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

https://doi.org/10.1192/bjp.94.395.470 Published online by Cambridge University Press

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Clinical and EEG Investigation of Prefrontal Lobotomy Patients.

1. A follow-up study of 30 cases of prefrontal lobotomy was done. Twenty-three of these patients were operated on after admission to St. Elizabeth's Hospital after a prolonged incapacitating illness. Of these 23, 21 were benefited by the operation, 11 were considered social recoveries, and 9 were discharged from the hospital. An organic syndrome was substituted for the psychosis. Restitution of the patient's pre-psychotic state should not be expected. One patient was made worse.

2. Protracted illness did not militate against improvement in these selected cases.

3. The criteria employed for the selection of these cases for psycho-surgery are justified by the high percentage of patients that were benefited.

4. No objective neurological signs resulted from the operation.

5. Post-operative convulsions occurred in 10 out of 30 cases.

6. Electroencephalograms of 23 out of 24 cases showed definite abnormalities.

7. There is no correlation between EEG pattern and post-lobotomy improvement. (Authors' abstr.)

The Effect of Bilateral Frontal Lobotomy upon the Autonomic Nervous System.

1. Cortical representations of the autonomic nervous system are located in the prefrontal area.

2. Following the subcortical section of the frontal lobes, the autonomic nervous system becomes more responsive to stimuli from without.

3. Equilibrium re-established itself on a different level.

https://doi.org/10.1192/bjp.94.395.470 Published online by Cambridge University Press

4. With the disconnection of the frontal lobe, excitatory and inhibitory influences upon the A.N.S. are abolished, which may explain certain clinical observations such as the fall in blood-pressure in hypertensive patients.

5. Frontal lobotomy which, at present, is performed for the surgical treatment of serious mental illnesses, may, in the future, become a method for the treatment of selected cases of hypertension. (Authors' abstr.)

The Effects of Electric Convulsive Therapy on Certain Personality Traits in Psychiatric Patients.

In contrast to the Minnesota and other personality questionnaires which were not helpful as diagnostic or prognostic aids, the perceptanalytic test of Rorschach was a valuable prognostic and diagnostic aid. The Rorschach findings paralleled the personality changes observed clinically. Even before treatment there was a significant difference between the Rorschach records of improved and unimproved schizophrenics treated with ECT.

The improvement after shock therapy seemed to depend on two different factors. One condition for improvement was the presence of only mild or no intellectual regression. In other words, the patient's intellect should not be markedly affected by the psychosis. The other condition was that there be a marked discrepancy between the potential and the actual level of the schizophrenic's mental or psychological functioning. The greater this discrepancy, the greater the improvement seemed to be, other conditions being equal.

According to the Rorschach findings, the discrepancy between the potential and actual mental functioning was apparently correlated with the schizophrenic's anxiety endangered by his awareness of the personality changes which had taken place as a result of the psychosis. To use simple language, many schizophrenics "exaggerate" the effect of the psychosis upon their personalities. They become unduly anxious and withdrawn in an apparent attempt to minimize the chances of maladjustment and conflict with the environment. Some become anxious and agitated, as if trying to escape painful insight into their personality deficiencies by means of a vigorous and usually sudden increase in motor activity. The patients seem so preoccupied with their anxiety and what might be termed their attempts to cure themselves of the anxiety that they neglect to function as well as they could in objective reality and in social relationship. If anxiety and depression are secondary results of the psychosis, then successful shock therapy removes these secondary effects of schizophrenia. According to available Rorschach evidence, schizophrenics whose actual psychological performance level is near their potential level do not improve even when these patients show very few, or no primary intellectual deficiencies caused by the psychosis.

The following personality changes have been observed in schizophrenics by means of the Rorschach method after a successful treatment: the patients became much more concise; they were less circumstantial; the logical coherence of their reasoning was improved. There was usually a definite improvement in the capacity for consciously directed and prolonged voluntary attention. They showed more control in thought and action. They were emotionally calmer and less sensitive. At the same time they appeared emotionally duller. These results probably can be explained fully by a decrease of emotional pressure. The decrease in anxiety and depression reacted favourably upon intellectual functioning. Thus, although there seemed to be no real improvement in intellectual capacity, the improvement in intellectual efficiency was very noticeable. The decrease in anxiety through successful treatment resulted in a lesser stimulation of imagination, and thus revealed more clearly the emotional impoverishment of the schizophrenic.

Finally, as far as the perceptanalytic test of Rorschach is concerned, there seemed to be no difference in its prognostic value whether used in insulin coma treatment or in ECT. (Authors' abstr.)

Effects of Cerebral Electroshock on Experimental Neuroses in Cats.

Six cats were made experimentally neurotic, and were then subjected to cerebral electroshocks comparable to those used in clinical therapy. All of these animals showed a marked disintegration of inhibitions, phobias, compulsions and other neurotic patterns, with emergence of simpler, more normally readaptive behaviour,

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which could be further improved by guidance, retraining, and other corrective procedures. However, all of the neurotic animals and two normal controls subjected to the electroshocks also showed an impaired capacity for complex adaptations, with subsequent recovery in only two of the animals. In no case, however, could these deficits be correlated with corresponding histopathologic changes in the brain. The significance of these observations in relation to the clinical use of shock therapy is briefly discussed. (Authors' abstr.)

Electroshock Therapy. A Review of over 23,000 *Treatments using Unidirectional Currents.*

1. Forty per cent. of the most chronic patients showed significant improvement in ward behaviour if adequately and repeatedly treated with suitable type of electroshock therapy. Relapses must be treated whenever they occur over months and years.

2. At least 60 per cent. of early cases, aged 60 or under, were rehabilitated within one year when adequately treated, and 65 per cent. by the end of the second year after the start of treatment.

3. Adequate treatment means intensive treatment until the expected improvement has occurred, and intensive treatment of relapses when they occur. No patient, otherwise suitable who is still not rehabilitated after one year, has had an adequate trial of treatment with less than 20 treatments.

4. An ideal therapy is one which achieves beneficial results without causing accumulating brain damage, thus permitting its use repeatedly for years if necessary.

5. This ideal is approached by the relatively low intensity 60-cycle pulsating direct current used in the treatment of the patients reviewed in this paper. This technique also has been accompanied by an exceptionally low percentage of skeletal complications. (Author's abstr.)

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The Advantages of Nitrous Oxide Inhalation in Psychiatric Treatment.

1. Previously described methods of inhalation anaesthesia and hypoxia in psychiatric conditions have been reviewed.

2. A technique of nitrous oxide administration beyond the state of intoxication and avoiding the stage of deep hypoxemia has been described.

3. Physiological changes with this form of anaesthesia are slight and the method may be considered safe.

4. After the anaesthesia, a period of facilitation of mental processes is observed, which is followed by a period of relaxation and sedation.

5. During the phase of facilitation the patient has a feeling of increased well-being, and shows greater spontaneity, less resistance, and enhanced insight, often expressing previously repressed ideational content and affects.

6. The period of sedation lasts for several hours, and is not associated with drowsiness or confusion. Sleep is usually improved the following night and other sedation is often unnecessary.

7. In states of acute manic excitement, repeated daily administration of nitrous oxide has controlled and terminated the attack in some cases.

8. Nitrous oxide hypoxia produces some of the features of the " shock treatments " as well as of narcoanalysis, but it is safe, convenient, and simple in admini-

https://doi.org/10.1192/bjp.94.395.470 Published online by Cambridge University Press

stration, and may be used in ambulatory patients without interruption of their ordinary activities.

9. The theories on the pharmacological action of nitrous oxide and the reason for its choice are discussed. (Authors' abstr.)

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Psychopharmacologic Study of Schizophrenia and Depressions.

From these data it would appear that the lactic and the pyruvic acid contents of venous blood and their ratio do not differ significantly for patients with either depression or schizophrenia from the values for normal controls under basal conditions. The data, furthermore, suggest that the intravenous administration of sodium amytal in a dosage of 250 mg. is not sufficient to change significantly any of these values. This experimental approach does not assist, therefore in the elucidation of the differential response of the two groups of patients to this drug.

Although there is no essential difference in the general condition of the oxidative reactions as so determined among the two groups of patients and the normal controls, the possibility of other metabolic disturbances is not eliminated. The data simply suggest that general metabolic disturbances may be sought either before or after the pyruvate : lactate phase in the carbohydrate oxidation-reduction system. Neither is the possibility of more specific metabolic disturbances in the central nervous system eliminated. For such studies, blood should be obtained from both the carotid artery and the jugular vein.

The values for the lactic acid of the blood here reported are lower than those recorded elsewhere in the literature, probably as the result both of the method used and of the basal state of the subjects. (Authors' abstr.)

The Electroencephalogram in Encephalitis.

The electroencephalograms in 240 cases of encephalitis were studied in various stages of the disease. It was found that abnormality is often focal, and that it correlates with the stage of the disease. During the acute and subacute phases it correlates with the general severity of symptoms. However, the only feature of the postencephalitic syndrome which correlates highly with electroencephalographic abnormality is the presence of convulsions.

The electroencephalogram has diagnostic value for encephalitis, and after the acute phase is past it has prognostic value for postencephalitic epilepsy.

Wave and spike activity of the *petit mal* type is a common sequel of encephalitis in children. (Authors' abstr.)

Effect of Electrically Induced Convulsions on Peripheral Venous Pressure in Man.

Electrically induced convulsions cause marked transitory elevations in venous pressure consequent to muscular straining, the Valsalva phenomenon, increased carbon dioxide tension of the blood and possibly also increased circulating epinephrine. After termination of the seizure the venous pressure remains slightly

https://doi.org/10.1192/bjp.94.395.470 Published online by Cambridge University Press

elevated. It is concluded that the pronounced increases in venous pressure are of such short duration as to create little hazard of inducing intracerebral capillary haemorrhages. That other hazards exist is, however, recognized. It is concluded that the marked rise in venous pressure and the circulatory changes associated with it are not essential to obtaining clinical improvement. (Authors' abstr.)

Psychosis During Withdrawal of Morphine.

While it appears that withdrawal of morphine is not sufficient in itself to cause a psychosis, it is apparent that it may intensify the symptoms of a psychosis that already exists; this was demonstrated by the patients who had a psychosis prior to withdrawal. It is interesting that in the case of a schizophrenic addict who had withdrawal of morphine alone, the increased vividness of the delusions and hallucinations together with the disorientation resulted in the picture of a toxic psychosis.

It is of course impossible to know how much the withdrawal of morphine contributed to the picture of the toxic psychosis apparently produced by alcoholism and barbiturates; there is little doubt that at least anxiety was increased.

In view of the fact that so large a percentage of persons with addiction to morphine have severe neurotic traits, it is curious that more do not become psychotic during withdrawal of the drug. The withdrawal of morphine, even with the best medical care, is a rigorous anxiety-producing experience. These facts perhaps lend support to the thesis that the psychoneuroses and the psychoses are not a continuum, but, rather, are distinct entities. The development of delirium in the first schizophrenic addict suggests a close relation between schizophrenia and toxic psychosis.

The findings in this study indicate that withdrawal of morphine, of itself, is rarely, if ever, a cause of psychosis. In each instance complicating factors (schizophrenia and various types of organic psychoses) accounted for the psychosis during withdrawal. It must be noted that rapid withdrawal (10 days) is the method usually employed, and that with quicker withdrawal more instances of psychoses would perhaps have occurred. Yet Himmelsbach and Williams found, during the abrupt withdrawal of morphine from 400 addicts under close supervision so that no other drugs could be used, only one patient who became obviously psychotic. (Author's abstr.)

