Part III.—Bibliography and Epitome.*

An attempt is being made to provide as far as possible a complete bibliography compiled from the specialist journals dealing only with Psychiatry and Neurology (which are really inseparable) and their ancillary subjects, psychology, anatomy of the nervous system, criminology, etc.

A number of titles may appear to have a very remote relation to psychiatry, but they are included for the sake of completeness.

If any reader can add the names of journals to the following list, which it is hoped to publish each year in the January number, the addition will be gratefully received and acknowledged.

Those journals which are available in the Library of the Royal Medico-Psychological Association are marked " 1," those available in the Library of the Royal Society of Medicine are marked " 2," those in the Library of the British Psychological Society are marked " 3," and those in the Library of the British Medical Association are marked " 4."

The titles of these journals are mostly in the form given by the Board of Editors of Publications of the American Psychological Association, January, 1939. Contributors are requested to use the exact form given below.

PSYCHIATRIC JOURNALS.

2 *Abh. Neur. Psychiat.*
Abh. Psychother.
2 *Acta Española Neur. y Psiquiat.*
3, 4 *Acta Psychiat. et Neurol.*
3 *Acta Psychol., Hague.*
Acta Psychol., Keijo.
Aliéniste Français.
2 *Allg. Ztschr. f. Psychiat.*
Altersprobleme.
Am. Imago.
2 *Am. J. ment. Def.*
2, 3 *Am. J. Orthopsychiat.*
1, 2, 3, 4 *Am. J. Psychiat.*
2, 3 *Am. J. Psychol.*
An. Bras. Hig. Ment.
An. Istit. Psicol. Univ. B. Aires.
An. Psicotec., Rosario.
Anal. Inst. Neurol. Montevideo.
Analele Psihol. (Rumania).
Anales de psicol, Buenos A.
2, 3 *Année Psychol.*
2, 3 *Ann. Méd. Psychol.*
2 *Ann. Osp. psichiatri., Perugia.*
Appl. Psychol. Monogr.
Arb. Psychiat. Inst., Sendai.
Arch. Anthrop. crim.
2 *Arch. Argent. de Neurol.*
Arch. Argent. Psicol. norm. pat.
2 *Arch. Bras. de Neur. e Psiquiat.*
Arch. Brasil Hig. Ment.
Arch. Chilenos de Crim.
Arch. Ital. di Studi Neuropsich.

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

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1, 2 *Arch. Neurobiol.*
4 *Arch. Neurol., Paris.*
2 *Arch. de Neurol. de Bucarest.*
1 *Arch. de Neurol.*
2 *Arch. di Antropol. Crim.*
Arch. di Crim. Neuropsiquiat. y Disc. Con., Quito.
2, 4 *Arch. f. Psychiat.*
2, 3 *Arch. ges. Psychol.*
Arch. Internat. de Neurol.
Arch. Ital. Psicol.
Arch. Krim. Anthrop.
1, 2, 3, 4 *Arch. Neurol. Psychiat.*
Arch. Neur. Psychiat., Mex.
2, 3 *Arch. Psicol. Neurol. Psichiat. e Psicoter.*
2, 3 *Arch. Psychol. Genève.*
2, 3 *Arch. Psychol., N.Y.*
Arch. Relig. psychol.
Arch. Speech.
Arq. da Assist. a Psicop. de Pernambuco.
Arq. de Neuro-psiquiat., Brasil.
3 *Austr. J. Psychol. Phil.*

Beih. Z. angew. Psychol.
Beih. Zbl. Psychother.
Bol. Inst. Psiquiat., Rosario.
2, 3, 4 *Brain.*
3 *Brit. J. Educ. Psychol.*
2, 4 *Brit. J. Inebriety.*
2, 3, 4 *Brit. J. Med. Psychol.*
2, 3, 4 *Brit. J. Psychol.*
2, 3, 4 *Brit. J. Psychol. Monogr. Suppl.*
Bull. Canad. Psychol. Ass.
2, 4 *Bull. de la Soc. de Psychiat. de Bucarest.*
2 *Bull. de la Soc. Roumaine Neur. Psychiat. Psychol. Endocrin.*
Bull. du Group. Franç. d'étud. de neuro-psychopath. infant.
2 *Bull. Los Angeles Neur. Soc.*
2 *Bull Menninger Clin.*
Bull. Soc. Psihol. med., Sibiu.

4 *Canad. Journ. Occup. Ther.*
2, 3 *Cath. Univ. of Amer. Studies in Psychol. and Psychiat.*
2 *Cervello.*
2, 3, 4 *Character and Per.* (now *J. Personality*).
2 *Child Develpm.*
2 *Child Develpm. Abstr.*
Child Develpm. Monogr.
Child Study.
Chin. J. Psychol.
3 *Comp. Psychol. Monogr.*
2 *Confinia Neurol.*
Contr. del Lab. di Psichol.
Contr. psychol. Theor.
Criança Portuguesa.

2 *Deutsche Ztschr. f. Nervenh.*
2 *Dis. Nerv. Syst.*

3 *Educ. psychol. Measmt.*
1, 2, 3, 4 *L'Encéphale.*
2 *Epilepsia.*
Evolut. Psychiat.

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Fiziol. Th. S.S.S.R.
2 *Folia Neuropath. Esthon.*
2 *Folia Psychiat. et Neurol. Jap.*
2 *Fortsch. Neur. Psychiat.*

3 *Genet. Psychol. Monogr.*
Giorn. di Psich. e di Neuropat.

4 *Hum. Factor.*
2, 3, 4 *Hyg. Ment.*

Illinois Psychiat. J.
2 *Index Neurol. y Psiquiat., Buenos Aires.*
3 *Indian J. Psychol.*
Indiv. Psychol. Bull.
3 *Industr. Psychol.*
3 *Industr. Psychotech.*
1, 2, 3, 4 *Int. J. Psychoanal.*
2, 3 *Int. Z. Psychoanal. u. Imago.*
Jap. J. appl. Psychol.
Jap. J. Exp. Psychol.
Jap. J. Psychol.
1, 2, 3 *J. Abnorm. Soc. Psychol.*
J. Am. Soc. Psychic. Res.
3 *J. App. Psychol.*
2, 4 *J. Belge Neur. Psychiat.*
2 *J. Comp. Neur.*
1, 2, 3 *J. Comp. Psychol.*
J. Consult. Psychol.
J. Crim. Law and Criminol.
2 *J. Crim. Psychopathol.*
2 *J. de Psychiat. Infant.*
3 *J. Educ. Psychol.*
J. Except. Child.
3, 4 *J. Exp. Psychol.*
2 *J. f. Psychol. u. Neurol.*
3 *J. Gen. Psychol.*
2, 3 *J. Genet. Psychol.*
J. Juvenile Res.
1, 2, 3, 4 *J. Ment. Sci.*
1, 2, 3 *J. Nerv. Ment. Dis.*
1, 2, 3, 4 *J. Neurol. Neurosurg. Psychiat., London.*
J. Neuropath. and Psychiat., Leningrad.
1, 2 *J. Neuropath. Ex. Path.*
2, 4 *J. Neurophysiol.*
J. Neuropsychiat. du Pacifique.
2 *J. Neurosurg.*
3 *J. Parapsychol.*
J. Personal.
J. of Psychic. Res.
J. Psihoteh.
2 *J. Psycho-Asthen.*
2, 3 *J. Psychol.*
J. Psychol., Moscou.
2, 3 *J. Psychol. Neurol., Leipzig.*
2 *J. Psychol. Norm. Path.*
J. Soc. for Psychic. Res.
3 *J. Soc. Psychol.*
J. Speech Dis.

Kriminal.
3 *Kwart. Psychol.*

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Mag. psychol. Szle.
2 *Ment. Health.*
Ment. Health Obs.
2, 4 *Ment. Hyg., Lond.*
2 *Ment. Hyg., N.Y.*
Ment. Hyg. Rev.
Ment. Hyg. Bull., Indiana.
3 *Mind.*
Mschr. Krim. Biol.
2 *Mschr. Psychiat. Neurol.*

Ned. Tijdschr. Psychol.
2 *Neopischiat.*
2 *Nervenarzt.*
3 *Neue psychol. Stud.*
Neurbiol., Pernambuco.
Nevrasse.
2 *Nevropath. i. Psikhiat.*
2 *Note e Riv. di Psichiat.*
Now. Psychjar.
Nuova Riv. di Clin. ed Assist. Psichiat.

Obshch. Klin. Nevropat.
2, 3 *Occup. Psychol.*
2 *Occup. Ther. and Rehabil.*
2 *Onder. Psychiat-Neur. Klin., Utrecht.*
2 *Osped. Psichiat.*

3 *Person. J.*
Pisani.
Polsk. Arch. Psychol.
Prace Psychol.
2 *Proc. Amer. Assoc. Stud. Ment. Def.*
2 *Proc. A. Res. Nerv. and Ment. Dis.*
3 *Proc. Soc. Psych. Res. London.*
3 *Psichotec.*
Psicoanal., Rome.
Psicoter. Cordoba.
Psyche, Cambs., Mass.
Psychiat. Monogr.
2 *Psychiat. en Neurol. Bl., Utrecht.*
2 *Psychiat. et Neurol. Jap.*
2 *Psychiat. Neurol. Wchnschr.*
2 *Psychiat.*
1, 2, 4 *Psychiat. Quart.*
2, 3 *Psychoanal. Quart.*
1, 2, 3 *Psychoanal. Rev.*
2, 3 *Psychol. Abstr.*
2, 3 *Psychol. Bull.*
Psychol. Clin.
Psychol. Exch.
3 *Psychol. Forsch.*
Psychol. Index.
2 *Psychol. Monogr.*
Psychol. Rec.
3, 4 *Psychol. Rev.*
3 *Psychol. Rev. Monogr.*
Psychol. Stud. Univ. Bp.
Psychol. wychow.
3 *Psychomet.*
Psychometr. Monogr.
2 *Psychosom. Med.*
2 *Psychosom. Med. Monogr.*

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Quart. J. Speech.
2 *Quart. J. Stud. Alc.*
Quart. Rev. Psychiat. Neur., Washington.

Rass. Neurol. Veget.
Rass. Studi Psichiat.
Rev. Argent. Neurol. Psiquiat.
Rev. de Psicoanal., Argentina.
Rev. di Neur. e Psychiat., S. Paolo.
Rev. di Psiquiat., Chile.
Rev. di Psiquiat. y Crim.
Rev. Espan. de Oto-neuro-oftam. y Neurocir.
3 *Rev. Franç. Psychoanal.*
Rev. Ibero-Amer. de Anal. Biblio. de Neurol. y Psiquiat.
Rev. Mex. Neurol. Psiquiat.
1, 2, 4 *Rev. Neurol.*
2 *Rev. Neurol. de Buenos-Aires.*
Rev. Neurol. Psychiat., Praha.
2 *Rev. Neuro-psiquiatr., Lima.*
2 *Rev. Oto-Neur.-Oftal. Cir. Neur. Sud-Am.*
Rev. Neuropsiquiatr.
Rev. Psicol. Pädag.
3 *Rev. Psihol.*
2 *Rev. Psiquiat. Crim., B. Aires.*
Rev. Psiquiat., Uruguay.
Rev. Psiquiat. y Disc. Con., Chile.
Rev. Sudam. Psicol. Pedag.
Rev. Tchèque de Neurol. et de Psychiat.
Ric. Psich.
2, 3, 4 *Riv. di Neurol.*
Riv. di Neuro-psiquiat., Peru.
3 *Riv. di Psichol.*
Riv. Ital. di Endocrin. e Neurochir.
2 *Riv. Patol. nerv. ment.*
Riv. Psichol. Norm. Pat.
2, 4 *Riv. Sper. Freniat.*
1 *Rocz. Psychjat.*
2 *Rorschach Res. Exch.*

1 *Schizofrenie.*
2 *Schweiz. Arch. Neurol. Psychiat.*
Skand. Arch. Psychol.
Sovet. nervropatol., psichiatri, psichoguoguia.
Sovet. Psichoneurol.
Sovet. Psikhotekh.
Speech Monogr.

Tohoku Psychol. Folia.
2 *Tr. Am. Neurol. A.*
Tr. Beritov Inst., Tiflis.
Tr. Kostchenko Ment. Hosp., Moscow.
2 *Trud. fiziol. Lab. Pavlova.*
Trud. tsentral. psikhonevrol. Inst.

Univ. Calif. Publ. Psychol.
Univ. Iowa Stud. Psychol.
Untersuch. Psychol. Phil.

3 *Z. angew. Psychol.*
Z. Arb. Psychol.
Z. Berufs. des Pflegepers.
Z. Individ. Psychol.

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2, 4 *Z. ges. Neurol. Psychiat.*
3 *Z. Pädag. Psychol.*
Z. Parapsychol.
2 *Z. Psych. Hyg.*
Z. Psychoanalyse, Tokyo.
3 *Z. psychoanal. pädag.*
2, 3 *Z. Psychol.*
Z. Psychother. med. Psychol.
Z. Tierspsychol.
2 *Zbl. Neurochir.*
1, 2 *Zbl. ges. Neurol. Psychiat.*
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Prefrontal Lobotomy. The Problem of Schizophrenia.

1. Prefrontal lobotomy is less successful in schizophrenics than in certain types of patients who have preserved better contact with reality. Nevertheless, the operation offers definite hope for those who are still fighting their disease.

2. While many chronic patients cannot be discharged from hospitals, their care is greatly simplified because of their new objective outlook on life and pleasure in living.

3. Prefrontal lobotomy bleaches the affect attached to the ego, and turns the patient's interest away from himself toward the outside world.

4. Prefrontal lobotomy is the procedure of last resort. This does not mean, however, that it should be delayed until emotional deterioration is well advanced.

(Authors' abstr.)

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Prefrontal Lobotomy : Fifteen Patients Before and After Operation.

The 15 cases reported range in age from 16 to 62, and presented a wide variety of symptoms, from apparent psychotic deterioration to a chronic but non-psychotic tension state. These patients were all considered to have a hopeless prognosis, and most of them had been in hospital for many years, one continuously for 18 years. All but 4 had received one or more forms of shock treatment.

The first lobotomy operation of the series was performed April 1, 1942, the last on January 28, 1944 ; hence the report cannot deal with end-results. However, the first patient is gainfully employed for the first time in his life, but has had a convulsive seizure ; 5 of the others are with their families, comfortable and socially acceptable, one of them doing regular housework. One patient is attending a special school. The rest are still in hospital, but one of them has freedom of the grounds, not possible before, and makes day-visits away from the hospital. None of the 15, so far, was made worse, and all showed some degree of improvement. Two aged patients, not included in this series, died of post-operative hypostatic pneumonia.

Each patient's history is presented as a graph representing onset of illness, the time of hospital residence, and the patient's status in the categories of mental comfort, social acceptability, and capacity for work, before and after lobotomy.

The technique of the operation, its dangers, and the anatomical considerations involved are briefly discussed.

It is suggested that anxiety may be an important common factor in a wide variety of syndromes, allayed by lobotomy ; and that the operation may intervene to modify the physical basis for a pathogenic degree of " cerebrotonia."

In some cases, edema and/or tenderness and blister formation appeared during the month following lobotomy, and is thought to be a trophic disturbance of central origin.

