkai Zassi* (*J. Kumamoto Med. Assoc.*), **16**, 1735–42 (1940); *Japan J. Med. Sci., IV. Pharmacol.*, **14**, *Abstracts*, 39 (1941) (*in German*).]

Gynergen and yohimbine diminish the hyperglucemic action of metrazole, but have no effect on the intensity of the convulsions produced. Atropine has no influence on the hyperglucemic action, but inhibits the production of convulsions. Pre-treatment with chloral hydrate or phenobarbital weakens or inhibits both the hyperglucemic and convulsant action. It appears that metrazole produces hyperglucemia by action through the sympathetic centers independently of its convulsant action. L. E. GILSON (Chem. Abstr.).

Influence of Chronic Repeated Metrazole Convulsions on Ca Excretion and Urinary Acidity of Rabbits. Laubender, Walther, and Barth, Fritz. [*Arch. exptl. Path. Pharmakol.*, **198**, 5–11 (1941).]

Rabbits were given a convulsive dose (12–18 mgm./kgm.) of metrazole intravenously every 2–3 days for 9 weeks. The excretion of Ca in the urine was not increased during convulsions nor on the intervening days, but remained the same as that of controls. Determinations of urinary pH and titratable acidity indicated a mild acidosis in the metrazole-treated animals.

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

Effect of Repeated Metrazole Convulsions on the Acid-base Balance of the Blood of Rabbits. Laubender, Walther, and Mertz, Bodo. [*Ibid.*, 12–26.]

During each metrazole convulsion an acidosis appeared, which passed away very quickly after the convulsion was over. The CO_2-combining curve of the plasma showed a rounding off like that produced by addition of a strong mineral acid. In addition to this effect, repeated convulsions, as described above, in time produced a lasting acidosis of a different type, characterized by a CO_2-combining curve which was not rounded off, but was more steeply inclined than normal. Apparently two different acids are involved in the effects of acute and chronic experiments. Through *Chem. Zentr.*, **2**, 642 (1943). L. E. GILSON (Chem. Abstr.).

Action of Metrazole on Crossed Extensor Reflex in Frogs. Sepulveda, J., and Croxatto, H. [*Anales acad. biol. Univ. Chile*, **3**, 55–67 (1940).]

Metrazole increases the crossed extensor reflex in *Bufo gay*, and increases the excitability of the spinal cord in frogs during spinal shock. B. C. P. A. (Chem. Abstr.).

Action of Metrazole on Neuromuscular Synapses. Salvestrini, H., Croxatto, H., and Alonso, O. [*Anales acad. biol. Univ. Chile*, **3**, 47–54 (1940).]

In cats under dial or chloral + morphine, or decerebrated, metrazole (10–20 mgm.) has a short depressant action on the contraction of muscles stimulated indirectly by tetanizing currents or by condenser discharges, and on muscle twitches produced by intra-arterial injection of acetylcholine. The depressant effect does not occur when denervated muscles are stimulated directly. B. C. P. A. (Chem. Abstr.).

Action of Metrazole on Superior Cervical Ganglion. Croxatto, H., and Alonso, O. [*Anales acad. biol. Univ. Chile*, **3**, 41–6 (1940).]

In cats under dial (0·75 gm. per kgm., intraperitoneally) metrazole (10–20 mgm.) injected 5–30 seconds before, or during, electrical stimulation of the preganglionic fibers of the superior cervical ganglion, or before intracarotid injection of 20–100γ of acetylcholine, annuls the contraction of the nictitating membrane. Metrazole acts by depressing the ganglion.

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

Action of Metrazole on Cholinesterase Activity of the Spinal Cord of Bufo gay. Sepulveda, J., and Croxatto, H. [*Anales acad. biol. Univ. Chile*, **3**, 31–40 (1940).]

In *B. gay* the cholinesterase activity of the spinal cord between (II) and V vertebrae is higher than in segments above or below metrazole (0·010–0·050 gm.), causes intense generalized convulsions and no change in cord cholinesterase activity. Escrine (0·0005–0·001 gm.) decreases the cholinesterase activity of the spinal cord by 40 per cent.

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