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Physiology and Therapy of Convulsive Disorders: (1) *Effect of Anticonvulsant Drugs on Electroshock Seizures in Man.*

Data are presented on the ability of anticonvulsant agents to prevent tonic-clonic seizures in non-epileptic patients undergoing electroshock therapy.

Diphenylhydantoin in non-toxic doses consistently abolishes the tonic phase of electroshock seizures. "Mesantoin" (N-methyl, 5-phenyl, 5-ethyl hydantoin) also ranks high in ability to modify the pattern of convulsions. Phenobarbital, sodium bromide and "mebaral" (N-methyl, 5-phenyl, 5-ethyl barbituric acid) are effective, but only in doses which occasionally produce undesirable side effects. "Tridione" (trimethadione) is ineffective in modifying the electroshock seizure pattern when given in doses more than adequate to control clinical *petit mal* epilepsy.

It is suggested that the modification of the electroshock seizure pattern in man offers a convenient method for the evaluation of potentially useful anticonvulsant drugs. (Authors' abstr.)

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Influence of Anxiety on Attention, Learning, Retention and Thinking.

A group of tests were selected for the study of active and passive attention, learning, retention, immediate memory and thinking. The reliability was established in all tests which were used in this study.

Anxiety appears to decrease active attention, as measured by the longest span of digits before an error is made. Passive attention as studied by the recall of the number of units of the " Barn Story " was affected adversely by intense anxiety. The effect was less clear when anxiety was not intense. Learning on the maze test was reliably slower in the presence of anxiety. Retention ability, tested by repetition of the maze test 24 hours after it was learned, was affected unfavourably by anxiety. Thinking was studied by means of the Kohs Block Test. It seems that anxiety decreases the score significantly with most patients, but there is a small group which is influenced little. The influence of anxiety in the different experiments was not uniform. It may happen that one or the other of the aforenoted functions is affected little, whereas all or the majority of the remaining functions are affected to a pronounced degree.

The possible influence of anxiety on the various functions which are tested in the current type of psychiatric examination has to be considered more seriously than has been done heretofore. It may be possible to gauge the intensity of anxiety from the findings. It is necessary, however, that the technic of the examination be refined by a careful scoring of the " Cowboy Story " test, and by the inclusion of additional tests which have been found useful and reliable in psychologic study. (Authors' abstr.)

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Penicillin in Treatment of Neurosyphilis.

Criteria for evaluation of therapeutic success in neurosyphilis are discussed.

One hundred and fifty-one patients with active neurosyphilis were treated exclusively with intramuscular injections of penicillin every 3 hours, the dose and the length of therapy being varied.

One hundred and thirty-five patients (90 per cent.) responded satisfactorily; 100 of these were followed for 12 months or more. The longest period of observation was 28 months.

The optimum dose of penicillin is yet to be established, but the authors' experience has led them to adopt a schedule of 40,000 units injected intramuscularly every 3 hours for 150 doses, a total of 6,000,000 units. (Authors' abstr.)

The Electroencephalogram in Poliomyelitis.

1. No definite or consistent electroencephalographic changes which might indicate abnormal electrocortical activity were observed prior to the onset of fever or paralysis in monkeys given intracerebral injections of either the RMV or the Aycock strain of simian poliomyelitis virus. Abnormalities in the electroencephalogram appeared during the paralytic stage and became more conspicuous with the progression of symptoms. The electroencephalographic changes consisted chiefly in a progressive increase of slow activity, disappearance of alpha rhythm, a relative increase in the amount of fast activity and a lowered voltage output.

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2. No electroencephalographic abnormalities were noted in guinea-pigs given either intracerebral or peripheral injections of murine poliomyelitis virus in the presence or absence of paralytic symptoms.

3. Of 17 patients convalescent from poliomyelitis, all of whom had severe residual paralysis, 2 exhibited definite electroencephalographic abnormality and 5 showed a borderline disturbance. The remaining 10 patients had normal electroencephalograms. (Author's abstr.)

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*The Psychiatric Manifestations of Temporal Lobe Lesions. *Frantz, R.* 150

The Psychiatric Manifestations of Temporal Lobe Lesions.

1. Mental aberrations are of common occurrence in cases of tumour of the temporal lobe. They include changes in personality, disturbances in affect, disturbances in intellectual and higher psychic functions, and hallucinations of vision, hearing, taste, and smell.

2. Certain of these psychic changes are identical, and it would seem indistinguishable from those seen in frontal lobe disease. Apparently the so-called " prefrontal lobe syndrome " is common to both temporal lobe tumours and tumours of the frontal lobe, but is presumed to be more specific for the frontal lobe group.

3. There is some evidence suggesting that the type of clinical picture which develops concurrently with brain tumour is influenced by the premorbid personality of the patient regardless of the site of the lesion.

4. It seems clear that a regional diagnosis of temporal lobe tumour cannot be made from the presence of psychic disturbances alone, but if an intracranial tumour is known to exist from other clinical data, neurologic and otherwise, the concomitant mental changes may be of some value in localizing it.

5. Mental symptoms following ablation of the right temporal lobe are relatively unimportant, and seem confined to a reduction in drive, some slowing of the mental tempo, and minor disturbances in memory. Therefore, one must conclude that the effects of irritation are much different from the effects of ablation.

https://doi.org/10.1192/bjp.94.395.470 Published online by Cambridge University Press

6. It has been rather conclusively demonstrated that intracranial hypertension itself does not produce a qualitative change in the psyche. Torpor should be considered only as a quantitative impairment of consciousness and should be excluded.

7. Symptoms of right temporal lobe disease center about the functions of vision, hearing, taste, and smell. Hallucinatory phenomena arise out of excitation of these centres, and are sometimes accompanied by peculiar and rather distinctive dream-like states.

8. Visual hallucinations are commonly reported to occur with tumours of the temporal lobe, being characteristically observed in the field of vision contralateral to the tumour, or, when hemianopia is present, in the blind field. These hallucinations tend to be of the complex, highly-organized type in contradistinction to the simple unformed hallucinatory phenomena reported in cases of occiptal lobe tumour.

9. Auditory hallucinations are likewise seen in cases of temporal lobe tumour, and are reported as being of complex, highly-organized character.

10. Hallucinations of vision and hearing occurring with temporal lobe tumours are usually accompanied by insight as to their real nature on the part of the patient.

11. In patients who have hallucinations of taste and smell and who prove to have organic intracranial disease the lesion is said invariably to be situated in the temporal lobes.

12. Much of the confusion over the significance of mental changes in temporal lobe lesions stems from the lack of complete premorbid, morbid, and post-operative psychiatric study by a psychiatrist, of patients suspected of having brain tumour.

(Author's abstr.)

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Experimental Catalepsy in the Rat Produced by a Steroid Hormone.

Desoxycorticosterone acetate injected intraperitoneally in large doses in immature female white rats produces a state of experimental catalepsy. This may be observed to occur either alone or in association with deep anaesthesia. In the latter case the catalepsy precedes and follows the period of anaesthesia. The intraperitoneal injection of pentamethylenetetrazol (metrazol) antagonizes the cataleptic effect of the steroid hormone. (Author's abstr.)

EDUC. PSYCHOL. MEASMT.

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GENET. PSYCHOL. MONOGR.

VOL. XXXV. MAY, 1947.

*A Continuation Study of Anxiety Reactions in Young Children by Means of a Projective Technique. *Dorkey, M., and Amen, E. W.* . . . 139
A Study of the Vocational Interest Trends of Secondary School and College Women. *Cawley, A. M.* 187

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

In summary, one may conclude that the data have yielded several significant findings.

The investigation has shown (*a*) that the equivocal pictures have definite value in discriminating between the child with a low anxiety score and the child with a high anxiety rating; (*b*) that a group of unselected normal children tend to associate anxiety, with a high degree of frequency, with certain specific areas of experience, especially with the field of child-child relationships, and that even though anxiety in this area decreases over a period of months, it is still the area of greatest anxiety for the majority of the children studied. (*c*) That the test is a good instrument for measuring anxiety is shown by the Rho for the odd-even split half correlation, which was ·95. (*d*) Rho for the retest correlation, ·22, shows that the test is sensitive to the changes that have occurred in the child's thinking and feeling. The correlation coefficient of ·44 for the older children, between test and retest, indicates a measure of reliability which is greater than is at first apparent, when one remembers that a projective test, to be of value, must indicate significant changes in individual thinking and feeling, when they occur. (*e*) The correlation of ·59 between test results and teacher ratings shows that there is positive relationship between test results and behavioral patterns.

(Authors' abstr.)

VOL. XXXVI. AUGUST, 1947.

*Maze Test Validation and Psychosurgery. *Porteus, S. D., and Peters, H. N.* 3

Maze Test Validation and Psychosurgery.

1. Taking all 55 patients together there is a decided and significant decline in Maze Test performance after lobotomy.

2. The decline is most marked if the first post-operative examination is given within one month of lobotomy, is somewhat less marked if 1 to 1½ months has elapsed, and is considerably less if the interval is longer than 1½ months. These tendencies to relatively smaller declines with time are apparently associated with improved planfulness. Practice effects are, however, greatly reduced in comparison with what happens in normal cases.

3. When the patients are divided into three groups on the basis of improved social adjustment and the Maze is repeatedly applied the two improved groups, though suffering the greatest initial decline, make larger subsequent gains than the unimproved group. The much improved patients finally excel the middle group. These statements relate to averages of performance.

4. When the number of applications of the test is disregarded and scores tabulated for stated intervals there is, except at one point, a steady rise in test age on successive applications, but not until the sixth testing does the average rise above the prelobotomy level.

5. After operation, patients have a greater tendency to repeat errors in successive trials in the Maze. The greatly improved group have again the best record when all post-operative performances are summated. If only the third, fourth and fifth applications of the Test are combined the difference in favour of the improved groups is still more striking.

6. What are called " shatter " effects are more characteristic of the unimproved group than of the other two groups of improved patients.

7. The improvement in qualitative performance in the Maze is most marked for the greatly improved group.

The conclusion seems inescapable that the Maze Test is very significantly sensitive to changes in intelligence following lobotomy. The correspondence

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between clinical observations and test performance also indicates clearly that recovery of planfulness is reflected in successive Maze Test applications.

Perhaps a final disclaimer should be made. In spite of the fact that the Porteus Maze has in the authors' opinion met all the validating criteria set up as the result of lobotomy, that is not the main lesson of this study. To their minds it is the conclusion that whether or not we consider planning and foresight essential to any description of intelligent behaviour, the effects of lobotomy demonstrate clearly that these traits are essential to social adaptation. Whether the Maze is adequate for carrying such an important diagnostic burden is another question.

Twenty-five years ago Yerkes remarked to the senior author of this monograph: "If psychologists would only pay less attention to Binet-measured functions and devote a more reasonable share of their efforts towards developing tests of other socially essential traits, the whole problem of objective testing would be much nearer satisfactory solution." That statement is true to-day. Development of better tests of planning, foresight and initiative than the Maze is one of the urgent tasks that face clinical psychologists in the future. Psychosurgery offers a unique opportunity to validate these forthcoming tests. Unfortunately, planning and foresight do not seem to be among the conspicuous qualities of psychologists; otherwise, such a diagnostic responsibility would not have been necessary to impose on a single test scale. (Authors' abstr.)

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An Experimental Study of the Effects of Sodium Amytal Upon Performance on the Hunt-Minnesota Test for Organic Brain Damage.