There has also been transient diuresis with low specific gravity, in connection with prolonged or periodic enuresis. (Authors' abstr.)

Spontaneous Convulsions following Convulsive Shock Therapy.

1. Of over 500 patients who received electric convulsive therapy, 2 exhibited spontaneous generalized convulsions 6½ to 8 weeks after termination of treatment. These 2 patients had never had seizures prior to treatment, nor were there any epileptic manifestations in any of the family members.

2. Pre-treatment EEGs are reported for the first time in patients exhibiting spontaneous convulsions subsequent to therapy. In both instances the brain-wave tracings were abnormal prior to shock.

3. It is concluded that spontaneous convulsions following convulsive therapy are prone to occur only in those patients who have latent convulsive tendencies as revealed by the EEG.

4. The suggestion is made that pre-shock EEGs are particularly indicated in patients who give histories of previous convulsions in childhood or later life, or who have family members exhibiting epileptic manifestations. (Authors' abstr.)

The Conditioned Aversion Treatment in Chronic Alcoholism.

Since the introduction of the aversion treatment 15 months ago at this hospital, 15 per cent. of an unselected group of patients have remained abstinent for a period of 5 to 15 months. An abstinence rate of 55 per cent., however, was obtained in a selected group of patients with a commendable sociological background. A period of at least three months' sobriety was obtained in 52 per cent. of all patients treated. The aversion treatment is regarded not as a therapy in itself, but merely as a valuable method to interrupt the alcoholic cycle for a conjectural period of time, which should be utilized for intensive psychotherapy. (Authors' abst.)

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Development of Statistics of Mental Disease in the U.S. During the Past Century. *Pollock, H. M.* 1

Effects of Psychological Deprivation in Infancy and Subsequent Stimulation. *Goldfarb, W.* 18

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Clinical and Electroencephalographic Studies of Changes of Cerebral Function Associated with Variations in the Blood Sugar.

1. The reaction of the EEG to hyperventilation is discussed with relation to blood-sugar levels, to age and to diagnosis. A group of psychoneurotics is described showing an unusual lability of the EEG to hyperventilation in the presence of normal blood-sugar values.

2. The relationship between the presence of nervous complaints in the early morning and the development of delta activity on hyperventilation in the fasting state was studied. Delta activity develops more frequently in subjects having such complaints than in subjects without them.

3. Patients developing delta activity on hyperventilation in the fasting state feel, in a larger percentage, better at later hours than patients without delta activity.

4. Two cases of spontaneous hypoglycemia with electro-encephalographic studies are reported. (Authors' abstr.)

Factors Affecting the Electroencephalogram of Patients with Neurosyphilis.

Fifty per cent. of 233 cases of neurosyphilis had abnormal EEGs. The incidence of abnormality in the various clinical types of neurosyphilis was as follows: Meningo-vascular lues 60 per cent., general paresis 55 per cent., optic nerve atrophy 44 per cent., tabes 14 per cent. In a control group the incidence of abnormality was 10 per cent. Tabes, therefore, did not have a significantly greater incidence of abnormal EEGs than controls; on the other hand, the incidence of abnormality in optic atrophy, general paresis and meningo-vascular lues was significantly greater than in control subjects.

Twenty per cent. of the total cases with neurosyphilis had positive histories of seizures as compared to an incidence less than 1 per cent. in the general population. The meningo-vascular type of neurosyphilis had the highest incidence of seizure histories and a large proportion were of the Jacksonian variety. The next highest incidence of seizures occurred in cases of general paresis, and they were mostly of the *grand mal* and "atypical" variety. No cases with a history of seizures occurred in the groups diagnosed tabes dorsalis or optic nerve atrophy.

A very high incidence of abnormal EEGs (90 per cent.) occurred in the cases with a history of seizures. The more abnormal the EEG in any given case of neurosyphilis, the greater the likelihood that the patient had a history of seizures. The paroxysmal type of EEG abnormality was the most specific for the seizure disorders.

In a group of cases of general paresis a number of clinical and laboratory findings were correlated with the incidence of EEG abnormality with the following results: The incidence of EEG abnormality was highest in patients with a history of seizures. The presence of tremors, dysarthria, abnormal reflexes or an "organic" mental picture also raised the incidence of EEG abnormality, but not as high as did the presence of a history of seizures. A slightly positive correlation was obtained

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between numbers of white blood cells, amount of total protein, severity of colloidal gold reaction in the cerebro-spinal fluid and incidence of EEG abnormality. No correlation was obtained between EEG abnormality and abnormal pupils, or between EEG abnormality and presence of delusions or hallucinations as a primary part of the mental picture.

A study of all cases in relation to age revealed that the largest number of cases of neurosyphilis were in the 40–50 year age-group. The incidence of epilepsy and of abnormal EEGs was lowest in this age-group. There was a rise in the incidence of fast activity with age and a fall in the incidence of slow activity with age. This trend in cases of neurosyphilis parallels the trend previously observed in control subjects and in neuropsychiatric patients. (Authors' abstr.)

The Electroencephalographic and Clinical Effects of Electrically Induced Convulsions in the Treatment of Mental Disorders.

The relationships between different variables incident to the program of electric shock treatment and electroencephalographic and clinical effects have been qualitatively and quantitatively worked out for 54 patients receiving such treatment for different types of mental disorders.

Different types and degrees of post-shock electroencephalographic changes are noted. In general, the degree of electroencephalographic changes varies as the number of shocks administered and inversely as the interval in days between the last shock and the post-shock EEG. There are, however, definite individual differences in shock threshold and subsidence time in regard to the degree of post-shock electroencephalographic changes, and also individual differences in regard to emphasis on some types of post-shock electroencephalographic changes rather than on others, indicating a differential cortical response to shock.

Fifty per cent. of the cases had normal, and 50 per cent. borderline-abnormal pre-shock EEGs. Some having borderline-abnormal EEGs show a marked degree of post-shock electroencephalographic changes, but the difference between the two groups—the normal and the borderline-abnormal—is not proved significant in this respect. However, those who show some epileptoid features in their pre-shock EEG tend to exhibit rare or occasional larval spike-and-wave pattern following shock more than the normal group. A definite electroencephalographic similarity between the epileptic and shocked brain is noted.

There is some tendency for the psychoneurosis with obsessive-compulsive features and depression to be more in the borderline-abnormal pre-shock EEG group than schizophrenia with depression or psychoneurosis with depression.

Following a simple system of weighting degrees of improvement, lack of improvement and relapse, and calculating the index of efficiency of treatment, and then the percentage of efficiency of treatment as compared with recovery, it is found that the percentage of efficiency of the electric shock treatment for the group as a whole at the time of discharge is 49 per cent., which indicates a definite improvement over the pre-shock status. A control group of 64 patients receiving no electric shock has demonstrated only 30·5 per cent. efficiency of the treatment they received. The difference between the results of these two types of treatment is statistically significant. Seventy-six per cent. of the patients who received electric shock and who could be followed up between four months and one year following discharge have retained or bettered their improvement status. It is believed that psychotherapy played an important role in the maintenance of the improvement, though not predominantly in its initiation. There is a statistical indication that patients having psychoneurosis with obsessive-compulsive and depressive features and the highest pre-shock abnormal and borderline EEGs profit by such treatment more as a group than schizophrenia without depression. There is a suggestion that patients with pre-shock borderline-abnormal EEGs profit more as a group by shock treatment than those with normal EEGs.

No significant relationship has been discovered between the number of shocks administered and the percentage of efficiency of treatment.

The necessity for working out intimate relationships between different variables in electric shock treatment for a *larger* number of patients is indicated to help in the proper selection of cases for treatment and the prediction of its success. The treatment of data as utilized in this study would greatly facilitate the comparison of results from different clinics. (Authors' abstr.)

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Spontaneous and Induced Epileptiform Attacks in Dogs in Relation to Fluid Balance and Kidney Function.

1. The so-called epilepsy which occurs spontaneously in dogs follows a distinct and plainly recognizable pattern. Various predisposing and exciting causes are discussed.

2. The water intoxication discovered by Rowntree is characterized by precisely the same pattern of convulsions. It is readily distinguished from other forms of convulsions, such as occur in rabies, uremia or strychnine poisoning.

3. Dogs with spontaneous "epilepsy" are invariably subject to convulsions with administration of smaller quantities of water than normal dogs. Certain other dogs, which remain free from spontaneous attacks during many months of observation, exhibit a similar subnormal tolerance of water, which may possibly represent a latent or sub-threshold stage of "epilepsy." These animals are free from obvious renal abnormalities, and with water administration they pass large volumes of pale urine, so that the sensitiveness is not due to urinary suppression such as Rowntree produced with pituitary extract.

4. Chronic susceptibility to water intoxication and also to spontaneous epileptiform seizures can apparently be produced by suitable kidney resections together with repeated overdosage with water. It is still not certain whether this result can be obtained in all dogs, or whether some undetectable individual predisposition plays a part. Although water elimination is known to be retarded after sufficient reductions of kidney tissue, the abundant polyuria in water tests seems to rule out this superficial explanation of the convulsions. The occult character of the relation with water balance or tissue hydration seems comparable with that in human epilepsy.

5. The name of epilepsy, applied by veterinarians to the canine disorder, seems justified by a number of features, including the ability to elicit seizures by water administration on the same basis as used by some writers for the diagnosis of latent epilepsy in patients. Attention is called particularly to the neglected opportunities for experimental study of the disease in dogs.

6. The apparent success in producing chronic idiopathic epilepsy for the first time experimentally is sufficiently important to deserve confirmation with a sufficient number of animals to test the influence of individual or accidental factors.

(Author's abstr.)

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Experimental Studies on Headache.

After several hours of migraine headache changes in cranial arteries appeared. A distended temporal artery, for example, seems more prominent. It becomes more easily palpable through the skin, and, instead of being readily collapsible, is rigid and pipelike and is less easily compressed by the palpating finger. The nature of these alterations was studied by experimental induction of analogous changes in cats.

The structure of the arteries of the ears of 6 cats was studied after infusion for two hours of 10 c.c. of mammalian Ringer solution containing 0·5 mgm. of acetylcholine bromide per hundred cubic centimeters. Measurements demonstrated thickening of the arterial walls of the infused ears. Also, a vasoconstrictor agent, ergotamine tartrate, was observed to be less prompt and effective in constricting arteries with thickened walls than arteries with normal walls.

It is suggested that during attacks of migraine headache the cranial arteries involved may undergo similar changes after prolonged vasodilatation. Such changes may explain the rigid, pipelike texture of the arteries, the steady aching pain and

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the tenderness of these structures when headache has persisted for many hours. Also, these changes may explain the decreased ability of ergotamine tartrate to reduce promptly the intensity of prolonged headache. (Authors' abstr.)

Cerebral Injury by Blunt Mechanical Trauma.

Rats submitted to repeated blunt impacts on the head, the strength of each of which alone was not sufficient to harm the animal (subconcussive trauma), began to reveal ill-effects after a certain number of blows, as shown by unconsciousness, with or without recovery, at times by other, persisting functional disorders and later even by death. When the repeated subconcussive blows were delivered in a short period—one impact after another, one minute apart—there was a somewhat higher incidence of ill effects than when the trauma was delivered at longer intervals from two to six days apart. No remarkable differences were noticed in the effects when, with a trauma of the same strength, the head in rapidly accelerated motion was made to strike a stationary object, and when a moving object was made to strike the fixed head of the animal. In the great majority of animals there was a certain correspondence between the response to the repeated trauma during life and the amount and extent of cerebral damage. Among the post-mortem changes, hemorrhage or any other type of change detectable on gross inspection was extremely rare. On the contrary, widespread evidence of neuronal injury, affecting in a disseminated fashion both nerve cells and nerve fibers, accompanied with loss of myelin and, in the later stages, with glial proliferation, was a consistent microscopic observation.

A neuronal injury identical in type was found in collateral experiments in animals recovering from a temporary period of unconsciousness following a single blow on the head which had left the skull and brain grossly intact. Microscopic evidence of neuronal damage was noticed in these animals as early as one to two hours after the trauma, and in a few instances the lesions were seen to persist as late as two months after the trauma. These observations suggest that concussion may be due to neuronal injury detectable with the present histologic methods. With the production of concussion by a single blow, no pronounced differences were noted in the effects when the impact was delivered on the stationary head and when it was delivered on the head in rapidly accelerated motion, with a trauma of the same momentum. (Author's abstr.)

Studies of the Sensation of Vibration. III. Evidence for Cortical Areas in Inhibition and Mediation of Tickle.

Two operations were performed on the right cerebral hemisphere of a patient. After the first operation a vibrating pointer placed against various parts of the body elicited an intense perception of tickle. The hyperesthesia showed no topographic localization and was bilateral, although it was more pronounced when the contralateral side of the body was stimulated. After the second operation the response of tickle to a vibrating stimulus disappeared. In normal subjects and in two subjects with lesions of the right frontal lobe a vibrating stimulus applied against the skin seldom produced a sensation of tickle.

These results indicate that in the mediation of tickle two centers are involved. One center is primarily involved in the mediation of tickle, and the other inhibits the tickle center. According to this conception, the inhibitory center was destroyed after the first operation, producing the release phenomenon, and the tickle center was destroyed after the second operation, eliminating the abnormal tickle response. A mechanism similar to the one described here has been found for the motor responses. The inhibitory center for tickle appears to be located in the inferior and posterior portions of the frontal lobe, and the tickle center probably in the inferior part of the parietal lobe. (Authors' abstr.)

Effect of Sodium Amytal and Amphetamine Sulfate on Mental Set in Schizophrenia.

The present experiment was performed in an attempt to quantify the improvement in attention (mental set) observed clinically in schizophrenic patients who have received intravenous injections of sodium amytal. The auditory reaction time was obtained under two types of conditions. In one condition the regular

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procedure, the length of the preparatory interval, i.e., the time between a visual warning signal and the auditory reaction stimulus, was constant for all the reactions to that interval. In the second condition, the irregular procedure, the length of the preparatory interval varied haphazardly. Five preparatory intervals were used: 2, 3½, 5, 10 and 20 seconds. Nine schizophrenic patients and 9 normal persons served as subjects. Each subject was tested with and without intravenous administration of 250 mgm. of sodium amytal and 10 mgm. of amphetamine sulfate.

Our results confirm the work of earlier investigations in which no drugs were used. The reaction time of the patient group was significantly longer than that of the control subjects in both procedures. The control group reacted more quickly in the regular procedure than in the irregular procedure for all preparatory intervals. The patient group failed to react more quickly in the regular procedure after the five-second preparatory interval. With medication the normal group continued to react more quickly in the regular procedure than in the irregular procedure for all preparatory intervals. The patient group, with medication, had reaction times which were significantly longer in both procedures than those of the control group. However, in contrast to their behaviour without medication, they now reacted more quickly in the regular procedure than in the irregular procedure for every preparatory interval.

It is concluded from these results, first, that the schizophrenic patients as a group suffer from inability to attain as high a level of mental set as do normal subjects, and that they do not maintain the level of preparation they attain as long as controls. Second, the reaction time technic may be used to measure one aspect of the improvement seen clinically (improvement in attention) in schizophrenic patients when sodium amytal is injected intravenously. Third, the improvement is such as to produce a normal relationship between the reaction times of the regular and those of the irregular procedure. (Authors' abstr.)