A significant difference was not established between the mean score of deterioration sensitive tests given to 40 student nurses after hypodermic administration of one and one-half grains of sodium amytal and that from tests of the same girls given without the drug. For the 40 cases the critical ratio was 0·84. In other words, the results of this study seem to indicate that sodium amytal when given subcutaneously in small sedative amounts probably does not have a clinically significant effect upon mental efficiency. Since sodium amytal is a representative barbiturate, it seems likely that the barbiturates do not interfere to an appreciable extent with intellectual capacity unless the patient shows clearly discernible signs of sedation. (Author's abstr.)

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A New Method of Measuring Emotional Stability.

1. Various measurements were taken from the finger plethysmographic records of 30 normal subjects, to whom was also administered the Bell Adjustment Inventory.

2. By means of factorial analysis three factors were determined, viz. (*a*) emotional stability, common to the Bell variables and the rate of finger volume change, (*b*) a possible emotional tension factor, highly loaded in absolute pulse volume before the tasks, and (*c*) a factor specific to the cold water test.

3. The results of the factor analysis, the correlation of ·409 between Bell emotional adjustment and R, as well as the partial correlation of ·687 between the above named variables when the effects of Factor 2 were eliminated, show that the rate of the reflex finger volume change (R) is a valid measure of emotional stability (as tested by the Bell Inventory).

4. The comparison of two groups consisting of labile and stabile subjects using the Bell Inventory as criterium shows that R differentiates between individuals who are emotionally stable and unstable.

5. If the effect of absolute pulse volume before tasks (P) is eliminated from the individual R scores, the correlation between R and Bell emotional adjustment increases from ·409 to ·504.

6. An R score of ·200 was found to be an effective norm for diagnosing emotionally unstable individuals.

7. The Goetz finger plethysmograph proves to be a useful means of measuring emotional stability. (Authors' abstr.)

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*The EEG after Prolonged Brain Asphyxiation. *Van Harreveld, A.* . . 361
*Autonomic and Somatic Reactions Induced by Stimulation of the Cingular Gyrus in Dogs. *Kremer, W. F.* 371

A Study of the Effects of Anaesthesia and Asphyxia on the Mono-synaptic Pathway through the Spinal Cord.

The anaesthetic nembutal, though depressing the activity of all components of the mono-synaptic pathway, produces a block in transmission essentially by stabilizing the motoneurone membrane so that the synaptic potential no longer initiates the discharge of impulses.

Asphyxia produces a brief depression, which is quickly followed by a period of hyperexcitability attributable to depolarization of the membranes of the afferent nerve fibres and the motoneurone somas. With continued asphyxia the depolarization progresses so that eventually there is failure of impulse propagation. This first becomes evident with orthodromic impulses in the presynaptic fibres and later with the antidromic propagation from axon to soma. Presumably variations in oxygen requirement determine this order of failure of the components of the pathway.

Oxygen-lack has the same effect as asphyxia except for the absence of an early transient depression of activity which precedes the phase of hyperexcitability.

Sudden readmission of oxygen during the period of asphyxial or anoxic hyperexcitability results in a depression.

Carbon dioxide excess produces pure depression of the mono-synaptic pathway. The accumulation of carbon dioxide explains the early depression in asphyxia, and, together with less diffusible products of anoxial metabolism, it accounts for the depression on sudden readmission of oxygen. During the period of hyperexcitability this depressant action would be submerged by the preponderating excitatory action of the partial depolarization. (Authors' abstr.)

The Electroencephalogram after Prolonged Brain Asphyxiation.

The EEG was recorded at regular intervals after asphyxiations of the brain of 10 to 30 minutes' duration.

The EEG after the shorter asphyxiations was characterized by short (1–2 seconds' duration) bursts of activity, with a wave-frequency of 7 to 12 seconds, repeated 10 to 20 times per minute. Evidence is presented for the cortical origin of these bursts.

The EEG after the longer asphyxiations is characterized by spindles of activity of longer (10 to 20 seconds) durations, with a wave-frequency of 12 to 16 seconds, which are repeated with intervals varying from a few seconds to about one minute. Evidence is presented for the view that the source of the potentials recorded as spindles is an unidentified subcortical structure centrally located in the brain. (Author's abstr.)

https://doi.org/10.1192/bjp.94.395.470 Published online by Cambridge University Press

Autonomic and Somatic Reactions Induced by Stimulation of the Cingular Gyrus in Dogs.

In five dogs the cingular gyrus was exposed by partial ablation of the opposite cerebral hemisphere. Electrical stimulation of moderate intensity or chemical stimulation with acetyl-beta-methylcholine produced responses in the somatic as well as in the autonomic realm. The experimental results suggest the existence of different functional areas in the cingular gyrus. Bladder contractions and other autonomic reactions can be obtained from the caudal third of the gyrus. Less conspicuous and of different character are the blood pressure and respiratory reactions obtained from the rostral third. The middle portion yields inconstant autonomic responses.

Stimulation of the rostral part usually suppresses the activity of somatic musculature, but may at times, as observed in one dog, evoke a slow tonic bilateral extensor reaction. This may indicate a connection with the striopallidum.

A definite interpretation of these reactions as to the significance of the cingular gyrus in the normal performance of either biological or psychological functions should await further research into this area. (Author's abstr.)

NOVEMBER.

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Further Observations on the Spreading Depression of Activity in the Cerebral Cortex.

A slow voltage variation having a duration of 4 to 6 minutes accompanies the spreading depression of activity in the rabbit's cerebral cortex. Each cortical region first becomes negative with respect to an extracortical reference electrode for 1 to 2 minutes. This negativity reaches, within 0·5 to 1 minute, a maximum of 8 to 15 mv. and then decreases somewhat more rapidly. The region then becomes positive for 3 to 5 minutes, this phase having usually a smaller amplitude than the negative.

A sudden cortical anemia, resulting from a 1-minute arterial occlusion, abolishes the " spontaneous " electrical activity of the cortex without itself inducing a slow voltage variation, but it promptly and profoundly alters the slow voltage variation accompanying the spreading depression of activity. This alteration consists essentially of a prolongation and an increase of the negativity. In a cortex, in no part of which a spreading depression of activity is in progress at the time, interruption of the circulation for longer periods induces a slow voltage variation only 2·5 to 5 minutes after the arterial occlusion, at which time the cortex becomes negative. The cortex then remains negative for as long as the circulation is interrupted (up to at least 12 minutes).

If the prolonged anemia is started while a region is involved in a spreading depression of activity and exhibiting the slow voltage variation, then the negativity, promptly induced in the region, persists for as long as the arteries are occluded (up to 12 minutes).

The results seem to indicate that in the spreading depression of activity, a change of the same nature as one resulting from prolonged interruption of the circulation occurs in the cerebral cortex. The electrical sign of this change is the negative voltage variation. (Author's abstr.)

Tectal and Bulbopontine Eyelid Reflexes and Mechanism of the Sleeping Attitude of the Acute Thalamic Pigeon.

Previous reports have shown that the superficial layers of the avian tectum opticum contain neurones which produce an opening of the contralateral eye

https://doi.org/10.1192/bjp.94.395.470 Published online by Cambridge University Press

when locally strychninized or faradized. In the present paper the influence of these neurones on the palpebral opening reflexes and their relationships with the cerebral hemispheres and with the bulbopontine centers have been investigated in thalamic and hemidecerebrated pigeons and owls. In addition, an attempt has been made to elucidate the mechanism of the well-known sleeping attitude described by Rolando and Flourens in the acute decerebrated pigeon.

1. After subliminal strychninization of the tectal eyelid neurones a lowering of the threshold for tactile, labyrinthine and acoustic palpebral reflexes has been observed in the contralateral eye.

2. After acute extirpation of a cerebral hemisphere in a chronic hemidecerebrated pigeon lowers the threshold for the opening eyelid reflexes is lower in the eye contralateral to the hemisphere first removed. This reflex asymmetry is not prevented by local chloroforming or by total extirpation of the optic lobe ipsilateral to the hemisphere first removed.

3. Hypnotic doses of chloralose (and also of urethane and dial) injected in chronic, hemidecerebrated pigeons close the crossed "decerebrated" eye, as if the animal were sleeping on this side only.

4. Abolition of the faradic and strychnine excitability of the tectal lid neurones by local chloroforming does not increase the threshold of the lid reflexes in the contralateral eye; on the other side the total unilateral removal of an optic lobe in the thalamic pigeon is never followed by the appearance of lid asymmetries.

(Author's abstr.)

Reflex Development in the Chronically Spinal Cat and Dog.

The course of development of reflex activity after spinal transection has been followed in 34 cats and 17 dogs.

Differences between the two species are noted in regard to reflex pattern, duration of spinal shock, degree of atrophy, and susceptibility to ulcers.

(Author's abstr.)

Mechanism of Nerve Conduction Block Produced by Anticholinesterases.

DFP and eserine, like procaine but unlike KCl, were found to produce conduction block in frog sciatic nerve in concentrations which did not reduce the demarcation potential.

DFP, eserine and procaine consistently increased threshold prior to conduction failure. DFP also increased threshold in concentrations which were inadequate to block conduction. These effects were demonstrable at the stimulating cathode. KCl consistently decreased threshold in frog sciatic nerve during progressive conduction failure.

DFP, eserine and procaine decreased conduction velocity concomitantly with increase in threshold. Conduction failure occurred when conduction time was approximately doubled. In contrast, KCl had little effect on conduction velocity.

DFP and eserine had relatively little effect on recovery of excitability until the terminal stage of conduction block, at which stage they abolished the supernormal period of excitability in the remaining conducting fibers. Most of the above actions were reproduced in single giant fibres of the ventral cord of the earthworm, with the exception that KCl failed to decrease threshold. In addition, it was found that action potential amplitude remained relatively normal until conduction block was imminent in earthworm preparations treated with DFP, eserine or procaine. In contrast, KCl progressively reduced action potential amplitude.

High concentrations of acetylcholine were without effect on properties of frog sciatic nerve when applied during the course of DFP action or after recovery from DFP block. Frog sciatic nerve was found to accelerate the hydrolysis of DFP, probably through an enzymatic action. Partial recovery of conduction was found to occur in frog sciatic nerve even after prolonged DFP block. It is concluded that DFP and eserine in high concentrations abolish nerve conduction by increasing the excitation threshold, and it is suggested that this action may be unrelated to the anti-cholinesterasic activity shown by these drugs in lower concentrations. It is further concluded that these observations do not support the conception of an excitatory role of acetylcholine in the propagation of nerve

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impulses, since conduction block by DFP or eserine was accomplished without the intervention of depolarization or of excitatory effects, contrary to the implications of the acetylcholine hypothesis. (Authors' abstr.)

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The relationship of this clinical picture with the so-called male climacteric is discussed.

On the basis of physiological, psychological and therapeutic considerations their relationship is positively established.

It is shown that hormonal treatment relieves the patient of his constitutional symptoms in every case. The relief of the physical complaints has a beneficial influence on the emotional manifestations, and if these are mild they may disappear completely. If the psychological changes are very severe, however, hormonal treatment is insufficient and deep psychotherapy or electric convulsive treatment is necessary. (Authors' abstr.)

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The Domestic Tyrant. *Stern, E.* 197
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1. Psychiatry, Biochemistry, Physiology, etc.

Dictatorship of the Psychopaths. (*2nd rev. ed.*) *Nissen, I. Oslo : Aschehoug,* 1946, *pp.* 255. *N. Kr.* 10.

Nissen's analysis of the psychology of German fascism affords the hypothesis that psychopathy is the ground of fascistic ideology. Its power-policy is a rationalization at large of the psychopathic aggression characterizing the Nazi leaders. Profiting from his many years of experience as a psychotherapist of the Adlerian school, Nissen discusses the psychopathic behavior, described as a remarkably irrational struggle for gaining power in all life situations. In a social group psychopaths will automatically endanger democracy. The Nazistic attitude, with its tremendous aggressive force, its untrue propaganda, its policy of intrigue, etc., is formed as compensation for social insecurity. The affinity among the members of such a group is increased by its patriarchic structure. Analyzing historical and sociological trends in the German " Volk," the author finds the development of " men-groups " prevailing, with its ideology of masculinity and ascetism, potential and manifest homosexual tendencies, and the truncation of the function of females except that of child-bearing. F. FLUGE (Psychol. Abstr.).

Potentiometric Micro Method for the Determination of Cholinesterase. Delaunois, A. L., and Casier, H. [*Experientia,* **2**, 147–8 (1946) ; *cf. C. A.,* **40**, 4759[1].]

The authors re-emphasize the fact that the use of the Sb electrode offers a more simple, even if less exact, method of measuring cholinesterase than the glass electrode. They believe the use of 0·2 c.c. of serum is not a disadvantage, and that the method of Sanz using 0·05–0·01 c.c. should be designated a micromicro method. They correct an error in the text, stating that N/200 should read 0·02 *N*.
C. RIEGEL (Chem. Abstr.).

Blood Cholinesterase. Augustinsson, Klas Bertil (*Stockholms Hogskola, Biochem. Inst., Sweden*). [*Arkiv. Kemi, Mineral. Geol. A* 18, *No.* 24, 16 *pp.* (1945) (*in English*).]

Cholinesterase from serum (I) and erythrocytes (II) were compared. (I) is stable over a wider range of pH (6–10) than is (II) (pH 7·18–8·12). At neutrality (II) migrates twice as fast as (I). (II) has an isoelectric point of 4·65–4·70, while (I) has one of 4·36. Both are closely related to albumin. (I) may be prepared from serum as follows : $(NH_4)_2$–SO_4 is added to 50 per cent. saturation, thereby removing globulins ; the filtrate is brought to pH 4·5 removing albumin ; (I) is precipitated from the filtrate with $(NH_4)_2SO_4$ at 70 per cent. saturation. While the action of erythrocytes on acetylaneurine was not proven, evidence was found indicating that the factor in serum which hydrolyzes acetylaneurine is the same factor which destroys acetylcholine. A. J. G. (Chem. Abstr.).

Action of Some Vitamins on Acetylcholinesterase. Reggianini, O. (*Univ. Bologna, Italy*). [*Boll. soc. ital. biol. sper.,* **22**, 982 (1946).]

Large doses of vitamins were injected into guinea-pigs daily or at various intervals. Vitamins A, D, K and PP had no effect on the acetylcholinesterase activity of the brain. Vitamin B_1 produced an average increase of 27·4 per cent. and vitamin C an increase of 11·7 per cent. in this activity.
HELEN LEE GRUEHL (Chem. Abstr.).

Changes in Activity of Cholinesterase in the Ontogenesis of Mammals. Kakushkina, E. A., and Arkhipova, A. D. (*Biol. Museum, Moscow*). [*Byull. Eksptl. Biol. Med.,* **11**, 533–5 (1941).]

Rabbits at various stages of embryonic and post-embryonic life (up to 1 year) showed a very low level of cholinesterase in 15-day embryos, rising to a maximum

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at 30 days (i.e., near the end of embryonic life), increasing after birth, and reaching adult level after 12 days. In the process of development of individual reflexes, the activity of cholinesterase increases. G. M. KOSOLAPOFF (Chem. Abstr.).

Blood Acetylcholine Content in Unconditioned and Conditioned Stimulation. Prokopenko, V. G. [*Byull. Eksptl. Biol. Med.*, **11**, 326–7 (1941); *cf. C. A.*, **38**, 4299[1].]

Blood acetylcholine was determined (leech-muscle method) in dogs in unconditioned (normal feeding) and conditioned (usual surroundings of feeding) stimulation. After 1–1·5 hours in the first case and 15–20 minutes in the second case the blood began to show acetylcholine-like properties, whereas in a hungry dog it did not react with the leech muscle. Thus during gastric activity dog blood contains a vagus substance which is one of the active humoral factors regulating the activity of the intestinal tract. G. M. KOSOLAPOFF (Chem. Abstr.).

Chemical Nature of the Active Substance Appearing in the Sympathetic Ganglion during Stimulation of its Preganglionic Fibers. Medvedev, V. M. (*Med. Inst., Kazan*). [*Byull. Eksptl. Biol. Med.*, **11**, 432–4 (1941).]

The action of acetylcholine, of excitation of preganglionic fibers, and of " active perfusate " (perfusion fluid from the veins of the sympathetic ganglion collected during excitation of preganglionic fibers) on the sympathetic ganglion of the cat was studied under the influence of either paralyzing (nicotine, atropine) or sensitizing substances (eserine, cocaine). The first class of agents produced a lack of response to electric stimulation of fibers or to "active perfusate"; acetylcholine gave a distinct muscular contraction; eserine sensitized the ganglion only to acetylcholine, while cocaine increased the effects of all three excitation factors. Hence, a substance similar to adrenaline, rather than acetylcholine, is the excitation carrier.

(II) *Senkevich, I. V.* (*State Med. Inst., Kazan*). [*Ibid.*, 435–8.]

From experiments on cats after cutting the post-ganglionic fibers on one side of the animal, thus depending upon blood to carry the stimulating substance to the other side of the animal for manifestation of muscular response to the excitation of preganglionic fibers, the active material can actually be transported by the blood. Sympathin (name given to material which forms during excitation of post-ganglionic fibers) is not identical with this substance, which is also apparently not identical with acetylcholine. Its nature remains open.

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

Inhibition of Creatine Phosphate and Acetylcholine Breakdown in Nerve Extracts by Procaine. Rapp, Gustav Wm. (*Chicago Coll. of Dental Surgery*). [*Arch. Biochem.*, **12**, 13–17 (1947); *cf. The Bur*, **45**, 13 (1945).]

An enzyme system is present in the extracts from the frog sciatic nerve which catalyzes a reaction between acetylcholine and creatine phosphate, and this reaction is inhibited in the presence of procaine. V. L. F. (Chem. Abstr.).

Effect of Acetylcholine and Physostigmine on Tetanic Contraction. Babskii, E. B., and Korenevskaya, O. G. (*Lenin State Pedagogic Inst., Moscow*). [*Byull. Eksptl. Biol. Med.*, **22**, No. 9, 29–32 (1946).]

Acetylcholine and atropine have no effect on tetanic contractions by nerve stimuli of the frog gastrocnemius muscle-ischiadic nerve preparation. Physostigmine antagonizes these contractions, not by inhibition of cholinesterase, but by some other mechanism. Physostigmine seems to inhibit some other enzyme system which causes the hyperirritability; there is no simple relationship between this system and that responsible for absolute and relative contractility of the muscle. Veratrine increases and prolongs the tetanic contractions in concentrations which have no effect on refractivity. H. A. WEGNER (Chem. Abstr.).

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The Action of Acetylcholine on Frog Motor Nerves. Sozer, Furuzan (Univ. Istambul, Turkey). [*Compt. rend. ann. et arch. soc. turq. sci. phys. et nat.*, **13**, 71–3 (1947) (*in German*).]

While the rheobase of frog motor nerves was not altered by 0·1–0·0001 per cent. of acetylcholine (I), the chronaxia of normal and of degenerated nerves was extended by 0·1 per cent. of (I), reduced in 80 per cent. of the experiments by 0·01 per cent. of (I), and extended again in 50 per cent. of the experiments by 0·001 per cent. (I). The extension of chronaxia was accompanied by a reduction of the velocity of transmission. An extension of the chronaxia was produced by 0·01–0·0001 per cent. thiamine. FELIX HAUROWITZ (Chem. Abstr.).

The Role of Acetylcholine in Paraphylactic (Anaphylactic) Shock. Antiparaphylaxis by Tissue Decholinization. Danielopolu, D., and Bruckner, I. (*1-ère Clin. Méd., Bucharest, Rumania*). [*Bull. acad. méd. Roumanie*, **18**, 143–5 (1946).]

Experiments were performed on intestine isolated from guinea-pigs prepared 20 days previously with horse serum (I) and egg albumin (II). Addition to the bath of 0·1, 0·4 or 1 c.c. of (I) provoked a strong contraction owing to liberation of acetylcholine (III). Tonus returned to normal after washing and replacement of the Tyrode's solution. After 1–3 repetitions of this procedure no response to (1) was elicited, and addition of (II) was also without result. After 100 γ of (III) was added and the bath changed again, 0·4 c.c. of (II) produced a strong reaction. If (II) were added twice more, the intestine again became insensitive to (I) and (II). After another recholinization (I) provoked a violent reaction. Thus "anti-anaphylaxis" is merely exhaustion of tissue choline and not exhaustion of antibodies. MARSHALL E. DEUTSCH (Chem. Abstr.).

New Facts showing that the Excitatory Action of Adrenaline on the Longitudinal Muscle of the Terminal End of the Guinea-pig Ileum is due to Acetylcholine Liberated Indirectly by the Action of Adrenaline. Danielopolu, D., and Popesco, M. (*1-ère Clin. Méd., Bucharest, Rumania*). [*Bull. acad. méd. Roumanie*, **18**, 66–7 (1946).]

The organ was treated with 883F in a dose sufficient to inhibit the sympathomimetic action of adrenaline (I) without affecting its parasympathomimetic action, after which (I) still produced a contraction of the longitudinal fibers. After atropine, which has an effect opposite to that of 883F, (I) inhibited these fibers. The stimulating action of (I) on the fibers was thus due to the parasympathomimetic action produced by the compensatory cellular response to (I).
MARSHALL E. DEUTSCH (Chem. Abstr.).

Antiacetylcholinolytic and Antiadrenolytic Action of Strophanthin. Danielopolu, D., and Popa, Gr. Gr. (*1-ère Clin. Méd., Bucharest, Rumania*). [*Bull. acad. méd. Roumanie*, **18**, 150–1 (1946).]

By use of a previously described method (*cf.* preceding abstr.), strophanthin is shown to have these actions. MARSHALL E. DEUTSCH (Chem. Abstr.).

Antiacetylcholinolytic and Antiadrenolytic Action of Eserine. Danielopolu, D., and Popesco, M. [*Bull. acad. méd. Roumanie*, **18**, 104–5 (1946).]

By use of a previously described method (*cf.* preceding abstr.) eserine is shown to have these actions. MARSHALL E. DEUTSCH (Chem. Abstr.).

Method for the Study of the Inactivation of Adrenaline and of Acetylcholine in Tissues and the Inactivating Action of Drugs on Cholinesterase and on the Adrenolytic Factors of Tissues. Danielopolu, D., and Popesco, M. (*1-ère Clin. Méd., Bucharest, Rumania*). [*Bull. acad. méd. Roumanie*, **18**, 95–6 (1946).]

A very fine needle is inserted in the femoral artery of a dog, and the minimum amount of adrenaline (I) or acetylcholine (II) which clearly affects carotid pressure is determined. Very slow injection of small amounts of the drug to be tested into the femoral artery is followed by the minimum dosage of (I) or of (II). Inactivation of cholinesterase is then shown by a greater drop in carotid pressure due to (II),

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and inactivation of the adrenolytic factors is shown by a greater rise due to (1). Before and after injection of the drug the effects of injection of (I) and (II) into an artery and into a vein are compared.

MARSHALL E. DUETSCH (Chem. Abstr.).

Influence of Neurine, Acetylcholine and Atropine upon the Lymph Flow in the Thoracic Duct. Yokozawa, Miyuki. [*Acta Schol. Med. Univ. Imp. Kioto*, **24**, 169–96 (1942).]