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Disturbances in Sleep Mechanism.

In 9 cases pathologic sleep was associated with lesions in the cortex. In none was there invasion of the hypothalamus. In 2 cases compression of the hypothalamus could not be completely ruled out. On microscopic examination, however, there was no evidence of changes in the nerve cells.

Increased intracranial pressure was present in only 4 of the 9 cases. It is reasonable to assume that the role played by increased intracranial tension in dysfunction of sleep is negligible, if not totally insignificant. Ocular and endocrine

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disturbances, except for diplopia in one case and endocrine features in another, were absent in this group of cases.

From the study of this series of cortical lesions, we are of the opinion that some fibers for the control of sleep originate in the cerebral cortex, especially the hippocampal, cingular, frontal, premotor and temporal convolutions. These areas are connected with the hypothalamus by means of the corticohypothalamic pathways. Injury to these areas or to their connections with the hypothalamus is occasionally the cause of pathologic sleep. (Authors' abstr.)

Electroencephalographic Findings in Cases of Bromide Intoxication.

A study of the electroencephalograms of patients with bromide intoxication reveals the following characteristics:

The incidence of electroencephalographic abnormality is high during the intoxicated state.

A progressive clearing of the patient's sensorium parallels electroencephalographic changes toward normal.

There exists a definite relationship of the blood bromide level, the electroencephalogram and the clinical picture. At high blood bromide levels (over 200 mgm. per 100 c.c.) the electroencephalogram tends to show diffuse slow activity, and the patient as a rule is confused and dysarthric. Thus far, no diffusely slow activity has been found in the absence of dysarthria. As the bromide level falls, the electroencephalograms of a number of patients show a phase of mixed slow and fast activity, and at low levels of bromide concentration the electroencephalogram shows essentially normal or mildly fast rhythms.

The electroencephalogram shows changes over a remarkable range in both frequency and voltage. High voltage activity as slow as 2 cycles per second is occasionally encountered in some of the confused patients with high blood bromide levels. Activity in the 5 to 8 cycles per second slow range is most frequent, however. On the fast side of the frequency spectrum, the activity is of medium or low voltage and is generally in the range of 12 to 25 cycles per second.

A striking phenomenon is the pronounced individual differences in the electroencephalogram and the clinical picture at the same blood bromide level.

(Authors' abstr.)

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Man's Frontal Lobes: A Critical Review.

A patient with bilateral frontal extirpation was observed to have made a good social and economic adjustment six years after operation.

It is concluded that though this patient may show some defect in planning

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for the distant future, the defect is not clearly demonstrated or shown to be due to the cerebral destruction. There is no defect of foresight for the immediate future, as shown by tactless remarks or inappropriate social behavior.

An analysis of methodologic difficulties in getting adequate anatomic, pathologic and normal control data suggests that these problems have not been sufficiently appreciated, and have led to error in the interpretation of symptoms referable to the frontal lobes.

A review of published case-reports of removal of the frontal lobe indicates that no one has as yet shown that defects follow a simple loss of tissue from man's frontal lobes; the loss must, presumably, have some effect, but it is hard to demonstrate, and its nature is not yet clear.

The implications of the evidence for surgical treatment, particularly of traumatic injury, are that social and intellectual defects need not follow an uncomplicated bilateral excision of tissue from the anterior part of the frontal lobes.

(Author's abstr.)

AUGUST.

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Progressive Facial Hemiatrophy.

In cases of facial hemiatrophy, the hair of the skull and of the face is affected frequently and at an early stage. This involvement may take the form of a circumscribed alopecia or of blanching of the hair, and may precede other symptoms.

The dermatologic manifestations of hemiatrophy usually start in the paramedian area of the face. This area is a vertical streak of about 1 or 2 finger-breadths running parallel and lateral to the midline.

The existence of a disease called abortive progressive facial hemiatrophy is assumed. Its minimal atrophic changes are located in the paramedian area and become stationary for years.

So-called *sclerodermie en coup de sabre* is apparently nothing but such an abortive progressive facial hemiatrophy.

Not only hemiatrophic and sclerodermatous manifestations, but often congenital malformations of the skin, are located in the paramedian area.

The paramedian area corresponds to the vertical line of the body at which the bilateral trophic influence of the brain centers ceases and the unilateral influence begins.

The brain, especially on the affected side, often shows involvement. Contralateral epilepsy is the most conspicuous symptom of such involvement.

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The fundamental manifestation of hemiatrophy is the atrophy of the fat and subcutaneous tissues.

The hemiatrophic changes may extend in various degrees from the area of the face to the homolateral parts of the body.

A patient with hemiatrophy may show, on the homolateral side of the body, abortive or latent symptoms of an atrophic process.

The pathologic process which leads directly to hemiatrophy is regarded as an active one, and is due to a state of irritation in the peripheral trophic sympathetic nervous system.

In the areas of hemiatrophy, phenomena of irritation of the sympathetic, the cranial and the spinal nerves are often found. They may be explained by an irritation transmitted from the sympathetic trophic system to other systems.

Inflammatory processes are often found in the areas of hemiatrophy. They have a predilection for localization in the hemiatrophic area because the sympathetic innervation there is disturbed.

The concomitant involvement of the brain homolaterally which leads to epilepsy may be explained by disturbance of the cervical sympathetic system, which innervates the vessels of the brain. This disturbance creates a locus minoris resistentiae for toxic or infective processes.

Thus, hemiatrophy is not due to a primary inflammatory process in the peripheral sympathetic nervous system. The primary process is elsewhere, but it indirectly weakens the resistance of the affected tissues to toxi-infections.

The irritation in the peripheral sympathetic nervous system that causes hemiatrophy is a release phenomenon. It is due to disturbance of the higher centers, which leads to increased and unregulated activity of the lower centers. This phenomenon is analogous to that seen with lesions of the higher centers of the pyramidal and extrapyramidal motor systems.

The etiologic process in hemiatrophy may be encephalitis. Usually it is a heredodegeneration.

As heredodegeneration, hemiatrophy may be compared to torticollis, narcolepsy, paralysis agitans and similar diseases.

The exogenous factors that have been incriminated as causes of hemiatrophy are inadequate to explain the disease. The course of the disease is one typical of a heredodegeneration. (Author's abstr.)

Emotions and Adrenergic and Cholinergic Changes in the Blood.

The experiments presented here demonstrate that during some specific emotions the blood contains factors that can produce effects on the isolated duodenum of the rabbit similar to those of epinephrine and acetylcholine. The physical condition of all the persons studied was good Menstruation did not seem to influence the reactions.

The results of such experiments are frequently difficult to analyze because one may not be dealing with merely the one emotion which dominates the psychologic and psychopathologic picture. Emotions which are not obvious may have to be considered. Anxiety, resentment and anger are accompanied with definite adrenergic factors; tension, and possibly fear, with cholinergic factors. The blood of one patient in a depressed state with no other emotions detectable had an entirely negative effect during one observation. In other studies of depressed states and in all observations on elated states, anxiety, tension or fear was present, with corresponding adrenergic and cholinergic effects. There does not seem to be an essential difference between normal and psychopathologic emotions except in the intensity of the adrenergic and cholinergic response. The intensity of the response depends on the intensity of the emotion, and probably on individual physiologic capacity to respond. (Authors' abstr.)

The Central Nervous System in Uremia: A Clinico-pathologic Study.

1. Uremia, although usually treated by the internist, occasionally results in symptoms that may cover the entire field of neuropsychiatric symptomatology.

2. The most common symptoms referable to the nervous system are convulsions and coma, but in isolated cases unusual syndromes, such as monoplegias, hemiplegias, aphasias and apraxias, or even mental symptoms of almost every type, may be present.

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3. The central nervous system in cases of uremia reveals widespread tissue changes involving both the nerve cells and the parenchymal elements. In the acute illness the predominant alteration occurs within the cortical neurons, which reveal an acute change in the nerve cells. In the more chronic illness the most striking changes are parenchymal rather than neuronal, and consist of focal and perivascular areas of demyelination and necrosis. The neurons show both acute and chronic changes in the more chronic illness. (Authors' abstr.)

Electroencephalogram of Dogs with Experimental Space-occupying Intracranial Lesions.

High voltage slow (delta) waves were seen characteristically in the electroencephalogram of dogs with subcortical, space-occupying lesions. Such changes at their height resembled the electroencephalographic alteration seen in some cases of intracerebral, space-occupying lesions in man.

Disappearance of normal rapid activity and flattening of the electroencephalogram were seen with subdural and extradural space-occupying lesions in the dog.

Minor shifts in electrode placement can greatly alter the amount of abnormality seen in the electroencephalogram in cases of focal damage to the brain.

The electrocorticogram is a more sensitive record of abnormal brain potentials than is the electroencephalogram obtained by leading from the skull in dogs.

The electroencephalographic alterations caused by space-occupying lesions are of a reversible nature if the lesion is of fixed dimensions.

The electroencephalogram of the unanesthetized waking dog is in part of cortical origin. Brain potentials seen in sleep and during pentobarbital anesthesia may be controlled by subcortical mechanisms. (Author's abstr.)

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*Peculiarities of the Cortical Processes and of Functional Organization of the Great Hemispheres. *Kupalov, P. S.* 14

The Functional Structure of the Cortex of the Great Hemispheres.

Data recently obtained in the laboratory again bring up the question of cortical representation of the food center. The present investigation utilizes a sugar

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solution which is poured into the mouth of the animal, thus removing the presence of natural conditioned stimuli. At the pouring of the 20–40 per cent. sugar solution, the majority of the animals give a small secretion. The greatest secretion occurs at the first pouring; then it sharply decreases, and towards the end of the experiment can approach zero. When conditioned stimuli are applied, the secretion increases. When it approaches a significant quantity, there appears a conditioned secretion. This increase of secretion on application of the sugar solution is explained by positing a gradually increasing excitability of those nerve elements which respond on the pouring of sugar. The question arises as to whether this occurs in the cortex or the subcortex. On the basis of facts presented in the article, the author states that we have a right to speak of a cortical food center, and that we have material characterizing its activity.

P. WORCHEL (Psychol. Abstr.).

Peculiarities of the Cortical Processes and of Functional Organization of the Great Hemispheres.

The author refers to Pavlov's contention that the adjectives "higher nervous" correspond to the adjective "psychical," and presents experimental data for the discussion of the following question: Speaking of cortical processes, do we mean psychic processes? Dolin secured conditioned convulsions by combining a sound stimulus with the introduction of camphor. Kupalov states that on the basis of his and Bykov's work, the cortex not only plays the role of an impulse initiator, selecting responses, but also takes part in the response. For some time experiments have been proceeding on subjecting the thoracic region of the spinal cord of a frog to radium emanations. In one series of experiments, the nerve supplying one side of the frog from the thoracic region of the spinal cord was cut. The muscles in the intact region, after the above radium emanations were applied, lost their striated appearance and were destroyed. The muscles whose nerve connections were severed were still functional and retained their striated cell structure. After a discussion of the data, the author states that the functional physiological organization of the great hemisphere is both an organization at rest and an organization in activity; in other words, the physiological rest is active. Then conditioned inhibition was formed on the introduction of morphine. Kupalov is convinced that the cortex is able to change its organization and to fixate any new complex, even pathological integration.

P. WORCHEL (Psychol. Abstr.).

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Changes in the Nervous System in Acute Porphyria.

Two cases of acute "idiopathic" porphyria are presented. In the first a brief delirium with tremor was followed by recovery. In the second the more usual abdominal cramps with delirium convulsions and severe motor paralysis occurred in two attacks separated by an interval of two years. The patient died in the second attack, and pathological examination revealed lesions of ischaemic nature in the peripheral nerves and cerebral white matter. The possibility of the presence of some locally acting vaso-constrictor substance is discussed in relation to the

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pathogenesis of the visceral disorders of porphyria. The importance of consideration of the condition in states of acute delirium with or without "toxic" motor neuritis is emphasized. (Authors' abstr.)

The EEG in the Prognosis of War Neurosis.

Three hundred soldier patients in a psychoneurotic rehabilitation centre had their EEG records taken. After their return to the Army they were followed up for periods up to 15 months. Nine records were discarded owing to the presence of excessive artefact, and one record with a specific form of abnormality, which proved to belong to a traumatic epileptic. Of the remaining 290 men, 59 were subsequently invalided, 58 when last heard of were on light duty, 173 on full duty. Of the whole group 121 records were normal, 70 were doubtful, 99 showed a non-specific abnormality. There was no association between abnormality of EEG and an unsatisfactory follow-up record. The presence of abnormal fast rhythms was associated with a bad outcome, and more definitely so if these rhythms were found in an EEG record which was classified as non-specifically abnormal. The total number of men who showed this combination was less than 10 per cent. of the whole group. The alpha rhythm rate for the poor and good outcome classes showed no significant difference. In the total number of frequencies observed per man, the bad outcome classes showed a greater variability than the good outcome class. This can be thought of in connection with the greater variability of neurotics as compared with normals in respect of several other physical characteristics. It is concluded that the use of the EEG in screening Army entrants, or soldiers who have suffered a neurotic breakdown, can only be engaged in with the utmost caution. (Authors' abstr.)

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Disability Arising from Closed Head Injury.

1. Out of 430 consecutive admissions to the Boston City Hospital immediately following head injury, a series of 200 cases, selected only by exclusion of age-groups under 15 years and over 55 years, and of vagrants and chronic alcoholic addicts, was followed for intervals of six months or longer. Each patient was examined soon after admission and at regular intervals thereafter by a team consisting of neurologists, psychiatrists, a psychometrist, an electroencephalographer and a social worker.

2. The majority of injuries (53 per cent.) were derived from traffic accidents, and relatively few were of great severity, consisting chiefly of " closed head injury " with varying degrees of scalp injury and loss of consciousness. Twenty-seven patients had post-traumatic amnesia lasting over twelve hours, 22 patients over two days, 8 over seven days. Eighteen patients had clear evidence of fracture of the skull.

3. One hundred and ten patients (55 per cent.) complained of symptoms in convalescence. The symptoms were related to structural physical disorder in 16 patients, to psychiatric symptoms in 70, to headaches in 81, and to dizziness in 68. These symptoms were frequently associated, but each could occur alone. The association of headache, dizziness and psychiatric symptoms (" postconcussion syndrome") occurred in 30 patients.

4. Absence from full occupation occurred in 30 cases by reason of other injuries or unrelated causes. In the remaining 170 patients, 136 returned to full occupation within two months, 16 in the third and fourth months, 4 in the fifth and sixth, 9 between six and nine months, and 5 nine months or more after injury. Such disability has variable relationship to the various post-traumatic symptoms. Psychiatric symptoms had the highest correlation with prolonged disability.

5. Factors of bad prognostic significance in relation to return to occupation within two months of the injury, and within six months of the injury, were analyzed. In each case features indicative of severity of injury (prolonged disorientation, abnormal neurologic signs, blood in the spinal fluid, electroencephalographic abnormality) and those indicative of psychologic stress (initial excitement or apathy, occupational worries, anxiety over compensation) were intermingled.

6. The symptoms associated with prolonged disability, whether the injury had been severe or mild, were predominantly mental symptoms related to anxiety. Even after severe injuries cranial nerve paralysis, dizziness and headache, and personality change accounted for a minor part of disability. Intellectual disorder played no significant part.