The intrafemoral or intraportal injection of neurine into dogs resulted in acceleration of lymph flow in the thoracic duct, an increase in albumin of lymph serum, and a higher portal blood pressure. Acetylcholine produced a similar but longer-lasting effect. Atropine counteracted these effects, more strongly those of neurine than those of acetylcholine. All three, however, decreased the volume of the liver and small intestine. After the ligation of the periportal hepatic lymph vessels neurine and acetylcholine still increased the lymph flow, but not albumin of lymph serum. The lymphagogous effect of neurine and acetylcholine depends to some degree on the output of adrenaline. J. G. YOSHIOKA (Chem. Abstr.).

Synergistic Influence of Physostigmine on the Lymphagog Effect of Acetylcholine. Yokozawa, Miyuki. [*Acta Schol. Med. Univ. Imp. Kioto*, **25**, 1–18 (1943).]

In atropinized dogs physostigmine and acetylcholine were shown to act synergistically in raising portal venous pressure and increasing the lymph flow in the thoracic duct and also increasing the volume of the small intestine, but not that of the liver. J. G. YOSHIOKA (Chem. Abstr.).

Electrogenic Properties of Acetylcholine. Barnes, T. C. [*Nature, Lond.*, **159**, 307 (1947).]

The electrogenic action of acetylcholine at the phase boundary between oils and aqueous solutions is discussed as the possible basis of the recorded electrical potential of cholinergic nerve impulses. A. C. HOFFMAN (Psychol. Abstr.).

Influence of Certain Narcotics on the Sensitivity of Leech Muscle to Acetylcholine. Mikhel'son, M. Ya (Viem, Leningrad). [*Byull. Eksptl. Biol. Med. (U.S.S.R.)*, **11**, 230–3 (1941).]

Uneserinized specimens of dorsal and abdominal leech muscle were tested as to sensitivity to acetylcholine in the presence or absence of several narcotics. Morphine at 1×10^{-7} level increases sensitivity to acetylcholine (maximum at 10^{-3}); at 10^{-2} morphine causes its own contractions, owing to suppression of cholinesterase. Codeine was similar to morphine; diacetylmorphine has no such effect; papaverine increases sensitivity at 10^{-4} level. Ether causes considerable increase of acetylcholine sensitivity at 1/500–1/250 levels; $CHCl_3$, however, does not increase acetylcholine sensitivity and at 5×10^{-5} itself serves to relax the muscle; both $CHCl_3$ and Et_2O have strong anticholinesterase actions. MeOH, EtOH, iso-BuOH and iso-AmOH gave the sensitizing effect only for the latter two (iso-AmOH stronger than iso-BuOH), although all four have some anticholinesterase action. Methylene blue is a very strong anticholinesterase agent and strongly sensitizes the leech muscle to acetylcholine. Leech muscle is proposed as the test material for comparative study of anticholinesterase agents.

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

The Mode of Action of Acetylcholine on Unstriated Muscle. Singh, Inderjit, and Singh, Mrs. Sunita Inderjit (Dow Med. Coll., Karachi). [*Current Sci. (India)*, **16**, 159 (1947).]

Acetylcholine and K, in concentrations such that neither alone will produce tonic contraction, together cause tonic contraction in frog-stomach muscle. That the contracture is due to the K is indicated by its continuance when acetylcholine is withdrawn and relaxation when the K is withdrawn.

FERRIN B. MORELAND (Chem. Abstr.).

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Sensitization of Acetylcholine by Thiamine. Carvalho, Paulo de. [*Arquiv. faculdade nacl. med.* (*Rio de Janeiro*), **1**, 11–19 (1946) (*English summary*).]

The rate of hydrolysis of acetylcholine (I) dissolved in defibrinated dog blood is studied by determination of the blood pressure of anesthetized dogs. Twenty γ (I) per ml. blood are completely hydrolyzed within 2–3 minutes. Addition of 0·1 mgm. thiamine (II) simultaneously with (I) prolongs its effect to 5 minutes. If (II) is mixed with the blood 10–15 minutes before addition of (I) its action lasts 12–15 minutes, and if added 30 minutes before, the action lasts 1 hour. These results cannot be compared directly with those conducted *in vivo*.

K. SCHOEN (Chem. Abstr.).

The Chemical Nature of the Substances of Brain Tissue which render Muscles Sensitive to Acetylcholine. Babskii, E. B., and Minaev, P. F. (*Acad. Med. Sci., Moscow*). [*Biokhimiya*, **12**, 231–40 (1947); *cf. C. A.*, **40**, 7258[7].]

The substance which sensitizes brain tissue to acetylcholine is a compound containing a labile phosphate group, and is probably adenosinetriphosphate.

H. PRIESTLEY (Chem. Abstr.).

The Ultraviolet Absorption Spectrum of Cerebrospinal Fluid: Ascorbic versus Nucleic Acid. Strait, L. A., Aird, R. B., and Hrenoff, M. K. (*Univ. of California Med. School, San Francisco*). [*Science*, **106**, 64–5 (1947).]

The 265 mμ band of cerebrospinal fluid (CSF) is shown to be due to ascorbic acid and not nucleic acid as assumed by Spiegel-Adolf and Wycis (*C.A.*, **41**, 1032*f*). The maximum ultraviolet absorption curves of CSF and ascorbic acid is shifted towards the shorter wave-lengths by a change in pH from 7 to 2, whereas a corresponding change in the pH of nucleic acid causes a slight shift in the opposite direction. The 265 mμ band of CSF responds to all decomposition tests for ascorbic acid. The residual absorption after destruction of ascorbic acid gives the so-called "**S**-shaped normal" curve. The observations of Spiegel *et al.* (*Science*, **105**, 208 (1947)) of the disappearance of the 265 mμ band from a fresh sample of CSF is what one might expect of ascorbic acid, and therefore cannot be accepted as evidence for a chromatolytic enzyme which splits nucleic acids. The ascorbic acid concentration of 80 samples of CSF from normal and abnormal patients ranged from 0·3 to 4·8 mgm. per cent. The ascorbic acid was determined by measuring the absorption before and after its destruction at pH 11, and the values agree with those of Wortis *et al.* (*C. A.*, **32**, 7531[1]).

A. DIETZ (Chem. Abstr.).

The Upper Limits of Normal Protein Concentration in the Cerebrospinal Fluid. Kafka, V. (*Langbro Sjukhus Alvsjo, Stockholm*). [*Monatsschr. Psychiat. Neurol.*, **110**, 325–9 (1945).]

The discrepancies among normal values for protein (I) concentration in the cerebrospinal fluid (CSF), reported from different laboratories, are due in large part to analytical errors. Kafka discusses in detail his procedure (*J. Neurol. Psychiat.*, **115**, 85 (1928)). Precipitation of (I) by Esbach's reagent (II) in special calibrated tubes, centrifugation under carefully controlled conditions, and direct reading of the volume of precipitate globulin (III) is determined by precipitation with saturated $(NH_4)_2SO_4$, centrifugation, careful removal of the supernatant liquid, solution of the residue in NaCl solution, and precipitation with (II) as before. Albumin (IV) is taken as the difference between (I) and (III). (IV) can be determined directly, but this is not recommended. The method for total (I) must be checked by control determinations on different amounts of a CSF of known (I) concentration. The method for (III) is checked by blank determinations on the reagents. The method does not give high precision, but the accuracy is sufficient for diagnostic purposes, and discrepancies between it and the Kjeldahl method (*cf.* Lindenmeyer, *C. A.*, **40**, 105[8]) should not occur. In 95 per cent. of 333 CSF's qualitative agreement was found (normal or not) between Kafka's method and Bisgaard's HNO_3 serial dilution method.

W. M. S. (Chem. Abstr.).

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Application of the Takata Quinine-spinal Fluid Reaction to Blood Serum. Ninni, Mario (Univ. Pavia, Italy). [*Boll. soc. ital. biol. sper.*, **23**, 47–8 (1947).]

The test with the modifications for serum is carried out as follows: 1 c.c. of a 1 : 2, 1 : 4, 1 : 8, 1 : 16 and 1 : 32 dilution of serum in physiological saline is placed in tubes and 0·10 c.c. of 0·36 per cent. anhydrous Na_2CO_3 added and shaken; 0.20 c.c. 2 per cent. aqueous solution of quinine-HCl is added, shaken, and let set for 24 hours. Clear or slightly turbid solutions are considered negative, a definite white precipitation is positive. Experiments on 130 serums from various disturbances indicated that this test is a good indication of the eucolloidity of a serum. H. L. GRUEHL (Chem. Abstr.).

Changes in the Cerebrospinal Fluid and Blood in Vernalestival Encephalitis. III. *Disturbance of the Carbohydrate-Salt Metabolism in Acute and Chronic Stages of the Disease. Mandel'boim, A. B. (Inst. Physiol., Acad. Sci., SSSR).* [*Byull. Eksptl. Biol. Med.*, **20**, *No.* 12, 42–5 (1945); *cf. C. A.*, **40**, 7362[2].]

K, Ca, chlorides, and sugar were determined in blood and cerebrospinal fluid of cases with meningeal (I), hemiparetic (II), bulbar (III), polyradiculoneurotic (IV), serous meningitic (V), poliomyelitic (VI), hyperkinetic (VII), and atactic (VIII) syndromes. Except as noted there was no deviation from normal. The K level of the cerebrospinal fluid was variable in (VI) and high in (VII), and of the blood, low in (I). Ca in the fluid was normal to high in (II), (III), (IV) and (VII), and high in (VI) and (VIII). Blood Ca was normal to high in (VI) and (VII). The K : Ca ratio of cerebrospinal fluid and blood was low in (II), (III), (IV), (V) and (VI). Blood sugar was low in (VI), and fluid sugar was low in (I) and (IV) and irregular in (I), (II) and (III). Changes in salt equilibrium and carbohydrate metabolism in such cases are less than in other central nervous system diseases, and are attributed to disruption of the regulatory vegetative-endocrine centers by virus. K. STARR CHESTER (Chem. Abstr.).

Biochemistry of the Sphingolipides. I. Preparation of Sphingolipides from Beef Brain and Spinal Cord. Carter, Herbert E., Haines, William J., Ledyard, W. E., and Norris, William P. (Univ. of Illinois, Urbana). [*J. Biol. Chem.*, **169**, 77–82 (1947).]

A study was made of the various procedures reported for the isolation of cerebroside and sphingomyelin from nerve tissue. The procedure adopted involved dehydration with acetone, extraction by ether of the glycerophosphatides in the acetone-extracted residue, extraction of the acetone-ether-extracted residue with alcohol, and the precipitation of the sphingolipides by cooling overnight. One hundred pounds of fresh beef brain yielded 1,300 to 1,600 gm. of a crude sphingomyelin-cerebroside mixture; 100 lb. of beef spinal cord gave 2,200 to 2,500 gm. The total yield of cerebroside was 4·2 per cent. of the fresh weight of the spinal cord; the yield of sphingomyelin was 1·37 per cent. JULIA O. HOLMES (Chem. Abstr.).

Influence of the Thyroid Hormone on the Formation of Mediators in the Central Nervous System. Kakushkina, E. A., and Tatarko, T. [*Compt. rend. Acad. Sci., U.R.S.S.*, **55**, 359–61 (1947) (*in French*); *cf. C. A.*, **41**, 5937*e*.]

Hyperthyroidism induced by feeding large amounts of fresh thyroid to dogs had no effect on the acetylcholine-like substances in the brain; however, the activity of the esterase was diminished; this raises the "acetylcholine coefficient." R. W. FLEMING (Chem. Abstr.).