7. The environmental factors of the injury were in total effect more important in accounting for disability than were the factors indicative of severity of injury, but neither can be neglected in the assessment of prognosis. The extensive association between head injury and psychiatric factors indicates possibilities for lessening disability by psychiatric treatment. (Author's abstr.)

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The Psychometric Pattern : (1) *Anxiety Neurosis.*

Twenty-five white males, diagnosed as psychoneurosis (anxiety neurosis) following psychiatric examination, were given the Wechsler-Bellevue Adult Intelligence Scale to afford qualitative and quantitative data regarding their performance on this test. The factors considered in evaluating such performance were (*a*) the number of patients deviating either positively or negatively on each subtest from their own mean weighted score on all ten tests ; and (*b*) the magnitude of the median deviation on each subtest. The results indicated no statistically significant difference between verbal and performance IQs. When the rank-order performance of the psychoneurotics on the ten subtests was correlated with that found to exist among normal subjects, the coefficient (rho) was both small and unreliable. The performance of the neurotic patients on each subtest was considered in detail, and compared with the empirical findings of Wechsler. While some discrepancies were evident, no complete reversal of results was found. Considering only significantly deviating scores, as described by Wechsler, no consistent psychometric patterns were discerned. It was suggested that the prescribed magnitude of the deviations held to be significant might be too great to reflect trends that actually exist. A discussion of the quantitative phases of scatter and the value of qualitative observations during test administration was presented. (Author's abstr.)

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*A Study of the Psychodynamics of the Art Work of a Nine-year-old Behaviour Problem Boy. *Naumburg, M.* 28
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Peptic Ulcers in the Insane.

A psychosomatic study showed peptic ulcers in 42 out of 2,000 necropsies on mental patients. More than half of the ulcer patients were emotionally unbalanced before the outbreak of their insanity. There was little or no evidence to show that there was any causal relationship between the personality-type, emotional instability, psychosis and ulcer formation. S. M. COLEMAN.

Electroencephalogram in Psychoneurotics.

"The electroencephalographic patterns occurring in psychoneurotics were studied with the patients at rest and during hyperventilation. They were compared with the patterns of control subjects. It was demonstrated that patterns with a high amount and good continuity of alpha activity are rarer in psychoneurotics than in the control subjects, and that they are particularly rare in patients with chronic anxiety and difficulties in adjustment. While, as a rule, the amount and continuity of alpha activity increase or remain the same during hyperventilation, a decrease was found in some psychoneurotics." S. M. COLEMAN.

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Psychodynamics of Art Work of Problem Boy.

A detailed study, profusely illustrated, of the art work of a nine-year-old behaviour problem boy. It is shown how the projective technique of "free" art expression can be used to supplement play therapy. S. M. COLEMAN.

FEBRUARY.

*Neuro-Optic Myelitis: A Clinicopathological Study of Two Related Cases. *Kohut, H., and Richter, R. B.* 99
*The Question of Shorter Courses of Electroshock Therapy in the Depressions. *Savitsky, N., and Tarachow, S.* 115
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Neuro-Optic Myelitis.

Two cases are reported of patients showing acute degeneration of the spinal cord and optic nerves. It is concluded that the material supports the contention that a definite clinicopathological syndrome of neuro-optic myelitis exists. The possible aetiology of one of the cases is discussed. S. M. COLEMAN.

Electroshock Therapy in the Depressions.

Twelve patients with endogenous depressions had complete remissions following 5 or less convulsions. The remissions were complete, and have lasted from 5 months to 2 years. These cases were relatively free from paranoid, hypochondriacal or neurotic symptomatology. S. M. COLEMAN.

Definition of Psychopathic Personality.

Having surveyed some of the relevant literature, psychopathic personality is defined as "a mental disease which develops before or during puberty, caused by inherited predisposition, or by acquired personality deviation due to psychic or somatic factors or both, which, in turn, cause super-ego deficiency; it is characterized by stereotyped deviations in the moral, social, sexual and emotional components of the personality, without intellectual impairment, psychosis or neurosis, with lack of insight or ability to profit by experience, and is of lifelong duration in almost all cases." S. M. COLEMAN.

Psychosomatic Aspects of Stuttering.

The writer's findings are based on a study of 116 cases investigated at the National Hospital for Speech Disorders in New York. The frequency of families of stutterers is noted, but it is seldom possible to rule out imitation or other non-hereditary factors. Physical examination failed to reveal evidence of constitutional inferiority or organic disease in a significant number of cases.

Psychiatric investigation revealed that the stutterer is often a schizoid individual. Many provided a history of bed-wetting, nail-biting and nightmares indicative of emotional tension. Analysis of the onset of the stutter revealed in nearly 50 per cent. a specific aetiological factor—a fear situation. The subsequent history supports this, viz., close association between emotion and the speech disorder, capacity for stutter-free speech in favourable conditions.

It is concluded that stuttering is the resultant of a conscious will to express oneself and an unconscious inhibition of speech. The latter appears to serve as a defence against anxiety. Therefore the symptomatic "cure" of stuttering is condemned. S. M. COLEMAN.

MARCH.

*Healing Mechanisms in the Shock-Treated Neurotic Patient. *Moriarty, J. D., and Weil, A. A.* 205
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Healing Mechanisms in Shock Therapy.

Forty-two neurotic patients were treated with convulsive therapy (the majority receiving unidirectional, electrostimulated convulsive therapy), with a condition of remission resulting in 38 per cent. and improvement in an additional 55 per cent. An investigation of the healing mechanisms disclosed an interplay of physiological, psychobiological and psychological factors. S. M. COLEMAN.

Psychiatry and Propaganda.

The common denominator between psychiatry and propaganda is that both deal with social relationships. A basic error of democracy, which allowed itself to be deprived of a great idealistic weapon, consists in mistaking for propaganda in general the propaganda psychology preferred by the fascists. The crucial problem for democracy and propaganda for democracy consists in selecting that proportion of tangible and abstract contacts which is suitable for the present time. S. M. COLEMAN.

Shock Treatment in Psychopathic Personality.

This report on three cases, two of which showed some improvement following shock therapy, suggests that the outlook for the psychopath need not be quite so gloomy after all. S. M. COLEMAN.

Fatigue in Latent Epilepsy.

A group of cases in which convulsions occur as a result of excessive fatigue is described. These cases have certain definite features in common, and their management is comparatively simple. The term latent epilepsy is applied to them, to indicate this very feature, and also because it connotes a more hopeful prognosis. S. M. COLEMAN.

Problems of Orphanhood.

The basic problem of orphanhood must be understood in terms of loneliness and of problems connected with any exceptional position. Special factors are: In many cases the orphan tries to compensate for the loss of a parent by the formation of a phantasy image in which it takes refuge when it needs sympathy. Feelings of guilt towards the dead parent may be at the root of the neurotic trends. The surviving parent may be made responsible for the death of the other parent, with consequent hostility. Identification with the dead parent may provide the content to hypochondriac and phobic fears. Conflicts between resentment and attachment may interfere in the relation with the parent substitute. Uncertainty about the meaning of death and the dangers of sickness may be the cause of anxiety. The reaction on the feeling of security may develop either towards a clinging behaviour, or in the direction of independence and withdrawal.
S. M. COLEMAN.

APRIL.

*Electroencephalographic and Neurologic Studies of Homosexuals. *Silverman, D., and Rosanoff, W. R.* 311
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Studies of Homosexuals.

Fifty-five homosexuals were studied clinically and electroencephalographically. A high incidence of histories and neurological signs suggestive of cerebral lesions were found as well as neuropathic taint in the family histories. Pathological or borderline variant EEGs were present in 75 per cent. It is concluded that an inherited or early acquired abnormality of the C.N.S. plays a contributory role in the development of homosexuality. S. M. COLEMAN.

The Psychoneurotic Ex-Soldier.

A follow-up on 142 ex-soldiers 5 months after discharge showed that improvement, when present, was attributed by the men themselves to: independence, quiet, being home, job and country life. Reasons for persistence of symptoms included lack of freedom, unsuitable employment and feelings of guilt.
S. M. COLEMAN.

Psychiatric Factors Influencing Learning.

The psychiatric factors influencing learning in the child include " nervousness " or nervous tension, emotional disturbances and neurotic traits, and organic brain lesions. S. M. COLEMAN.

MAY.

*War Psychiatry and Its Influence upon Post-war Psychiatry and upon Civilization. *Strecker, E. A.* 405
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War Psychiatry and Its Influence.

Among the subjects discussed in this address are: The intimate relationship that exists between military neuropsychiatric disabilities and morale; the clinical manifestations, underlying conflict, prognosis and treatment in military neuropsychiatry; and finally, the effect that war psychiatric experience is likely to have on civilian psychiatry and civilization in general. S. M. COLEMAN.

Present and Future Effects of War Neuroses.

The view is held that the war has released potential instabilities through the breaking up of patterns. Admitting that these mass instabilities are very serious, it is thought that much more could be done if the whole psychiatric machinery was clear in its purpose and was organized towards a single aim—the economic one. The objective of the psychiatrist is to get the neurotic into a job. Successful here, he will be best fitted to make an adjustment to social and domestic life.
S. M. COLEMAN.

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War Neuroses or Battle Fatigue.

Some hold that war neurosis or " operational fatigue " is entirely dependent on recent experiences and conflicts, and that the term " psychoneurosis " differentially denotes the presence of symptoms which are dependent on conflicts which arose early in childhood. While agreeing that this is a useful working concept in the combat zone, it is submitted that more thorough investigation always shows that such battle reaction individuals never start with a psychologically clean slate. More particularly in the fatigue reaction type a certain degree of ego immaturity is to be found. S. M. COLEMAN.

JUNE.

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Mechanisms in Experimental Epilepsy.

Experimental epilepsy was induced in the dog by electrical stimulation of the brain or by the injection of convulsant drugs, and the blood plasma from the superior longitudinal thoracic vein was analysed for potassium content before and after the seizure. It was found that convulsions modify the permeability of nerve cells, with a consequent loss of intracellular potassium. This is associated with an increase in frequency and intensity of brain waves. On the other hand, natural and artificial sleep are accompanied by a decrease in the potassium content of the brain and in the frequency of its waves. S. M. COLEMAN.

Treatment of Epileptic Patients.

The above hydantoin derivative, hydantal, in combination with phenobarbital, is considered to be less toxic than epanutin, and also to be superior in the control of epilepsy. This is a preliminary report, and the number of cases (17) is admittedly small. S. M. COLEMAN.

Nightmares of Suffocation.

The writer's theories conform with those of Otto Rank. Analysis reveals that nightmares of suffocation are to be traced back to the trauma of birth, more especially the subsequent phase of partial asphyxia. Claustrophobia—fear of being in an enclosed place, coffin, etc.—has a prenatal origin. It represents the anxiety of the foetus as to its ability to escape from the womb. S. M. COLEMAN.

First Evidence of Pancreatic Disease.

Three cases of pancreatic disease are reported, with depression and anxiety as the presenting symptoms. It is advised that the clinician should be always alert for a pancreatic disease, particularly in a negative history, when the subjective complaints include deep-seated pain in the epigastrium and mental disturbances. S. M. COLEMAN.

Tubercle Bacilli in Dementia Praecox.

Tubercle bacilli are to be found in the C.S.F. in 40 per cent. by culture in cases of schizophrenia. S. M. COLEMAN.

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VOL. CII. JULY.

*The Relationship of Intracranial Pressure and Presence of Blood in the Cerebrospinal Fluid to the Occurrence of Headaches in Patients with Injuries to the Head. *Friedman, A. P., and Merritt, H. H.* . . 1
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Intracranial Pressure and Headaches.

Headaches persisting for several months after a head injury cannot be directly related to the pathology of the brain injury, as indicated by examination of the cerebrospinal fluid. S. M. COLEMAN.

Acute Spinal Epidural Abscess.

A case is presented in which an acute spinal epidural abscess occurred as a complication of a routine diagnostic lumbar puncture. The patient was operated upon and recovered with residual weakness. The importance of early recognition and prompt surgical intervention is stressed. S. M. COLEMAN.

The Liver in Extrapyramidal Disease.

The findings of mild and unspecified structural liver changes in three cases of postencephalitic parkinsonism, one case of Parkinson's disease and one case of Huntington's chorea sustain the prevailing histological reports. With the employment of delicate liver function tests positive readings were obtained in 85 per cent. out of 54 cases with extrapyramidal disease. The highest percentage of positive readings (93 per cent.) was found in 15 cases of Huntington's chorea. No summary issue is taken with the problem of primary, secondary or correlated involvement of the liver in extra-pyramidal disease. S. M. COLEMAN.

Integration in Psychoanalysis.

According to the writer the principle of integration is implicit throughout the theory of psychoanalysis. Examples here studied are the synthesis of id, ego and super-ego within the total personality and the evolution of cultural thought. S. M. COLEMAN.

AUGUST.

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Note on Initial and Succeeding Voltages to Obtain *Grand Mal* in Electroshock Therapy. *Huddleson, J. H., and Lowinger, L.* 191

Devic's Disease.

Devic's disease, or neuromyelitis optica, is characterized by a morbid process that involves both the spinal cord and the optic pathway. This disease, with multiple sclerosis, diffuse sclerosis and the encephalomyelitides, are viewed as

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basically identical processes, the difference being the location, intensity and other individual variabilities. A fairly typical case is reported which is complicated by the presence of an adhesive diffuse arachnoiditis, causing a complete spinal block.
S. M. COLEMAN.

Character and the Traumatic Syndrome.

It is concluded that to refer to a mental reaction following a trauma as a neurosis, implying a disease entity, is incorrect because the etiology is not specific or clear. Also the adjective " traumatic " is not valid because the same picture may occur where there has been no obvious trauma, and a number of symptom pictures may follow the same trauma. Finally, the term syndrome seems superfluous because it is purely descriptive and not explanatory.

In the writer's opinion these patients should be treated by Karin Horney's technique of character analysis. It is explained that " character analysis as a method of thinking, feeling and acting in theory and practice is a dynamic method of describing a dynamic process ; in other words, it is a dialectic method. It frees us of the static descriptive type of thinking implied in the nosology of disease entities." There follows a section on the pretraumatic personality, including case histories. It is found that the traumatic syndrome is preconditioned by the feeling of failure to live up to an idealized image of the self. S. M. COLEMAN.

Speech Disorders in World War II.

Two hundred and seventeen cases of speech disorder were observed, 18 per cent. of which followed wounds or exposure to modern warfare. These were classified in the following manner : Dysarthria (73), dysphemia (49), dysphasia (48), dysphonia (28), dyslalia (19). Speech therapy was found of value in many patients.
S. M. COLEMAN.

Electroencephalographic Findings.

The cerebral electro-activity of four children during the acute stage of encephalitis and meningo-encephalitis is described. It is grossly disturbed ; the abnormalities are generalized, and consist of slow, bilateral synchronous waves of enlarged amplitude. S. M. COLEMAN.

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Neurosis and Sexuality.

The clinical records of 1,233 neurotic soldiers were classified by the degree of sexual activity they had shown, and the frequencies of various psychiatric findings were analysed in the two groups of the sexually inadequate and the sexually average. Sexual inadequacy was found to have significant associations with neurosis in childhood, unsatisfactoriness of home life, school record, occupation, rank in Army, past head injury, degree of military stress undergone, bodily habitus, intelligence, various personality traits, amnesic symptoms, outcome of illness. In nearly every case sexual inadequacy was found to be positively associated with a higher frequency of the abnormal finding. Where a graded characteristic is in question, such as in intelligence and bodily habitus, sexual inadequacy was more frequent at the extremes of the distribution. The findings are closely paralleled by a similar analysis of the same clinical material by degree of military stress undergone. It is concluded that the factors which tend to bring about neurotic breakdown and those

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which predispose to sexual inadequacy are related. Various hypothetical bases for this observation are discussed. One which appears to be particularly favourable for further investigation suggests that the common factors are to be sought in an imbalance of the endocrine system. (Author's abstr.)

An Exploratory Study of Mental Organization in Senility.

Twenty psychological tests were given individually to 84 senile dementia patients and repeated after four months, total testing time per patient being approximately three and a half hours. The average age of the patients was 73·4 ± 6·5 years. Test-retest reliabilities were established for the tests used, and intercorrelations run between the tests. A factorial analysis was carried out on these inter-correlations, in an attempt to throw some light on the type of mental organization to be found in senility. Comparisons were made between the scores of the patients on various tests and the scores of normal adults and children on these tests. A comparison was also made between the scores on the tests of a " superior " and an " inferior " group of seniles, as determined by the level of the skill required in the work they had been doing in the course of their lives.

With few exceptions the reliabilities found for the tests were remarkably high, thus demonstrating that it is quite feasible to apply psychological tests of the type used even to senile dementia patients. A slight improvement was found for most of the tests from first to second testing, which was probably due to practice effects and " test sophistication."

The factor analysis resulted in a factor-pattern which accounted for 43 per cent. of the variance, a general factor contributing 20 per cent. to the variance, and three group-factors, identified as being concerned mainly with speed, memory, and physical strength, contributing 10, 7 and 6 per cent. respectively.

The general factor presented a picture of the mental organization of the patients which differed greatly from that found in normal adults. An attempt was made to account for this difference in terms of the theory of " fluid " and " crystallized " ability.

The level of the senile patients on the progressive matrices test of abstract non-verbal ability approximated that of 8-year-old children; similarly, their performance on the digits repetition test was similar to that of 8-year-old children. On the vocabulary test, however, the seniles scored well above the 14-year-old level. The correlation between matrix and vocabulary for the senile patients was shown to be very significantly lower than the same correlation for normal adults. These facts were also brought into relation with the theory of " fluid " and " crystallized " ability.

The comparison of the superior and the inferior senile patients showed the superior group consistently scoring at a higher level than the inferior group, even on tests of physical strength. The degree of superiority, however, varied within wide limits.

The results allow the following conclusions:

(*a*) Mental ability in the seniles tested has considerably deteriorated.

(*b*) This deterioration affects most strongly tests involving abstract reasoning ability (" fluid " ability).

(*c*) This deterioration affects least tests involving a mere reactivation of past experiences and knowledge (" crystallized " ability).

(*d*) Due to the differential deterioration in the abilities of senile patients, the organization of these abilities, as compared with normal adults, becomes profoundly altered. (Author's abstr.)

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Cerebral Changes in the Course of Pernicious Anemia and their Relationship to Psychic Symptoms.

The brains of five cases of pernicious anemia in which the manifestations of this disease appear to have developed in the course of a psychosis were studied, with one case of pernicious anemia without neuro-psychiatric complications and one of psychosis following pernicious anemia.

The alterations were qualitatively the same in all cases, only the intensity of the process showing some variations. The nerve cells presented acute, severe, chronic, ischemic, edematous and fatty changes in varying degree.

The small blood vessels appeared to be increased in number, and presented a mild endarteritis in all cases.

The distribution of the glia of the white matter was markedly irregular. Often the glia nuclei gathered around the blood vessels, so that the course of the latter was well outlined, even when the vascular walls were at a different level, and could not be seen. Frequently between the conglomeration of the glia nuclei and the blood vessels a small area of white matter, which frequently underwent a process of demyelination, was interposed. These areas of demyelination at times had the tendency to coalesce.

Inasmuch as in at least two cases the vascular changes were found with especial intensity in the regions involved in Wernicke's encephalopathy, it is permissible to consider the described findings as abortive forms of that condition. Some facts gathered from the literature justify a conclusion that more or less pronounced forms of Wernicke's encephalopathy may be found in all conditions in which Castle's formula is altered.

The cases here reported seem to confirm the idea expressed by other authors that there is a certain relation between pernicious anemia and paranoid reactions (may be a common constitutional factor).

Since no mental symptoms were observed in one of our cases which showed the same neuropathologic alterations, the hypothesis is advanced that the organic changes merely precipitate or sensitize one toward a psychosis, the type of which is predetermined by psychological or constitutional mechanisms.

(Authors' abstr.)

Physiochemical Effects of Electrically Induced Convulsions.

(1) Following the convulsions, the electrolyte content of the cerebrospinal fluid as indicated by its conductivity, the total interferometric values (IV) and the ratio of the interferometric value of non-electrolytes (INE) to that of the electrolytes (IE) were increased. Particularly the increase of the IV value and of the $\frac{INE}{IE}$ ratio after the convulsions were statistically significant.

(2) Regarding the electrolyte content of the cerebrospinal fluid, a distinct increase in the potassium and phosphate content was found.

(3) Consideration of the time factor seems of importance. The average increase of the phosphates was 18·5 per cent., that of the K 21·5 per cent., if the puncture was performed within one hour after the last convulsion (group 1), while 1–3 days after the last convulsion (group 2), the increase of phosphates was 1·3 per cent., that of K 11·2 per cent. The difference in the electrolyte content shortly after the last convulsion and 1–3 days later is also reflected in the conductivity measurements that show an increase of 2·3 per cent. in group 1 and of 0·5 per cent. in group 2.

(4) Experiments on isolated surviving frog's brains showed a definite increase in the conductivity and thus in the ion concentration of the bathing fluid during and one minute after stimulation. This increase of leakage from the brain on

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stimulation is at least partly due to diffusion of K as shown by determinations of K in the bathing fluid. Thus stimulation of the brain is followed by a brief release of ions from cells of the central nervous system. The amounts diffusing into the subarachnoid space are too small to produce a perceptible change of the blood : cerebrospinal fluid ratio.

(5) Regarding the non-electrolytes, in increase of the ratio $\frac{NE}{E}$ by 4·1 per cent. was found in the dogs that were punctured within the first hour following the convulsions (group 1); it may be inferred that following the convulsions, there is an increase not only of electrolytes, but also of non-electrolytes in the spinal fluid, and that the increase of the non-electrolytes is even larger than that of the electrolytes. In the following days the ratio $\frac{NE}{E}$ further increases (6·8 per cent. in group 2).

(6) Analyzing these changes, the permeability of the blood-liquor barrier was studied by the uranine test. As far as this test permits conclusions, it seems that an increased permeability of the blood-liquor barrier is not responsible for the increase of non-electrolytes. An abnormal content in glucose and proteins also could be excluded as the cause of this increase of non-electrolytes.

(7) Using Hauptmann's saponin hemolysis test as an indicator of lipides in the cerebrospinal fluid, a slight increase of the inhibitory effect upon saponine hemolysis as compared with normal spinal fluids was found following convulsions only occasionally.

(8) In spectrophotometric studies, the cerebrospinal fluids of dogs subjected to convulsions showed band absorption between wave-length 2,550 and 2,850 Å. Since an abnormal protein content could be excluded, and barbiturates had not been administered to the dogs, the absorption band probably is due to abnormal amounts of nucleic acids or their constituents, belonging to the pyrimidine-purine group. Microchemically traces of thymonucleic acid were detected in the spinal fluid following the convulsions. These findings suggest a breakdown of nuclear substances under the influence of the convulsions. (Authors' abstr.)

Focal Autonomic Representation in the Cortex and Its Relation to Sham Rage.

(1) In the cat, cortico-autonomic representation lies entirely or chiefly in the frontal lobes. Bilateral removal of this area is followed by all the symptoms of sham rage which appear in preparations which are totally decorticate.

(2) The orbital surface of the frontal pole has been previously shown to be related to vagal function. Removal of this region bilaterally causes panting, increase in heart rate and increased production of adrenalin, as shown by denervated iris and nictitating membrane. Such animals may die within the first hours following operation as a result of respiratory and cardiac disturbances.

(3) Removal of the lateral and mesial portions of the frontal lobes bilaterally causes protrusion of the claws, piloerection, increased irritability and some increased production of adrenalin as shown by the sympathectomized iris and nictitating membrane. None of the other manifestations of sham rage appears in such animals.

(4) In the cat, removal of the cortical representation of the autonomic system results in signs of excessive function of the autonomic system, which are chiefly sympathetic. In the monkey there are similar signs of release of autonomic function following the same procedure, but no sham rage results.

(5) The diminution of sham-rage phenomena which occurs in chronic decorticate and frontal lobectomized preparations is a manifestation of homeostasis, which is probably brought about by adjustment of the entire remaining autonomic system. (Author's abstr.)

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The Effect of Anticonvulsant Drugs on Recovery of Function Following Cerebral Cortical Lesions.

Following previous observations that cortical stimulants increased both rate and amount of recovery of motor activity of *Macaca mulatta* deprived of areas 4 and 6 of one hemisphere, the effects of sedatives were tried under the same experimental conditions.

(1) Phenobarbital, in doses which had no observable sedative effect on cage performance, produced marked slowing in rate of recovery and eventual retardation in motor performance.

(2) Dilantin alone did not seem to cause such retardation, but, administered together with doryl, it inhibited or prevented the enhanced recovery rate which is caused by doryl alone.

(3) Electroencephalograms taken pre-medication and before and after operation were not affected in any way by either dilantin or doryl and atropine in the doses given.

(4) The electroencephalogram was altered after several days by phenobarbital in doses of approximately 40 mgm. per kgm. This dose was not, however, enough to cause any clinical change in the performance of the monkeys.

(Authors' abstr.)

Chemical Changes in the Cerebral Cortex Associated with Convulsive Activity.

Cerebral lactic acid increases during the convulsive electrical discharge produced by metrazol in an animal immobilized with dihydro-beta-erythroidine and maintained by artificial respiration. A decrease in cerebral phosphocreatine usually occurs, with a corresponding increase in inorganic phosphate. Adenosine triphosphate is unchanged.

The findings are similar in the epileptiform seizures occasionally seen in animals given morphine with local infiltration of procaine.

The observed chemical changes occur in the absence of any decrease in the cerebral oxygen supply, but are interpreted as indicating that the oxidative processes lag behind an increased energy expenditure during convulsive activity.

(Authors' abstr.)

The Functional Significance of the Rostral Cingular Cortex as Revealed by its Responses to Electrical Excitation.

Excitation of the rostral part of the cingular gyrus in the monkey (*Macaca mulatta*) produces a complex response characterized by opening of the eyes, dilatation of the pupils, changes in facial expression, alterations in the respiratory movements, changes in the cardiovascular apparatus, vocalization, piloerection, and cessation of muscular movements with relaxation of muscular tension.

Cytoarchitectural study reveals that the responsive cortex is situated in the region designated by Brodmann, from his study of *Cercopithecus*, as area 24. In the macaque this cortical region does not possess cytoarchitectural uniformity.

The complex response bears the connotation of emotional expression, thus

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definitely implicating the cingular region in the emotive process, and demonstrating the potentiality of the cerebral cortex to produce emotional expression.
(Author's abstr.).

Efferent Fibers of the Parietal Lobe of the Cat (Felis domesticus).

In six adult cats the cytoarchitecture and efferent pathways of the parietal lobe have been investigated.

The cortex pattern was found to be of six layers, and these were found to be similar throughout the parietal lobe. Some increase was noted in the depth of the molecular layer more posteriorly in the parietal lobe. No Betz cells characteristic of motor cortex were seen.

The parietal cortex was found to send association fibers to the adjacent cerebral lobes.

The parietal cortex was found to send commissural fibers by way of the corpus callosum to the opposite parietal lobe.

Parieto-thalamic fibers terminated in the thalamic nuclei ventralis postero-lateralis, ventralis posteromedialis, posterior and pulvinar.

Parieto-tectal fibers ended in the superior colliculus.

The parietal cortex sent fibers through the pyramids to the spinal cord, in which they accompanied the lateral cortico-spinal tract of the opposite side.

The functional significance of this parietal projection system has been reviewed, and from this investigation it is felt that the interpretation of its function as a mechanism of sensitization of sensory neurons is the more plausible one.
(Authors' abstr.)

Effects of Lowering the Blood pH on Excitability of the Nervous System.

Changes in excitability of various parts of the nervous system which occur with reductions in the pH of the blood in the intact animal were studied.

The greatest reductions in excitability occurred in reflex arcs. The changes in excitability of supranuclear centers were of much smaller magnitude. Nevertheless, the reductions in excitability were considerable. Motor nuclei and peripheral motor nerves underwent the least reduction in excitability in extreme acidosis. (Authors' abstr.)

Generalized Atonia and Profound Dysreflexia following Transection of the Brain-stem through the Cephalic Pons.

Dogs after brain-stem transections through varying levels of the midbrain and pons have been maintained and studied by gross clinical inspection for several weeks subsequent to the operation.

The transections were made by *blunt traction*, so that the brain structures cephalad to the transection remained undisturbed in the cranium. During the operative procedure, *the blood supply to the brain was not molested by ligation of the carotid, nor by temporary occlusion of the vertebrals.*

A generalized and enduring muscular atonia invariably followed a transection placed appropriately at an upper pons level.

A profound dysreflexia followed a transection of the brain-stem at any level of the midbrain and pons. It was selective to the extent that some reflexes were affected to a greater degree than others, and the extent that the reflexes were affected varied with the level of the transection. This dysreflexia was more inclusive and more profound following a transection through the upper pons.

An obvious spontaneous extensor rigidity did not routinely follow midbrain transections. These preparations did not exhibit undue resistance to passive manipulation of the limbs or trunk musculature, and the reflex standing stance was not exaggerated. Low midbrain preparations did invariably exhibit a profound and permanently enduring inpairment of the righting reflexes.
(Author's abstr.)

Facilitation of Flexion Reflex in Relation to Pain after Nerve Injuries (Causalgia).

Reflex contractions of the tibialis anticus muscle in the spinal cat are used as indicators of changes in conductivity within the spinal cord.

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When the reflex response of the muscle is near threshold, it is found that contractions can be greatly increased if there be cutaneous or other stimulation of the foot or lower leg while rhythmic faradic stimulation of the cut sensory nerve is taking place.

This increase in conduction is brought about by facilitation, since the non-electrical stimuli are ineffective if the electrical stimuli to the nerve be discontinued.

Stimuli which cause such facilitation when applied simultaneously with the faradic shocks are hot (55°) or cold (ice) water, spreading the toes, twisting a claw, rubbing the fur with an applicator, or blowing strongly on the fur of the foot.

It is suggested that such facilitation may have a relation to the production of paroxysmal pain from slight cutaneous stimuli in patients who are suffering the pain following nerve injury (causalgia). (Authors' abstr.)

Electrical Activity of Denervated Mammalian Skeletal Muscle as Influenced by d-Tubocurarine.