Content of Calcium in Brain Tissue under Narcosis. Meglitskii, P. P., and Zinov'eva, M. T. (Inst. Med., Leningrad, U.S.S.R.). [*Byull. Eksptl. Biol. Med.*, **20**, *No.* 4–5, 32–3 (1945).]

Experiments were carried out to determine the diffusible Ca in the brain before and after 30 minutes of ether narcosis. The animals used were guinea-pigs and rats. For the pigs, the average normal Ca content was 24·8 mgm. per cent.; after narcosis it rose to 41·8 mgm. per cent. For the rats, the average normal Ca content

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was 37·9 mgm. per cent.; after narcosis it rose to 60·4 mgm. per cent. The content of water in the brain remained approximately the same before and after narcosis. S. GOTTLIEB (Chem. Abstr.).

Regulation of Organic Metabolism by the Upper Sympathetic Ganglion of the Neck, Sinel'nikov, E. M., and Bugaeva, M. G. (Ukrain. Research Inst. Stomatol., Odessa). [*Byull. Eksptl. Biol. Med.*, **11**, 442–5 (1941).]

After extirpation of the upper sympathetic ganglion of the neck in young dogs, teeth showed no change in inorganic composition (Ca, Mg and P), but there was a fairly regular (up to 3·5 per cent.) increase of the organic constituents.
G. M. KOSOLAPOFF (Chem. Abstr.).

Biochemical Foundations of Abnormal Behavior in Man. Hoagland, Hudson. [*Ciencia e ivest. (Buenos Aires)*, **3**, 229–37 (1947).]

Previous research on the relationship between metabolism, and especially cerebral respiration, and psychic processes and disturbances is discussed. Further, the investigations on the connection between hypothalamus function and endocrine glands, ketosteroid elimination, the influence of the adrenals and pituitary on psychic function and enzyme deficiencies are reviewed.
A. E. MEYER (Chem. Abstr.).

Mechanism of the Action of Potassium on Nerve Refraction. Zol'nikova, A. I. (Central Inst. Neurology, Moscow, U.S.S.R.). [*Byull. Eksptl. Biol. Med.*, **20**, *No.* 10/11, 9–12 (1945).]

Sciatic-gastrocnemius preparations were made from the frog, and the absolute and relative refractory periods of the nerve after excitation by a single stimulus were measured. The influence of acetylcholine, KCl and atropine was studied. A 0·2–0·4 per cent. KCl concentration in Ringer's solution prolonged the refractory phase. This prolongation could be antagonized by atropine. Experiments show that the effect of K is due to its ability to release acetylcholine.
S. GOTTLIEB (Chem. Abstr.).

Nervous Regulation of the Anterior Hypophysis. I. Excitants of the Central Nervous System (Picrotoxin and Metrazole) and the Estrus Cycle of the Rat. Ubatuba, Fernando (Inst. Oswaldo Cruz, Rio de Janeiro). [*Rev. Brasil. Biol.*, **7**, 203–14 (1947).]

In adult rats intravenous injections of convulsant doses of picrotoxin or metrazole during or between estrus periods failed to disturb the estrual rhythm or to induce pseudopregnancy. Presumably the drugs do not provoke the release of luteinizing hormone by the anterior hypophysis.
L. E. GILSON (Chem. Abstr.).

Section of the Hypothalamus to Remove the Hyperglycemic Effect of Urethan. De, P. (Med. Coll., Calcutta). [*Indian J. Med. Research*, **34**, 185–7 (1946).]

The persistent hyperglycemia characteristic in the cat under urethan anesthesia gradually subsides after section of the hypothalamus. The plane of section passes from the anterior border of the superior corpora quadrigemina through or behind the mammillary bodies. M. H. POWER (Chem. Abstr.).

Effect Produced by Lesions of the Hypothalamic Region on the Carbohydrate Metabolism. Rusishvili, G. G., and Yankovskaya, Ts. L. (Pavlov Physiol. Inst., U.S.S.R.). [*J. Physiol. (U.S.S.R.)*, **32**, 223–8 (1946) (*in Russian*).]

Lesions were produced in the hypothalamic region of three dogs, and observations on the carbohydrate metabolism were made. None of the dogs under observation showed hyperglycemia. Marked hypoglycemia in the post-operative period coincided with severe general disturbances and epileptic fits. A therapy of massive sugar administrations proved beneficial in these cases.
S. GOTTLIEB (Chem. Abstr.).

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A Method of Screening Sympathomimetic Amines for Stimulant Action on the Cerebrum. Clymer, Nancy V., and Seifter, Joseph (Wyeth Inst., Philadelphia, Pa.). [*J. Pharmacol.*, **89**, 149–52 (1947).]

Young chicks react to amphetamine (I) in a characteristic manner. The syndrome produced by injecting 2–5 mgm. of (I) develops in three stages. The first two stages take place 1–2 minutes after the injection, and consist of vigorous head movements and ruffled feathers accompanied by a forward tilt of the body and drooping wings. The third stage, about 3 minutes after the injection, is the crucial test for (I). Under the influence of (I), the ordinary intermittent peeping of the chick becomes a continuous twitter, about 250 times per minute, and sometimes may even become a warble. This twittering reaction may last an hour. Corneal anesthesia and a failure to respond when the toes were pinched were noted at the height of the reaction. Of 60 compounds, including the more commonly used sympathomimetic amines, only *d*-amphetamine, *dl*-amphetamine (benzedrine), *d*-desoxyephedrine, β-phenyl-α-aminobutane, and β-phenyl-tert-butylamine produced the twittering reaction. Of the other compounds some produced none of the above effects, some produced the first two stages, and synephrine and neosynephrine produced lethargy. Other effects of each compound are described. Only chicks 1 day to 3 weeks old showed the twittering reaction with (1). Squabs, pigeons and hens ejected food and the pigeons lost the ability to fly. Canaries exhibited convulsions, and day-old ducklings showed excitement only. Attempts to abolish the syndrome by sympatholytic drugs were in general unsuccessful.

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

A Method of Estimating Curare-like Activity on the Isolated Phrenic Nerve Diaphragm Preparation of the Rat. Chou, T. C. (Dept. Pharmacol., Oxford, Eng.). [*Brit. J. Pharmacol.*, **2**, 1–7 (1947).]

The phrenic nerve diaphragm preparation was stimulated to maximum contractions by condenser discharges from a neon lamp circuit, contractions being recorded by isotonic lever. The muscle was immersed in Tyrode's solution fortified with glucose, oxygenated with a stream of 95 per cent. o–5 per cent. CO_2, the bath being at 37–38° and having a capacity of 100 ml. The Tyrode was changed four times during 13 minutes between addition of drugs. Drugs were allowed to act for 3 minutes. Percentage inhibition was determined by measuring the height of contraction just before tubocurarine was added to the bath, and again 3 minutes later. The curare action is less at slower rates of stimulation (5/minutes) than at faster rates (20/minutes). At rates greater than 20/minutes recovery was slow owing to fatigue. Curare action is less in pure O than in O–CO_2 mixtures. The overall error of the method is about 6 per cent.

Wm. M. Govier (Chem. Abstr.).

Nerve Centers and Sugar Regulation. Marinelli, Luigi, Giunti, Valentino, and Discepoli, Giuseppe (Univ. Perugia). [*Arch. sci. med.*, **83**, 174–80 (1947).]

Measured quantities of glucose were injected into the spinal canal in dogs. This was followed by a decrease in blood sugar with a min. after 30 minutes. Return to normal occurred after 2 hours. Conclusion : Glucose stimulates nervous centers directly.

A. E. Meyer (Chem. Abstr.).

Adenylpyrophosphatase in Brain, Liver, Heart and Muscle of Chick Embryos and Hatched Chicks. Moog, Florence (Washington Univ., St. Louis, Missouri). [*J. Exptl. Zool.*, **105**, 209–20 (1947).]

Adenylpyrophosphatase (I) activity was followed in the organs of the developing chick from the 12 days of incubation till 14 days after hatching. It increases during that time. The (I) content of the brain rises steadily, and reaches a maximum at 7 days after hatching. The chick becomes increasingly vigorous and alert during this time. (I) activity in skeletal muscle reaches a maximum at hatching when the first functional demands are made on this tissue ; then it declines slightly to the adult level. Cardiac (I) reaches a maximum at 16 days of incubation, declines at hatching, and then increases to the adult level. Anoxemia may be responsible for the decline of (1) at hatching. Liver (I) becomes sensitive to Ca

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activation at hatching. If Ca is not added, (I) activity remains nearly constant throughout the period ; but when present, (I) activity rises sharply after hatching. The method of Moog and Steinback (*C. A.*, **39**, 4942[2]) was used for (I) determination.
C. H. RICHARDSON (Chem. Abstr.).

Variations in Vitamin B_1 Content of the Brain in Experimental Hyperthyroidism. Rossi, C. A., and Moruzzi, G. (Univ. Bologna, Italy). [*Boll. soc. ital. biol. sper.*, **22**, 1146–8 (1946).]

Rabbits were made hyperthyroid by daily intramuscular injections of 100*r*/γgm. of thyroxine. The vitamin B_1 titer of the brain (Rittsert determination) diminished about 80 per cent. in 30 days. HELEN LEE GRUEHL (Chem. Abstr.).

Indophenol Oxidase of the Central Nervous System. VI. Action of Sodium Cyanide and Carbon Monoxide on the Indophenol Oxidase of the Nerves. Mitolo, Michele, Sgaramella, Vincenza and Marzano, Giuseppe (Univ. Bari, Italy). [*Boll. soc. ital. biol. sper.*, **22**, 971–4 (1946) ; *cf. C. A.*, **41**, 2167*h*.]

NaCN was injected into various animal species in lethal doses ; CO was inhaled until it caused death. The nerves were excised immediately and indophenol oxidase determined by the Mitolo photometric micro-method (*C. A.*, **40**, 5821[3]). NaCN notably inhibited the indophenol oxidase power of the nerves, but rarely entirely inhibited it. The toxic action of CO was much less intense, and in some nerve sections there was even an occasional increase in indophenol oxidase.

VII. Action of Convulsive Poisons on the Indophenol Oxidase of the Nerves. Mitolo, Michele, Scaramuzzi, Franca, and D'Alessandro, Angela. [*Ibid.*, 974–7.]

Lethal doses of strychnine or quinine or convulsive doses of caffeine, codeine, dionine or heroin were injected into various animals and birds. In general the convulsive drugs increased the indophenol oxidase in the nerves, but this effect varied with the different animal species. In the rabbit there was generally a diminution.

IX. Action of some Reduction Oxidation Indicators and Eosin on the Indophenol Oxidase of the Nerves. Mitolo, Michele, Borgia, Carlo E., and Salerno, Michelina. [*Ibid.*, 1066–9.]

Guinea-pigs were injected with small innocuous doses of 2, 6-dichlorophenol-indophenol, thionine, the chloride of brilliant cresyl blue, methylene blue, or eosin. Various portions of the nerves were excised 30 minutes after injection. Methylene blue, thionine, and 2, 6-dichlorophenolindophenol inhibited the indophenol oxidase activity of the nerves, while brilliant cresyl blue increased it, and protected the animal from NaCN intoxication. Small doses of eosin diminished the indophenol oxidase activity. HELEN LEE GRUEHL (Chem. Abstr.).

Nicotinic Acid, Tryptophan and Pellagra. Biological Research and New Problems of Human Physiology. Chiancone, F. M. (Lab. Recerche Lepetit S. A., Milan). [*Vitaminologica (Milan)*, 1946, 97–9 ; *cf. C. A.*, **39**, 3339[1].]

There is discussed the role of nicotinic acid in human pellagra, black tongue of dogs, and fowl dermatosis, and its synthesis from tryptophan in rats, but not in man. Rats deprived of pyridoxine eliminated xanthurenic acid (4, 8-dihydroxy-quinoline-2-carboxylic acid) in the urine, but not quinurenic acid (*cf.* Axelrod, Morgan and Lepkovsky, *C. A.*, **40**, 626[5]). Rats were fed an excess of nicotinamide and an indication was found of increased elimination of xanthurenic acid.
E. L. GREEN (Chem. Abstr.).

Sympathicomimetic Substances Extracted from Nerves and Tissues of Mammals. Bacq, Z. M., and Fischer, P. (Univ. Liege, Belg.). [*Arch. intern. physiol.*, **55**, 73–91 (1947).]

By comparison of the simultaneous contractions of the nictitating membrane and uterus of the non-pregnant anesthetized cat it was possible to indicate that extracts of the spleen of ox, cow, calf, horse and dog contained only arterenol,

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extracts of coronary nerves of human coronary arteries contained only adrenaline, while extracts of splenic nerves and sympathetic system of horse and calf contained both substances. H. L. WILLIAMS (Chem. Abstr.).

The Neuro-regenerative Growth Substance "NR." (III). Koechlin, B., and Muralt, A. von (Univ. Bern, Switz.). [*Helv. Chim. Acta*, **30**, 519–24 (1947) (*in German*); *cf. C. A.*, **40**, 1571⁷.]

The " NR " substance (I) previously described is a non-proteinaceous, H_2O-soluble dialyzable compound of low molecular weight found in brain. Active extracts can also be prepared from peripheral nerves and the spinal cord. The (I) is found chiefly in the white matter of the brain, while the grey matter is only slightly active. Brain (with cerebellum and medulla) from a freshly slaughtered animal is stripped of the pia mater and coarsest blood vessels, and ground at 4° in isotonic salt solution. The cells must be well disintegrated. Dialysis of the mixture gives a clear yellowish dialyzate containing most of the activity. An optimum dilution of the dialyzate can be found, above and below where activity is decreased. This is attributed to the possible presence of an " NR " inhibitor. As a 1 c.c. injection of active material corresponds to only 1 mgm. of moist brain tissue, " NR " is present and effective in very small amounts.

IVAN A. WOLFF (Chem. Abstr.).

The Excitation by Succinic Acid of the Respiratory Center of the Dog in Apnea of hyperventilation. Bovet, Daniel, Monod, Jacques, and Lwoff, Andre. [*Compt. rend.*, **224**, 1844–6 (1947).]

Injection of 5–200 mgm. $NaHCO_3$ per kgm. into the saphenous vein or the carotid of the anesthetized dog in apnea from hyperventilation restored the action of the respiratory center as indicated by movements of the diaphragm. HCl had a similar action due to mobilization of alkali reserves. Injection of sodium succinate (I) gave the same results as $NaHCO_3$. In some dogs the injection into the saphenous vein of 5 mgm. (I) per kgm. restored movements of the diaphragm in 5–6 seconds, while others required 20–50 mgm. per kgm. The latent period was shorter when (I) was injected into the carotid. Certain animals did not react to either $NaHCO_3$ or (I). After the injection of glucose or EtOH (I) was ineffective, but Na salts of *l*-malic, fumaric and aspartic acids showed action. Na acetate, propionate and butyrate were inactive except in one instance when the butyrate showed weak activity. In the absence of CO_2 the nerve cell is deprived of diacids and other products essential to its metabolism. The fact that $NaHCO_3$ and (I) are inactive in some cases show that the effects of CO_2 deficiency are complex.

M. O. A. (Chem. Abstr.).

Action of Phenylisopropylamine on Neuromuscular Excitability. Boriani, A. (Univ Bologna, Italy). [*Boll. soc. ital. biol. sper.*, **23**, 11–13 (1947).]

Phenylisopropylamine acting *in situ* on the gastrocnemius muscle and sciatic nerve of *Rana esculenta* greatly diminished the excitability of each.

HELEN LEE GRUEHL (Chem. Abstr.).

2. Pharmacology and Treatment.

Comparative Central-depressant Actions of some Ring-substituted Phenobarbitals. Alles, Gordon A., Ellis, Charles H., Feigen, George A., and Redemann, Mildred A. [*Univ. Calif. (Berkeley) Pubs. Pharmacol.*, **2**, 173–81 (1946); *cf. C. A.*, **41**, 4573*f*.]

In a group of ring alkyl-substituted derivatives (m-Me, p-Me, p-Et, p-iso-Pr, p-tert-Bu, p-OMe, 3, 4-O_2CH_2) of phenobarbital, the hypnotic effect always was less than that of phenobarbital itself; this was especially true of the p-OMe and the 3, 4-O_2CH_2 derivatives. Only the Me derivatives were comparable to phenobarbital in therapeutic index. In anticonvulsant action all the derivatives were inferior to phenobarbital, and exerted such action markedly only in hypnotic or lethal doses.

JOSEPH S. HEPBURN (Chem. Abstr.).

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Conditions of Mechanical Sensitivity of the Carotid Sinus under Barbiturate Anesthesia. Panashchenko, A. D. [*J. Physiol. (U.S.S.R.)*, **32**, 287–91 (1946) (*in Russian*).]

Hexenal and sonbutal were used in rabbits and cats. Control experiments on non-anesthetized animals showed that mechanical stimulation produced a fall in the blood pressure with no marked changes in respiration. A much stronger effect on the blood pressure was produced under conditions where the sensitivity of the medullary centers and the receptors was changed by compressing the common carotid arteries. In this case the respiratory changes were variable. Similar experiments with both sonbutal and ether produced, in complete anesthesia, a drop in the blood pressure, and in incomplete anesthesia, no change in the blood pressure. In both kinds of narcosis respiration changes were variable. Hexenal anesthesia, whether complete or incomplete, failed to produce any blood-pressure changes indicative of a change in sensitivity of the pressure-sensitive receptors of the carotid sinus. Respiration was usually found to be inhibited.

S. GOTTLIEB (Chem. Abstr.).

The Carbohydrate Metabolism during Prolonged Pentothal Anesthesia in Dogs. I. The Blood Sugar and the Liver Glycogen. Booker, Walter M. (Howard Univ. School of Med., Washington, D.C.). [*Anesthesiology*, **7**, 405–15 (1946).]

The changes in blood sugar and in liver glycogen in dogs under prolonged pentothal (I) anesthesia are described. Evidence is presented tending to show interruption of the normal glycogenic-glycogenolytic activity of the liver under prolonged anesthesia. It appears that livers of animals deprived of food do not polymerize glucose under prolonged (I) anesthesia, and that prolonged anesthesia with (I) seems to decrease markedly the liver glycogen. The liver-function tests indicate that the liver is severely taxed during prolonged (I) anesthesia which may affect the normal functioning of the carbohydrate enzyme system at the site of the liver. The experiments raise the question as to the effectiveness of glucose administrations during prolonged (I) anesthesia to protect the liver, since excess glucose is not converted into glycogen during prolonged (I) anesthesia in animals on a normal diet, and since there is a breakdown of the stored liver glycogen in animals on a normal and on a high-carbohydrate diet.

RUTH BERGGREN (Chem. Abstr.).

Influence of Sex and Age in Acute Barbiturism. Donatelli, L. (Univ. Firenze, Italy). [*Boll. soc. ital. biol. per.*, **22**, 853–4 (1946).]

On the basis of clinical studies and tests on guinea-pigs, rabbits and mice, it was concluded that there was great individual variation in susceptibility to barbiturate intoxication within a species and even in the same individual under various conditions. In general, females were less susceptible than males. Men over 50 were a great deal more susceptible than younger men.

HELEN LEE GRUEHL (Chem. Abstr.).

Age, Sex and Acute Barbiturate Intoxication. Donatelli, Leonardo (Univ. Firenze, Italy). [*Arch. Intern. Pharmacodynamie*, **74**, 90–111 (1947); *cf. C. A.*, **41**, 3212*h*.]

On the basis of analysis of 160 human cases of barbiturate poisoning (usually barbital), Donatelli concludes that women are more resistant to the drug than men, and that human beings above the age of 50 are more sensitive than are those from 20 to 49 years of age. The same sex difference is demonstrable experimentally in guinea-pigs and mice, but not in rabbits. The resistance of female guinea-pigs persists in pregnancy, and is accentuated in the puerperium and during lactation. Administration of testosterone or estrogenic preparations to male mice prolongs the duration of narcosis, but shortens the period when given to females. The effect of luteinizing hormone or castration is not clear.

WM. M. GOVIER (Chem. Abstr.).

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A Comparative Study on the Effect of Morphine and Chloral Hydrate on Respiration, with Special Consideration to Effecting Recovery of the Respiratory Center Injured by these Drugs by Means of Various Respiratory Analeptics. Matsumoto, Hiroshi. [*Acta Schol. Med. Univ. Imp. Kioto*, **25**, 19–44 (1943).]

From studies in rabbits of the analeptic effect of intravenous injection of camphor, cornidine, caffeine, lobeline, atropine, strychnine, picrotoxin, NH_3, EtOH, and adrenaline on morphine and chloral hydrate narcosis, it is concluded that chloral hydrate paralyses the respiratory center, while morphine produces a block action. J. G. YOSHIOKA (Chem. Abstr.).

Toxicity and Hypnotic and Antiepileptic Potency of Acetophenone. Comparative Study of Thienyl Ketones. Quevauviller, Andre (*Fac. pharm., Paris*). [*Ann. pharm. franç.*, **5**, 16–20 (1947) ; *cf. C. A.*, **41**, 3868*e*.]

A comparative study of the pharmacological properties of acetophenone (I), methyl methylthienyl ketone (II), methyl dimethylthienyl ketone (III), and of a mixture of unidentified ketones (IV) (probably ethyl propylthienyl ketones). Toxicity tests gave the following results (doses in gm. per kgm. body weight) : maximum tolerated dose (mice), (I) 0·70, (II) 0·10, (III) 0·10, (IV) 0.20 ; MLD_{100} 1·60, 0·30, 0·40, 0·50 ; MLD^{50} 1·07, 0·23, 0·26, 0·34 respectively. Replacement of the Ph group of (I) by thienyl groupings increases the toxicity, destroys the hypnotic properties, and produces a depressive action on the respiratory center. At 50 per cent. of the MLD_{50} (I) has a definite antiepileptic action, while (II), (III) and (IV) have only a slight action which, at such subtoxic dose, cannot surely be considered as pure anticonvulsive. A. PAPINEAU-COUTURE (Chem. Abstr.).

Studies on the Influence of Active Reaction Media on the Action of Narcotics. Lebedeva, N. Ya (*Stalingrad Med. Inst.*). [*Farmakol. i Toksikol.*, **9**, *No.* 6, 10–12 (1946).]

In search of causes for intensification by acidity and weakening by alkalinity effects of 8 narcotics were tested on isolated frog heart, perfused with Ringer solution buffered with $NaHCO_3$ to 3 pH levels (6·4, 7·0 and 7·8). The tests reveal two groups of narcotics : $CHCl_3$, narcolan, Et_2O, trional and urethan showed no sensitivity to pH. Barbital, phenobarbital and amytal were quite sensitive to pH, reaching maximum activity on the acid side. Thus, phenobarbital (1 : 6,000) decreased cardiac amplitude 83, 46 and 7 per cent. at pH 6·4, 7·0 and 7·8 ; the corresponding figures at 1 : 3,000 were 100, 66 and 19 per cent. Sensitivity to pH, shown by barbiturates but not by other narcotics, is attributed to keto-enol tautomerism. These tests confirm the soundness of alkali therapy in barbiturate poisoning.
JULIAN F. SMITH (Chem. Abstr.).