1. The effects produced by the intra-arterial injection of acetylcholine upon denervated muscle may be duplicated by d-tubocurarine.

2. The intra-arterial injection of this alkaloid provokes both electrical activity and contraction of denervated mammalian muscles.

3. Following the injection of d-tubocurarine the muscle becomes less responsive, or completely unresponsive, to previously effective concentrations of acetylcholine.

4. In larger concentrations the injection of d-tubocurarine is capable of causing prolonged muscle-contractures.

5. During these contractures the electrical fibrillation of denervation is markedly diminished and is sometimes completely suppressed.

6. These experimental findings are discussed. (Authors' abstr.)

Electrical Activity of the Thalamus and Basal Ganglia in Decorticate Cats.

1. Typical bursts of 8–12 per second spikes were recorded for as long as three days from the thalamus of cats which had undergone either homolateral or bilateral removal of the neocortex, and, in one instance, bilateral decortication plus section of both optic nerves and transection of the midbrain.

2. Normal bursts were absent in preparations studied from 21 days to one year after decortication, although two of these animals yielded atypical low voltage bursts from restricted areas.

3. The activity of other subcortical areas was briefly noted, and found to be in general agreement with the results of others. (Authors' abstr.)

Nerve Regeneration in Cats on Vitamin B_1 Deficient Diets.

1. The behaviour of cats on a raw carp diet showed rapid development of anorexia, ataxia, vestibular disturbances and convulsions.

2. With a better controlled thiamine deficient diet which was tube-fed, ataxia and vestibular disturbances were mild even in cats which survived 116 days.

3. The peripheral nerves (tibial, peroneal and saphenous), which were excised immediately after death from thiamine deficiency, were able to conduct impulses as shown in action potential records. Also, microscopic examination showed no peripheral nerve damage.

4. The tibial, peroneal and saphenous nerves regenerated " normally " in the presence of severe thiamine deficiency. The longitudinal and diameter growths of the fibers and action potentials were used to measure the regeneration. (Authors' abstr.)

Lumbar Sympathetic Dermatomes in Man Determined by the Electrical Skin Resistance Method.

1. By means of the electrical skin resistance method areas of skin denervated by lumbar and sacral sympathectomies (at intended levels from L_1 to S_1 inclusive) were outlined in 75 patients with a total of 103 operations.

2. At each level the operations gave characteristic patterns of high electrical skin resistance.

3. The outlines of these patterns were continuous and divided each leg into regular segments.

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4. It was shown that the outline of the pattern for operations at any one level represented the lower boundary of the next higher dermatome. Thus, in this study the lower boundaries of T_{12} to L_6 sympathetic dermatomes, inclusive, were determined.

5. The outlines of these sympathetic dermatomes agreed closely with those of the sensory and vasomotor dermatomes determined by Foerster.

6. It is now known that the entire surface of the human body, like that of the salamander, is divided into regular segments from one end of the longitudinal axis to the other. (Authors' abstr.)

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Cerebral Concussion.

Concussion is a fundamental mode of reaction of nervous tissue. Clinically it is a transitory and reversible state following head injury of sufficient velocity, brevity, and energy, and it is characterized by instantaneous onset, followed by widespread paralytic symptoms and later non-recoverable amnesia, without evidence of structural cerebral injury. The physiological mechanism appears to be an excitation of every neuronal mechanism, followed by a refractory interval varying from neurone to neurone, shortest in the respiratory centre, longest in some parts of the cortical apparatus. The EEG gives evidence that the cortex is primarily affected. The supranuclear mechanisms are also very susceptible. In man, the peculiar amnesia is its chief external sign, accompanied by loss of reactivity, which is its most prominent feature in animals (stunning). The only comparable reaction in man is that produced by electroshock therapy. There is no clear evidence of its identity with blast shock. Many features of concussion are still unexplored.

M. E. MORSE (Psychol Abstr.).

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The Psychometric Pattern. II. Migraine.

Twenty-five white males, ranging in age from 17 to 33 years, with an average chronological age of 19·6 years, were tested by the complete Wechsler-Bellevue Adult Intelligence Scale in conjunction with neuropsychiatric examination. Each was examined by at least two psychiatrists, and the resulting diagnosis of migraine headache met with general agreement. Data obtained from the test results were analyzed with a view toward determining specific abilities or disabilities on the various subtests and discovering consistencies of function. This was accomplished by considering: (1) The number of patients deviating either positively or negatively on each subtest from their mean weighted scores on all subtests, and (2) the magnitude of the median of these deviations. The mean I.Q. obtained on the full scale was 96·24, $\sigma = 13{\cdot}80$. The difference between the mean verbal and performance I.Qs. was 2·92 in favor of the performance scale; however, this difference was not statistically significant. When the rank order performance of the migrainous patients on the various subtests was correlated with that of normal subjects, the coefficient was found to be rho + ·536, P.E. = ·16. This is larger than that found to exist between neurotics and normals, but smaller than that obtained when the performances of neurotics and migrainous patients are correlated.

The best performance of the migrainous patients was evidenced on tests involving visual motor co-ordination, perceptual discrimination, synthetic and analytical ability, and ability to differentiate essential from non-essential details. Their relatively good performance on the Object Assembly test and relatively poor performance on the Picture Arrangement test were found to be of interest from a clinical standpoint when compared with the observations of other investigators. A discussion of the relationship between the migraine syndrome and the psychoneuroses was presented. (Author's abstr.)

PSYCHOL. BULL.

VOL. XLII. 1945.

*The Use of the Wechsler-Bellevue Scales with Normal and Abnormal Persons.
Rabin, A. I. 410
The Aircraft Pilot. *Viteles, M. A.* 489

The Use of the Wechsler-Bellevue Scales with Normal and Abnormal Persons.

The Wechsler-Bellevue Scales have stimulated considerable psychometric research and have supplanted some time-honored diagnostic tools. The reliability and validity of Wechsler's scales, as a whole and in part, have been proved in several studies. The consensus of opinion is that the test correlates highly with some of the best measures of intellect, and that it tends to differentiate better than other measures between the dull and feebleminded. The literature produces a dissenting opinion which is undocumented and statistically unproved. It also tends to narrow the I.Q. range as compared with other tests. There is considerable evidence that the Verbal Scale correlates more highly than the Full Scale or Performance Scale with most intelligence tests. The Verbal Scale compares well with other tests in predicting academic success at the college level; the Performance Scale is practically useless in this respect.

Because of its particular structure as a point scale, the Wechsler-Bellevue is easily adaptable to research in the field of mental deficit in special clinical groups in particular, and to research involving the differentiation of various groups in general. Several approaches, from a statistical and technical view-point, in the analysis of test findings, have been made available. The differentiation of groups by means of their attained mean scores on the various subtests is the most obvious method. This, however, does not take the absolute total score magnitudes into consideration. Ranking the means of subtest scores for groups is a method which circumvents this difficulty. The differences between Verbal and Performance I.Qs. have also been used widely. A difference in favor of the Verbal Scale, following Babcock's rationale concerning the preservation of verbal capacities and the reduction in new learning in deterioration, is probably indicative of some pathological conditions (usually schizophrenia), while a difference in the opposite direction tends to be indicative of psychopathic personality. A verbal dominance

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akin to that found in psychopathological conditions may also be found in Southern negro criminals. A more sophisticated method developed deals with intra- instead of interpersonal variations. The deviation of each subtest from the mean of all subtests in the same individual has been used as a yardstick. This method tends to produce some results which are at variance with those obtained with the simpler methods. Special *Indexes* based on ratios between the sums of the scores of some subtests (for schizophrenia and psychopathic personality) and on differences between such combinations (cerebral damage) have also been devised. Several other methods of intra-individual variation have been suggested, but not investigated. It seems to some clinicians that the use of this method in the description and diagnosis of individual cases is possible despite the absence of sufficient statistical support. Such procedure would, to a large extent, be intuitional, and dependent on the degree of clinical insight and experience of the examiner. Variability, according to most investigators, is characteristic of pathological conditions. The data tends to show that the patient's emotional condition and attitude are largely responsible for this variability. A study in which the patients were selected on the basis of their good attitude in the testing situation failed to attain more variability than in normalcy.

The fact remains that the various measures of scatter and variability, the different patterns, have succeeded in differentiating *groups* but not *individuals*. The patterns are characteristic enough of certain groups, but mask the peculiarities of some individuals within those groups. Hence, thus far, on the basis of the Wechsler-Bellevue patterns we have group, but not individual, diagnosis. There is insufficient agreement even in those group differentiations. The studies failed to control all of the most important factors; they controlled some. Hence, variation in findings. Age, race, schooling, intellectual level, cultural background and degree of co-operativeness are major factors which have not been equally controlled in the several studies. For this reason, the results are not comparable. In case of psychopathological material, the diagnostic criteria, which may differ from one institution to another, must also be reckoned with if exact and comparable data is to be produced. Patterns obtained, after the above-mentioned factors are taken into consideration, may achieve a status of a differential diagnostic tool in *individual cases*. In order to achieve this degree of accuracy, the co-operative effort of several institutions may be required. In the meantime, the individual variability analysis and descriptions and the utilization of the broad hints from the group studies have their place in clinical practice. In this connection more qualitative studies of Wechsler-Bellevue responses and more detailed analysis of their content are wanting. Also, the investigation of several factors (based on factor analysis) in different clinical groups and at different age levels, rather than considering the subtests as *functional unities*, is an untapped source of important data.

The psychometric literature, especially dealing with psychopathological material, is lacking in retest data. Long range retest studies are rare. Only a few small attempts in which the Wechsler-Bellevue is employed have been made. Such studies do not only throw some light on the problem of reliability, but also offer more insight into the problem of *patterns*. Quantitative measures of attitude; or behavior schedules administered to patients examined and re-examined, will shed further needed light on concomitant intellectual conditions and psychometric correlates of various behavior and personality disorders. (Author's abstr.)

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The Neuropsychiatric Aspects of Porphyria.

A review of the case-histories outlined above reveals that, in addition to the features of the syndrome of acute porphyria which are already well known, there are others which require emphasis.

The disease occurs with special frequency, if not exclusively, amongst people with severe, neurotic personality disorders. The patients usually appear to be hysterical, except in those instances where organic brain disease clouds the underlying features of the personality. It is probable that the psychoneurosis plays an important part in the pathogenesis of the disease, and in determining the time of onset of the acute attack. Thus, Eldahl has reported a case of acute porphyria in which a psychic insult was thought to have been the releasing factor.

In seven of the ten cases reported here there was a history of major psychosis or serious personality deviation in one or more members of the last three generations of the family. In two of the remaining three cases there was no opportunity to enquire into the family history, so that the incidence of mental disease amongst the relatives of these patients may have been even higher. It is obvious that porphyria occurs in families in which psychiatric disorders run rife.

The peculiarities of the deep tendon reflexes constitute a striking feature of the symptomatology of the acute attack. Other authors have reported cases in which the ankle-jerks were present, while the knee-jerks were absent, but the frequent occurrence of this sign has not been sufficiently stressed. The fact

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that the absent reflexes may frequently be elicited if the tendon is repeatedly tapped should be borne in mind, while the phenomenon of summation, in which the reflexes become progressively more active as the tendons are struck, is a distinguishing feature of this disorder. Another peculiarity of the reflexes is their great variability, the degree of their activity varying much from time to time.

Once the porphyrinopathic polyneuropathy and degenerative changes in the anterior horn cells have set in, the small muscles of the hands appear to be affected early and with great frequency.

The diagnosis of porphyria without porphyrinuria should be kept in mind in those cases in which the clinical signs and symptoms of the syndrome are not accompanied by the presence of porphyrins in the urine. (Author's abstr.)

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A Case of Stable Modification of the Character of Conditioned Reflex Activity in dogs.

During previous experiments, difficulties were encountered in obtaining complete reversal of a differential stimulus into a positive stimulus. The physiological mechanism of this phenomenon was explained in terms of the inactivity of the initial inhibitory phase of the stimulation process as a result of reversal. The present investigation has been planned to establish the relation of the above-mentioned phenomenon to the stability of the inhibitory connection formed by the stimulus being reversed, or, in other words, to the number of combinations with the inhibitory stimulus effected previous to the reversal. The conclusions are: (1) The relation looked for exists. (2) However, a preliminary intensive training of the inhibitory process by some other form of experiment contributes to the formation of stable inhibitory connections, even if the number of applications of the inhibitory stimulus was not large. (3) After a long training of the inhibitory process, a two-times repeated reversal of a pair of antithetic conditioned stimuli can lead to inertness, though the remaining stimuli of the system applied, which has not been reversed, may continue in action. (4) During this period no attempt to form a delayed conditioned reflex as an experimental means for determining the mobility of nervous processes is successful.

P. WORCHEL (Psychol. Abstr.).

Magnitude of the Conditioned Response as Affected by Extension of the Conditioned Stimulus Over the Period of Action of the Unconditioned Stimulus.

The present investigation extends the work of F. P. Mairov, who demonstrated that a weak stimulus protracted into the period of eating acquires a greater efficiency in evoking the conditioned response. Four dogs were involved in the experiment. Each was made to develop two pairs of food-conditioned responses

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to strong and weak stimuli. In one case the strong and the weak stimuli were allowed to continue 5 seconds after food was presented ; and in the other, the weak and strong stimuli were extended for 30 seconds, that is, all the time the dog was eating. In two dogs of the strong type, the conditioned stimulus became more efficient by not discontinuing it until eating was over. In dogs of the weak type this rule was overshadowed by the lower limit of working capacity of their cortical cells ; and with them the inverse relation was observed in some cases, the conditioned stimulus decreasing in strength when prolonged throughout the eating period.

P. WORCHEL (Psychol. Abstr.).

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Subacute Emotional Disturbances Induced by Combat. *Cohen, R. A., and Delano, J. G.* 284
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Nervous System Dysfunction in Adaptation to High Altitude and as Post-flight Reactions.

Severe nervous dysfunction without circulatory collapse occurred in 0·28 per cent. of a group exposed to a simulated altitude of 38,000 ft. with a constant oxygen supply, either during flight or several hours after reaching ground level. The reactions fall into the following categories: Disturbances of equilibrium and co-ordination, of subcortical mechanisms, or of the large sensory and motor tracts; migraine and symptoms suggesting meningeal irritation and increased intracranial pressure; and disturbances of cortical function in the nature of amnesia, confusion, disorientation, and aphasia. Their causation is obscure. Signs of lesions in the large tracts suggest a vascular origin rather than aero-embolism. The disturbances are not relieved by further administration of oxygen, but they disappear fairly promptly without residuals. No one portion of the nervous system is more vulnerable than another. M. E. MORSE (Psychol. Abstr.).

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1. Psychiatry and Neurology.

Experimental Alcoholism and Alcoholic Neuritis. Lecoq, Raoul. [*Compt. rend. soc. biol.*, **136**, 659–60 (1942).]

Daily treatment of pigeons with alcohol for long periods sometimes produced acidosis and neurotic symptoms and sometimes not, depending on the kind of stock diet used. L. E. GILSON (Chem. Abstr.).

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Recent Researches on Poliomyelitis. Finlayson, M. H. [*Clin. Proc. (S. Africa)*, **3**, 481–5 (1944).]

A brief review. H. L. WILLIAMS (Chem. Abstr.).

Electroencephalography in the Study of Chronic Behavior Problems. Will, O. A., jun. [*Nav. med. Bull., Wash.*, **44**, 341–52 (1945).]

A survey is made of electroencephalographic findings both of behavior problem individuals and of various types of mental abnormalities. A high percentage of abnormal brain waves is noted both for the mentally ill and for the disciplinary cases, indicating a disturbance of brain physiology. It is suggested that many of the disciplinary cases are mentally ill, and that an electroencephalographic study would be an advisable routine for the more severe disciplinary cases.

G. W. KNOX (Psychol. Abstr.).

Mechanism of Experimental Epilepsy. Parrot, Jean Louis, and Lefebvre, Jacques. [*Compt. rend. soc. biol.*, **137**, 662–4 (1943).]

Dogs lightly anesthetized with chloralose were given an intravenous injection of 1·25 mgm./kgm. of eserine, then the brain was stimulated sufficiently with 110 v.a.c. to produce general epileptiform convulsions. Blood samples taken from the longitudinal sinus of the brain during or shortly after the convulsions contained something that acted like acetylcholine on leech muscle.

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

Nervous and Mental Manifestations Observed in Spontaneous Hypoglycemia. Lieberman, Alan A. [*Elgin Papers*, **5**, 43–51 (1944).]

A patient with spontaneous hyperinsulinism due to pancreatic adenoma, and chronic mental symptoms, responded to surgery of the pancreas with full recovery. Two patients with functional hypoglycemia recovered on a high-protein, low-carbohydrate, moderate-fat diet. Conclusions: Hypoglycemic states may simulate any variety of nervous and mental disorders. Glucose-tolerance studies must be made in cases showing fluctuations in the level of conscious awareness.

T. LAANES (Chem. Abstr.).

2. Anatomy, Physiology, Biochemistry and Pathology.

Influence of Morphine on the Temperature of Cerebral Cortex. Voronin, N. M. [*Farmakol. i Toksikol.*, **7**, No. 4, 3–4 (1944).]

By use of Voronin's technique for introducing a thermocouple into canine cerebral cortex without trauma, the temperature effects of subcutaneous morphine-HCl solution were observed. The dose was 0·01 (unit not stated) per kgm. body weight. In the first 2 minutes after injection the cerebral cortex temperature rises 0·1 or 0·2° but soon begins to drop. Vomiting and unease retard the temperature drop, but after 20–30 minutes the dogs become quiet. The temperature drop continues, more slowly, for 3–5 hours. The observed temperature changes in three dogs were: 38·8 to 36·9° (rectal 38·3 to 37·7°); 39·3 to 36·4 (vaginal 40·3 to 6·9°); 38·7 to 35·2° (vaginal 39·1 to 36·8°). The temperature effect should be duly considered in prescribing morphine.

JULIAN F. SMITH (Chem. Abstr.).

Phlorizin Glucosuria. McKee, F. W., and Hawkins, W. B. [*Physiol. Rev.*, **25**, 255–80 (1945).]

None of the theories to account for the action of phlorizin is satisfactory. The only thing fairly certain is the localization of its action on the epithelial lining of the proximal convoluted tubules, the glucosuria apparently being due to interference with the sugar reabsorption. The effect of phlorizin on various organs (kidney, liver, pancreas, and endocrines) is discussed. Other questions considered include the influence of phlorizin on the total metabolism, as well as the intermediary protein and fat metabolism and mineral metabolism.

S. M. (Chem. Abstr.).

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Influence of Hypocapnic Anoxemia on the Effects of Excitation of the Splanchnic Nerve. Grandpierre, R., and Franck, C. [*Compt. rend. soc. biol.*, **137**, 743–4 (1943).]

In dogs under chloralose anesthesia electric excitation of the splanchnic nerve produced a much greater rise in blood pressure when they were breathing air containing only 3–7 per cent. of O_2 than when breathing normal air. The effect is partly nervous, since it occurs in less-marked degree in adrenalectomized dogs, and is partly due to adrenaline discharge. Injected adrenaline produces less effect during hypocapnic anoxemia than normally.

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

Antagonistic Effects of Histamine and a Synthetic Antihistamine, RP 2339. Chauchard, B., and Chauchard, P. [*Compt. rend. soc. biol.*, **137**, 708–9 (1943).]

In a guinea-pig or rat 0·25 mgm. of histamine injected intraperitoneally increases peripheral sensory and motor-nerve chronaxia and cortical chronaxia (depression of central nervous system); 12·5 mgm. of RP 2339 (N-dimethylaminoethyl-N-benzylaniline) produces exactly the opposite effects. In rabbits, local application of a 1 : 2,000 solution of histamine to the cervical sympathetic system causes a large increase in chronaxia, or even blocks conduction by the preganglionic fibers (sparteine type of action), while a 2·5 per cent. solution of RP 2339 decreases chronaxia and may cause conduction block of the strychnine type. The two drugs together completely neutralize each other. On the postganglionic fibers of the superior cervical ganglion the effects of the individual drugs are the reverse of the effects on the preganglionic fibers, but together they still neutralize each others' effects.

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

Changes of Amino N in the Blood of Mental Patients. Horwitt, M. K. [*Elgin Papers*, **5**, 177–8 (1944).]

Preliminary report. The average basal blood amino N level of 8 young schizophrenic patients was raised from 3·14 to 4·47 after 6 weeks of bi-weekly insulin shock treatments, and it remained at 4·31 (average) 2 weeks after treatment.

T. LAANES (Chem. Abstr.).

Subcortical Epilepsy from Electric Shock. Gley, P., Lapipe, M., Rondepierre, J., Horande, M. H., and Touchard, T. [*Compt. rend. soc. biol.*, **137**, 737–8 (1943); *cf. C.A.*, **36**, 3265[5].]

In dogs 30–60 mgm./kgm. of diphenylhydantoin suppresses the epileptic symptoms ordinarily produced by bipolar electric shock excitation of the sigmoid gyrus of the cerebral cortex. It does not suppress the epileptic tonoclonic convulsions produced by shock from placing one electrode on each temporal region in dog or man.

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

Composition of Bones of Paralytics. Bartolomucci, Ermelindo. [*Folia med. (Naples)*, **27**, 623–32 (1941).]

In order to test the veracity of statements in the literature that nervous disorders cause changes in the skeleton, a study of the bones of paralytics was undertaken and the following conclusions were formulated. The water content varies within normal limits. The Ca and P contents are somewhat less constant than in normal tissue, but the ratio is maintained. The phosphatase action is like that in normal cases. No connection between paralysis and skeletal changes was found. Four cases of poliomyelitis were included.

WILLIAM F. BRUCE (Chem. Abstr.).

Further Investigations on the Recovery of Inhibited Conditioned Reactions. Gellhorn, Ernst. [*Proc. Soc. Exptl. Biol. Med.*, **59**, 155–61 (1945); *cf. C.A.* **37**, 4803[1].]

Further experiments on rats showed that several conditioned reactions which had been established and inhibited in a definite temporal sequence may recover simultaneously under the influence of hypoglucemic coma or convulsions or as the result of electrically induced convulsions. The restitution of inhibited conditioned

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reactions is not accompanied by a change in the response of positively established conditioned reactions. Thus insulin coma and electric shock can act specifically on inhibited conditioned reactions without causing dedifferentiation.

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

Influence of Depressants of the Ganglionic Cells of the Autonomic Nervous System on Anaphylactic Shock in Rabbits. Vallery-Radot, Pasteur, Mauric, G., and Holtzer, Mme. A. [*Compt. rend. soc. biol.*, **138**, 336–7 (1944).]

The preliminary intravenous injection of nicotine tartrate or sparteine sulfate had no inhibiting influence on the production of anaphylactic serum shock.

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

Action of Anti-epileptics on Convulsions Produced by Electric Stimulation of the Spinal Cord. Gley, P., Lapipe, M., Rondepierre, J., Horande, M. H., and Touchard, T. [*Compt. rend. soc. biol.*, **138**, 231–2 (1944).]

One electrode was placed on the back of the neck of a rat or guinea-pig and one on the base of the tail. The application of 110 v. (a.c.) for $\frac{1}{2}$ second produced tonic followed by clonic convulsions. Phenobarbital, 0·2 gm./kgm., and diphenylhydantoin, 0·4 gm./kgm., both suppressed these convulsions, although it is known that these two drugs do not act alike on various other nervous reactions.

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

Effect of Histamine and a Synthetic Antihistamine (RP 2339) on Visceral Excitability. Chauchard, B., and Chauchard, P. [*Compt. rend. soc. biol.*, **138**, 219–20 (1944); *cf. C.A.*, **39**, 3587[8].]

When injected intravenously in dogs or intraperitoneally in rats and guinea pigs, histamine decreases the chronaxie and summation time of the intestine and uterus while N-dimethylaminoethyl-N-benzylaniline (RP 2339) produces the opposite effects. On the heart the actions of the two compounds are reversed. In each of these three cases the two compounds antagonize each other. But both compounds decrease the summation time of the splanchnic vasoconstrictor nerves and increase the summation time of the splanchnic vasodilators, and both have a constrictor action on the muscles of blood vessels, both excite the adrenal medulla, and both decrease the chronaxie of striated muscles.

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

Chronaximetric Study of Electric Shock. Chauchard, B., and Chauchard, P. [*Compt. rend. soc. biol.*, **138**, 158–9 (1944).]

Convulsions were produced in rabbits by application of 90–100 v. (a.c.) to the head. The central nervous system showed a very large increase in chronaxie and the peripheral nerves showed a slight decrease. These effects are like those observed in convulsions produced by insulin or metrazole.

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

Electrophysiology and Pharmacodynamics of Experimental Epileptic Convulsions. [*Ibid.*, 318–19.]

The effects of electric shock, metrazole, diphenylhydantoin, phenobarbital, and chloralose on the chronaxie of the central nervous system are discussed.

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

The Pathological Affinities of Beri-beri and Poliomyelitis. McCormick, W. J. [*Med. Record*, **157**, 414–19 (1944).]

A marked resemblance in the epidemiology, symptomatology and pathology of beri-beri and poliomyelitis is cited in support of the author's hypothesis of vitamin B deficiency as the basic etiological factor in poliomyelitis.

RUTH BERGGREN (Chem. Abstr.).

Antidiuretic Material in the Supraoptic Nucleus. Melville, Eleanor V., and Hare, Kendrick. [*Endocrinology*, **36**, 332–9 (1945).]

As judged by application of the method described in the preceding abstract, the supraoptic region of the hypothalamus of a 6·6-kgm. dog contains water-

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soluble antidiuretic substances equivalent to 1·5–5 units of pituitrin. Degeneration of the supraoptic nuclei resulting from hypophysectomy or surgical transection of the pituitary stalk is attended by a severe loss of this material.

KATHRYN KNOWLTON (Chem. Abstr.).

The Effect of Electrical Stimulation of the Vagosympathetic on the Frog Lung. Brecht, K., and Fraessle, K. [*Arch. ges. Physiol.* (*Pflüger's*), **247**, 649–59 (1944).]

Electrical stimulation of the vagosympathetic caused contraction or tension of the smooth musculature of the lung. Since the lung is more sensitive to acetylcholine than the heart it responded to a weaker stimulus. The contraction resulted from stimulation of vagus fibers with release of acetylcholine. The tension resulted from stimulation of sympathetic fibers with an adrenaline effect.

H. L. MASON (Chem. Abstr.).

The Influence of Carbon Dioxide Tension on the Bio-electric Phenomena of the Cerebral Cortex. Kornmuller, A. E., and Noell, W. [*Arch. ges. Physiol.* (*Pflüger's*), **247**, 660–85 (1944); *cf. C.A.*, **38**, 2112⁷.]

The effect of hypocapnia on the action current, the spontaneous potential variations, and the convulsion current indicated an increased excitability of the cerebral cortex. Increased CO_2 tension stimulated certain rhythmic processes but decreased nerve sensitivity. H. L. MASON (Chem. Abstr.).

The Effect of Oxygen Deficiency on the Cerebral Cortex: A Bio-electric Study. Noell, W., and Kornmuller, A. E. [*Ibid.*, 685–712.]

A general hypoxemia or local KCN poisoning caused increased excitability of the cerebral cortex. This effect was not due to lowered metabolism, since local cooling had none of the effects of hypoxemia. H. L. MASON (Chem. Abstr.).

The Influence of Carbon Dioxide on the Effect of Oxygen Deficiency. Kornmuller, A. E., and Noell, W. [*Ibid.*, 713–22.]

The effects of hypoxemia were specific, and were not due even in part to the accompanying hypocapnia. Increased CO_2 tension did not modify the effects of severe hypoxemia, but when the hypoxemia was moderate, a high CO_2 tension reversed the effect of hypoxemia and had the effect on the cerebral cortex of CO_2 alone. No evidence was found for a central sensitization by CO_2 in the presence of O deficiency. H. L. MASON (Chem. Abstr.).

The Blood Flow and Oxygen Supply of the Brian. IV. The Role of Carbon Dioxide. Noell, W., and Schneider, M. [*Arch. ges. Physiol.* (*Pflüger's*), **247**, 514–27 (1944); *cf. ibid.*, **246**, 181 (1942).]

A quantitative description of the effect of CO_2 on the blood flow of the brain of dogs was obtained from determinations of the arteriovenous O difference and arterial and venous CO_2 and O tensions. In the physiological range a small change (e.g., 2 mm.) in alveolar CO_2 tension caused a relatively large (8–10 per cent.) change in blood flow. As the CO_2 tension was decreased the blood flow decreased, but not below a rate which was necessary to maintain the venous O tension at 19 mm.

H. L. MASON (Chem. Abstr.).

V. The Effect of Lowered Blood Pressure. Noell, W. [*Ibid.*, 528–52.]

With an initially good blood flow through the brain the blood flow varies linearly with the blood pressure while the vessels remain passive. When the pressure falls to about 90 mm., however, vasodilation occurs. In the presence of a greatly decreased blood flow as the result of hypocapnia, a very small fall in blood pressure results in vasodilation. The vasodilation is not related to the CO_2 tension of the tissues, but more probably to the O demand of the tissues.

H. L. MASON (Chem. Abstr.).

VI. Influence of Hypoxemia and Anemia. [*Ibid.*, 553–75.]

The vascular constriction which results from hypocapnia is reversed sufficiently by reduction of arterial O tension so that the venous O tension does not fall too

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low. With good blood flow and high alveolar CO_2, vascular reaction to lowered arterial O tension first becomes evident when the venous O tension falls to 20–30 mm. When venous O tension falls below 20 mm. blood flow increases rapidly, and at 10–12 mm. is three times normal. Decreased O capacity due to removal of erythrocytes increases blood flow. With a normal arterial O tension a small lowering of the venous O tension, which is evidence of an O deficit in the tissues, causes the same vasodilation as a large fall in arterial O tension. The hypoxemia resulting from ascent to 7,500–8,000 m. causes the same marked vascular reaction as reduction of the blood pressure to 60–70 mm., or reduction of hemoglobin to 10–12 per cent. by loss of erythrocytes, or, if the viscosity is maintained without loss of erythrocytes, by reduction of hemoglobin to 36 per cent.