Jacob's Ladder (*Polemonium caeruleum*) *as a Sedative. Tsofina, G. A.* [*Farmakol. i. Toksikol.*, **9**, *No.* 6, 45–6 (1946).]

Extracts of Jacob's ladder (I) were given to mice in three series : (1) 0·25–0·75 ml. of 4 per cent. extract ; (2) same dose after giving 1 mgm. phenamine (II) in solution, or 0·2 ml. 10 per cent. camphor solution in oil ; (3) 0·75 ml. 4 per cent. extract of (I), and 1 mgm. (II) 60 minutes later. The sedative effect was pronounced in each series, with substantial duration, and intensity of results were variable, but favorable enough to warrant further study. Pharmacodynamic properties and mechanism of action also merit attention. The evidence indicates that effects of (I) are only partly attributable to saponins.
JULIAN F. SMITH (Chem. Abstr.).

Comparative Influence of Analeptics on Some Functions of the Central Nervous System. II. Effects of Analeptics after Bleeding. Arbuzov, S. Ya. [*Farmakol. i Toksikol.*, **9**, *No.* 6, 3–9 (1946) ; *cf. C. A.*, **40**, 6172[2].]

Effects of corazole (I), cardiamine (II), and strychnine (III) on reflex time, respiration, and blood pressure were tested with rabbits before arteriotomy. The action of (I), (II) and (III) was intensified by arteriotomy ; the minimum effective, spasmodic and lethal doses were lessened, while sensitivity of nerve centers to analeptics was sharply increased. To prevent toxic action, especially by ana-

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leptics having spasmodic effects in small doses, a liquid blood substitute should precede the analeptic. The minimum doses (in gm./kgm.) for affecting the latent reflex period before and after arteriotomy were, respectively: (I) 0·005 and 0·0025; (II) 0·01 and 0·005; (III) 0·0001 and 0·0001, given intravenously in each case.

JULIAN F. SMITH (Chem. Abstr.).

Effect of Insulin Hypoglycemia on Brain Glucose, Glycogen, Lactate, and Phosphates. *Olsen, Norman S., and Klein, J. Raymond (Univ. of Illinois, Chicago).* [*Arch. Biochem.*, **13**, 343–7 (1947).]

The intramuscular administration of insulin to paralysed cats (5 units/kgm. body weight) resulted in most instances in a decrease in brain (whole brain frozen with liquid air) lactate, pyruvate, glucose, phosphocreatine, adenosinetriphosphate and acid-labile phosphate, and there was an increase in adenosine-diphosphate. Plasma lactate, pyruvate and glucose decreased. The most marked chemical changes occurred in the brain after the onset of coma. There was no marked relationship between the degree of chemical change in the brain and the duration and change in the electric activity. VERNON L. FRAMPTON (Chem. Abstr.).

The Present Status of Tryparsamide in Syphilotherapy. *Koteen, Herbert (Cornell Univ. Med. Coll., New York, N.Y.).* [*Am. J. Med. Sci.*, **213**, 611–20 (1947).]

A review including consideration of the pharmacology and toxicity of tryparsamide, which is considered a dangerous and inefficient drug.

FERRIN B. MORELAND (Chem. Abstr.).

Pharmacological Studies on Bulbocapnine. I. Extrapyramidal Catatonic Symptomatology in Chronic Experimental Toxicosis from Bulbocapnine. *Ottaviano, Giuliano, and Pappalardo, Piero (Univ. Catania, Sicily).* [*Boll. soc. ital. biol. sper.*, **22**, 1082–3 (1946).]

The daily injection of dogs with 30 mgm. bulbocapnine/kgm. for 40 days did not produce any noxious effects, but its continued use rendered the animals more sensitive to its action.

II. Blood Sugar after a Single Injection and During Prolonged Treatment with Bulbocapnine. [*Ibid.*, 1083–5.]

A single injection of 30 mgm./kgm. body weight in dogs caused a marked increase in blood sugar, which reached a maximum after 30 minutes. Daily injections of the same dose for 40 days caused a greater increase in blood sugar after injection, and increased the basic values after prolonged treatment.

III. Calcium and Potassium of the Blood Serum of Dogs during Prolonged Treatment with Bulbocapnine. [*Ibid.*, 1085–6.]

A single injection of 30 mgm./kgm. caused an increase in Ca and a diminution in K of the blood with maximum and minimum values, respectively 30 minutes after the injection. Determinations were made by the Kramer and Tisdall method (*C. A.*, **16**, 3688) after deproteinization of the serum with 10 per cent. trichloracetic acid. The same dose was injected daily, and tests were made every 10 days, 30 and 90 minutes after the injection. Similar results were obtained.

IV. Behavior of the Reticulo-endothelial System during Prolonged Treatment with Bulbocapnine. [*Ibid.*, 1087–8.]

Single or repeated injection of bulbocapnine had no effect on the function of the reticulo-endothelial system. HELEN LEE GRUEHL (Chem. Abstr.).

Effect of Cocaine on Reflex Activity of the Frog. *Gerebtzoff, M. A. (Univ. Brussels, Belg.).* [*Compt. rend. soc. biol.*, **140**, 791–2 (1946).]

In frogs subcutaneous injection of cocaine or local application to the brain increases reflex activity. The nervous center responsible is located in the diencephalon. L. E. GILSON (Chem. Abstr.).

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Antiadrenolytic Action of Atropine. Danielopolu, D., and Popa, Gr. Gr. (1-ère *Clin. Méd., Bucharest, Rumania*). [*Bull. acad. méd. Roumanie*, **18**, 171–3 (1946).]

By use of a previously reported method (*cf.* preceding abstr.), atropine is shown to have an antiadrenolytic action in addition to its antiacetylcholine action and its antihistaminolytic action. The second of these actions is stronger than the first. MARSHALL E. DEUTSCH (Chem. Abstr.).

Action of Thiamine Applied Directly to the Cerebral Cortex. Dias, M. Vianna (*Inst. Oswaldo Cruz, Rio de Janeiro*). [*Science*, **105**, 211–13 (1947).].

The application of thiamine-HCl solutions to the motor area of craniectomized unanesthetized dogs produced clonic contractions of corresponding muscles. Simultaneous cutaneous stimulation elicited generalized epileptiform convulsions. 2-Methyl-5-ethoxymethyl-6-aminopyridine, 4-methyl-5-β-hydroxy-ethylthiazole. pyridoxine, niacinamide, and ascorbic acid were ineffective.
KARL F. URBACH (Chem. Abstr.).

Influence of Ephedrine on Motor Chronaxia. Sandomirskii, M. I. (*Pavlov Inst. of Evolut. Physiol. and Pathol. of the Higher Nerv. Activity, Koltushi*). [*J. Physiol.* (*U.S.S.R.*), **32**, 511–14 (1946) (*in Russian*).]

Chronaximetric tests were carried out on 12 narcoleptics, 4 neurasthenics, and 6 normal individuals. In 18 of the 24 cases a considerable decrease in rheobase and an 18–66 per cent. shortening of the chronaxia was observed on administration of 50 mgm. ephedrine (I) orally. In 4 cases the administration of (I) led to a 28–45 per cent. increase in chronaxia ; in 3 of these the rheobase was slightly decreased. The shortening of chronaxia coincides with a certain increase of cortical excitability, as evidenced by euphoria following (I) administration. The data indicate that the effect of (I) sets in 15–20 minutes after its administration. The changes in chronaxia lasted 1·5–2·5 hours. H. A. WEGNER (Chem. Abstr.).

Reversal of Pharmacological Action on the Autonomic Nervous System by Doubling the Molecule. Buchel, Leya, Kohler, Denyse, and Levy, Jeanne. [*Compt. rend.*, **224**, 299–301 (1947).]

When injected, 2-p-toloxyethylamine has a vasoconstrictor and hypertensive effect. The double molecule, 2,2′-di-p-toloxy-diethylamine, when injected, has a vasodilating and hypotensive effect. W. M. McC. (Chem. Abstr.).

Action of Calcium Administered Intravenously and into the Cerebral Ventricles. Amiragova, M. G. (*Ihst. Physiol., Acad. Sci., Moscow*). [*Byull. Eksptl. Biol. Med.*, **22**, *No.* 9, 47–50 (1946).]

Intravenous injection of Ca into dogs simultaneously with intraventricular injection causes the same effect as injection into the brain only.
H. A. WEGNER (Chem. Abstr.).

Pharmacological Properties of Iodinated Choline and Brominated Choline. Cullumbine, H., and McDonald, F. F. [*Quart. J. Pharm. Pharmacol.*, **20**, 81–3 (1947).]

The Br compound is 2–5 times as active as the (I) compound. Both compounds behave qualitatively like the other choline compounds, but, on the blood pressure at least, the range between the dose required to produce a muscarine-like effect and that required to produce a nicotine-like effect is small. Pressor doses also depress the respiration. S. W. GOLDSTEIN (Chem. Abstr.).

Effect of Analeptic and other Substances on Paralyzing Action of Myanesin. Berger, F. M. [*Quart. J. Pharm. Pharmacol.*, **20**, 94–9 (1947).]

The effects of adrenaline, amphetamine, atropine, ephedrine, leptazol, niketha-mide, physostigmine, picrotoxin, prostigmine and strychnine on the duration of myanesin paralysis has been investigated in mice. None of the substances had any appreciable effect on the duration of paralysis. The administration of a lethal

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dose of strychnine or leptazol to animals paralysed with myanesin prevented the occurrence of convulsions and deaths in the case of strychnine and of death only in the case of leptazol. The duration of paralysis in rabbits was shortened if strychnine was given intravenously immediately after myanesin was administered. The results of these experiments indicate that myanesin causes paralysis by a mechanism different from that of narcotics, anesthetics, and curare-like agents, and offer further evidence to show that myanesin has a selective depressant action on the spinal cord. S. W. GOLDSTEIN (Chem. Abstr.).

Spinal-fluid Findings in Spinal Anesthesia. Black, M. Gene (*Massachusetts Mem. Hosp., Boston*). [*Anesthesiology*, **8**, 382–9 (1947).].

The spinal fluids of 200 patients were studied to determine the effect of spinal anesthesia. In 75 control cases the spinal fluids were within normal limits. In 60 cases in which the fluid was taken 30 days to 10 years after spinal anesthesia there was, in comparison, a mild increase in protein, chiefly because the interval was less than 3 months in 20 cases. In 40 cases in which the spinal fluid was taken 1–30 days after spinal anesthesia there was a significant rise in protein, tending to indicate that a mild but transient irritation occurs after spinal anesthesia. In 25 cases specimens of spinal fluid obtained before and after continuous spinal anesthesia were examined. Protein variations were negligible, which suggests that the time interval was inadequate for meningeal or tissue irritation to be demonstrated. Spinal-fluid sugar contents in this group presented a marked rise at the end of operation when patients were kept in a horizontal position. This rise may be caused by pooling of the glucose at the site of injection. The Trendelenburg position promotes diffusion; this diffused glucose may promote central-nervous-system metabolism. It is suggested that pontocaine or any similar anesthetic agent used intraspinally may produce transient irritation, the possible exception being the rare individual allergic to the drug. Glucose, when used in conjunction with spinal anesthetic agents and if permitted to diffuse by use of the Trendelenburg position, may be helpful rather than harmful to the tissue of the central nervous system. RUTH BERGGREN (Chem. Abstr.).

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