H. L. MASON (Chem. Abstr.).

Heat Regulation After Section of the Cervical Spinal Cord. Issekutz, B., Jr. [*Arch. ges. Physiol.* (*Pflüger's*), **247**, 204–21 (1943).]

During 2–3 days after section of the 7th cervical segment the O consumption by the hind legs of dogs decreased when the nose and neck were cooled. Later, the O consumption increased in response to the stimulus. Cooling one hind leg of a normal, lightly narcotized dog increased O utilization of both legs; warming decreased it. This reaction was abolished temporarily by section of the cord. It returned in 3–5 days, but the increase of O consumption of the one leg due to cooling of the other occurred only when the rectal temperature fell 0·5–1·0°.

H. L. MASON (Chem. Abstr.).

Relative Effects of Androgen upon the Mating Behavior of Male Rats Subjected to Forebrain Injury or Castration. Beach, F. A. [*J. exp. Zool.*, **97**, 249–95 (1944).]

The mating responses of 24 male rats with demonstrated preoperative sexual vigor were tested after castration, unilateral hemidecortication, unilateral hemidecortication plus castration, and bilateral decortication with and without castration. If copulation with a receptive female was absent after operation, an average of ·5 mgm. of testosterone proprionate per day was injected until copulation returned or until 20–25 mgm. had been administered. Small amounts of the hormone revived the incomplete mating responses, which survived 90 days after castration, so that the copulatory reaction returned; ejaculation returned after the administration of larger doses. In some cases androgen, in amounts greater than was required for castrates, was required to restore the mating responses in hemidecorticates. Hemidecorticated castrates showed even less postoperative sexual responsiveness and required still greater amounts of androgen. Complete bilateral decortication with or without castration permanently eliminated copulatory behavior; although the hormone administration led to increased responsiveness, copulation did not occur even after 20 mgm. It is suggested that a "central excitatory mechanism" indicates a "copulatory threshold" which is raised or lowered by the presence of absence testicular hormone.

L. C. MEAD (Psychol. Abstr.).

Deficient Efferent Innervation of the Extremities Following Removal of Neural Crest in Amblystoma. Yntema, C. L. [*J. exp. Zool.*, **94**, 319–46 (1943).]

Embryos of *Amblystoma punctatum* were subjected to bilateral removal of the crest of the neural folds in stages 15 or 16. The effects of this operation were determined by histological examination following a classification of the extent of limb movements. It is concluded: "(1) Extensive removal of the neural crest frequently results in fore and hind limbs with deficient motor innervation. These limbs are not functional. In complete absence of nerves, the muscles of the limb are atrophic. (2) Limbs with an adequate motor supply, but no sensory supply, are functional. (3) In non-functional limbs, the posture may be determined by muscles which are innervated and normal. (4) The motor fibers appear to depend on presence of early sheath cells to reach and penetrate the extremities, and establish a complete distribution. (5) The number of primary motor fibers is not appreciably reduced in absence of neural crest. The variations in the size of the motor roots in the experimental animals are dependent upon the number of secondary fibers present."

L. C. MEAD (Psychol. Abstr.).

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Further Experimental Evidence Against "Neurotropism" in Nerve Regeneration. Weiss, P., and Taylor, A. C. [*J. exp. Zool.*, **95**, 233–57 (1944).]

The theory of neurotropism (regenerating nerve fibers are attracted by degenerating nerve) is contradicted by these experiments. Nerves in the rat were allowed to regenerate in forked arteries, the branches of which confronted the outgrowing fibers with alternative routes. These led either into blind channels or channels containing degenerated nerve, tendon, or fat tissue. It was found that the regenerating nerve fibers "(1) grew into blind channels with the same density and orientation as into channels containing degenerated nerve; (2) were never deflected from their course toward channels containing supposedly 'neurotropic' agents; (3) approaching the entrance of a degenerated nerve have shown no tendency to converge upon it." The results also suggested that fibers connected with a functional periphery may grow to a larger diameter than fibers not so connected. L. C. MEAD (Psychol. Abstr.).

Resorptive Action of Mustard Gas on the Central Nervous System. (1) Dynamics of Chronaxia in Cerebral Cortex After Applying Mustard Gas to the Skin. Levitina, G. A., and Palatnik, S. A. [*Farmakol. i Toksikol.*, **7**, No. 3, 60–3 (1944).]

Chronaxia (1) of the cerebral motor area in rabbits was determined before and after application of a lethal dose (LD) of mustard gas (100–115 mgm./kgm.) to a shaved patch (8 × 8 cm.) of dorsal skin, or 4 × 4 cm. for $\frac{1}{2}$ and 3 × 3 cm. for $\frac{1}{4}$ the LD. The poison increases (1), i.e., it decreases the functional lability of cerebral cortex cells. Thus, of 9 rabbits given the LD the increase of (1) in 6 rabbits after a latent period of 13–48 minutes was 10–60 per cent.; in the other 3 (latent period 10–30 minutes) an initial small decrease in (1) was followed by an increase. Of 5 rabbits given $\frac{1}{2}$ the LD the increase in (1) (latent period 12–38 minutes) was 10–40 per cent. in 3; in the other 2 a small initial decrease was followed by an increase. JULIAN F. SMITH (Chem. Abstr.).

Influence of Aniline on Permeability of the Hemato-encephalic Barrier. Shakhnovskaya, S. B. [*Farmakol. i Toksikol.*, **7**, No. 3, 59–60 (1944).]

In tests with white mice both acute and chronic $PhNH_2$ poisoning often raised the permeability of the hemato-encephalic barrier to intravenously injected 1 per cent. trypan blue solution (10 c.c./kgm.). Topographic distribution of the dye in the brain differed; acute poisoning gave preferential staining of the cortex, whereas in chronic poisoning the dye went mainly to the periventricular and nerve-stem areas. Restoration of the hemato-encephalic barrier was faster after acute than after chronic poisoning. Test mice were poisoned by inhalation of $PhNH_2$ vapor. JULIAN F. SMITH (Chem. Abstr.).

Vagotonin and Central and Peripheral Nervous Excitability Chauchard, B., and Chauchard, P. [*Compt. rend. soc. biol.*, **137**, 631–2 (1943).]

The intra-peritoneal injection of 1 mgm. of vagotonin in guinea pigs produces first a decrease in central and peripheral nerve chronaxia, indicating excitation, then, 20–30 minutes after the injection, a decrease in chronaxia throughout, indicating depression. Between these stages there is a period during which cortical chronaxia is still decreased while peripheral chronaxia is increased. The same effects are produced in lightly anesthetized guinea-pigs. These effects are different from the effects of insulin on chronaxia. L. E. GILSON (Chem. Abstr.).

Pigmentary Changes in the Nervous System. Formation of Pigments (Autogenous Pigments). Cazal, P. [*Compt. rend. soc. biol.*, **138**, 95–6 (1944).]

The melanin, lipofuscins and Spatz pigment of nerve tissue are discussed. L. E. GILSON (Chem. Abstr.).

Pigmentary Changes in the Nervous System. Pigment Deposits (Exogenous Pigments). Elimination and Disintegration. [*Ibid.*, 116–17.]

Discussion. Pigments formed by decomposition of blood hemoglobin are often deposited in nerve tissue, but they do not remain there indefinitely. L. E. GILSON (Chem. Abstr.).

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The Central Nervous Regulation of the Protein Metabolism. Schrade, W., and Roester, L. [*Klin. Wochschr.*, **22**, 390–1 (1943); *Chem. Zentr.*, **2**, 735 (1943); *cf. C.A.*, **38**, 2379⁹.]

Insufflation of air into the brain ventricle of rabbits after occipital puncture resulted in a primary considerable lowering of the rest N within a minimum 2–3 hours after the onset (in one case a reduction from 41 to 13 mgm. per cent.). This was followed by an increase to an average of 32 per cent. above normal. The entire reaction disappeared after 12–24 hours. Schrade and Roester discuss the extent to which the shock occasionally observed after the central stimulation by air, or the action on the heat center (made evident by a primary temperature fall and occasionally a secondary temperature rise), are involved in the development of the reaction. A nearly 50 per cent. decrease in the urinary N excretion occurred through the central stimulation. Especially the 2nd phase of the reaction, the rest-N increase, is assumed to be independent of the heat center.

RUTH BERGGREN (Chem. Abstr.).

Cytochrome Oxidase in Normal and Regenerating Neurons. Howe, Howard A., and Mellors, Robert C. [*J. Exptl. Med.*, **81**, 489–500 (1945).]

Manometric determinations of cytochrome oxidase (I) activity were carried out on gray matter from the thalamus (II) and anterior horn (III) of cats and monkeys under various experimental conditions. The (II) of the cat was studied following the degeneration of virtually all the thalamic neurons secondary to decortication. In comparing the deneuronated (II) with the normal (II), it was found that approximately 34 per cent. of the (I) activity was contributed by the neurons and the balance by neuroglia and mesodermal tissues, which on the operated side remained comparable to that of the normal side. Total activity of the normal (II) averaged 5·52 units per mgm. of dry weight where 1 unit is defined as the amount of (I) required to produce a net O consumption of 10 c.c./hr. under the specified conditions of the experiment. The gray matter of the (III) of the spinal cord was isolated by a special technique, and its (I) activity was compared with (III) in which motoneurons had been stimulated to regenerative activity by section of peripheral nerves. Average normal levels of 2·23 units were found for cat (III) and 0·69 unit for monkey. Reductions of (I) activity in the range of 22–23 per cent. were observed for both cat and monkey following nerve section. The maximum reduction of (I) activity coincided with maximum refractoriness of the cells to poliomyelitis virus (30 to 70 days following nerve section). Neither of these states could be correlated in time with maximum chromatolysis (10 to 15 days).

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

Regenerative Cycle of Motoneurons with Special Reference to Phosphatase Activity. Bodian, David, and Mellors, Robert C. [*J. Exptl. Med.*, **81**, 469–88 (1945).]

Experiments are reported on the determination of the possible changes in, and localization of, acid phosphatase activity in motor nerve cell undergoing axon regeneration.

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

Action of Quinine-HCl on Subordination and Chemically Stimulated Reflexes. Lapicque, Marcelle. [*Compt. rend. soc. biol.*, **137**, 343–4 (1943); *cf. C.A.*, **18**, 2204.]

The influence of quinine-HCl on nerve reactions in frogs and toads was studied. The effects were slight and irregular.

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

Changes of Noble-metal Electrode e.m.f. of Cerebral Cortex. McCulloch, W. S., Klein, J. R., and Goodwin, C. [*Proc. Soc. Exptl. Biol. Med.*, **58**, 292–3 (1945).]

One noble-metal, one glass, and two Ag-AgCl saline-wick electrodes were placed close together on the cerebral cortex of a cat. The e.m.f. between each pair of electrodes was measured and in some experiments recorded continuously. The electric hook-up is shown. When the effect of ether used for operation had passed off in cats curarized with dihydro-β-erythroidine-HCl by continuous infusion, and under constant artificial respiration, the e.m.f. of glass and noble-metal remained practically constant. The d.c. voltages between wick electrodes were

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less than 1 mv. The e.m.fs. of noble-metal electrodes (Pt, Au, Ta) and C were not significantly different, and were most frequently between 0·14 and 0·15 v. positive to the theoretical H electrode referred to which the Ag-AgCl wick electrode is 0.27 v. positive. Alteration of composition of respired gas from 100 per cent. O_2 to 4 per cent. of O_2 in N_2, although it altered the O_2 tension of the cortex by a factor of 4, did not affect the e.m.f. of either glass or noble-metal electrodes. Intravenous injection of glucose was similarly without effect. Injection of adrenaline decreased the e.m.f. of glass and noble-metal electrode; breathing 5 per cent. CO_2 in O_2 increased both. Cessation of artificial respiration produced an increase in the e.m.f. of the glass electrode and a decrease in that of the noble metal. When air was readministered at the end of 3 minutes both electrodes overshot their original e.m.f. and returned slowly. The equivalence of noble-metal electrodes and that they are noble suggest that *in vivo* as well as *in vitro* the observed e.m.f. measures an oxidation-reduction potential. Its value is in the range of the hemochromogens. Since in computing oxidation-reduction potentials the log of the ratio of oxidant to reductant and the log of the concentration of H^+ enter with the same sign, changes of both noble-metal and glass-electrode potential in the same direction may only indicate that the system communicating with noble-metal electrodes includes H^+, and one cannot conclude that the change involves any other significant alteration in the oxidant-reductant ratio. But the large changes seen upon cessation of respiration are opposite in sign, implying a great change in this ratio. For this reason, alterations of e.m.f. of noble-metal electrodes may indicate chemical alterations which have escaped other methods of synchronous detection. L. E. GILSON (Chem. Abstr.).

Peripheral Mechanism of Pain. Mediation of Histamine in Sensations of Burning and Itching. Parrot, Jean L. [*Compt. rend. soc. biol.*, **137**, 620–1 (1943).]

In human subjects, previous ingestion of 0·2 gm. of N-dimethylaminoethyl-N-benzylaniline (RP 2339) decreased the sensitivity of the skin to the sensation of burning when the finger was plunged into hot water, and also decreased the itching sensation produced by intradermal microinjection of histamine, and by other methods of skin irritation. This indicates that histamine is a mediator in these pain sensations. L. E. GILSON (Chem. Abstr.).

Sensitivity of Nerve Tissue Cultivated in vitro to 2, 4-Dinitrophenol. Verne, Jean. [*Compt. rend. soc. biol.*, **136**, 635–6 (1942); *cf. C.A.*, **38**, 4628⁷.]

Although fibroblasts grow normally in the presence of dinitrophenol, 1 : 90,000, nerve fibers and neuroblasts undergo degeneration in presence of concentrations higher than 1 : 160,000. By repeated subculturing in media containing increasing concentrations of dinitrophenol neuroblasts are enabled to tolerate a 1 : 120,000 concentration. L. E. GILSON (Chem. Abstr.).

Excitability Changes at the Neuromuscular Junction During Tetany. Kuffler, Stephen W. [*J. Physiol.*, **103**, 403–11 (1945); *cf. C.A.*, **38**, 2752⁷.]

Experimental tetany was produced in cats by thyroparathyroidectomy and in frogs by parathyroidectomy, and by reduction of ionized Ca in the blood stream. The effect of tetany on the neuromuscular system was studied, and it is suggested that the symptoms of tetany are a result of lowering of the threshold at synapses and end plates. The severity of symptoms was not directly related to the degree of blood-Ca reduction. H. L. WILLIAMS (Chem. Abstr.).

Some Rarer Forms of Mental Deficiency. (1) *Phenyl-pyruvic Oligophrenia. Medlicott, R. W.* [*New Zealand Med. J.*, **43**, 191–4 (1944).]

A review including the biochemical aspects of this disease and a report of two cases. RUTH BERGGREN (Chem. Abstr.).

The Elimination of Phenylpyruvic Acid by Mentally Deficient Individuals. Brugger, C. [*Schweiz. med. Wochschr.*, **73**, 967–9 (1943); *Chem. Zentr.*, **1**, 1104 (1944).]

The close relatives of a 16-year-old imbecile did not eliminate phenylpyruvic acid in the urine, in some cases even after feeding *l*-phenylalanine.
W. H. FISHMAN (Chem. Abstr.).

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The Cerebrospinal Syndrome in Brucellosis. Videla, Carlos Alberto, and Giudice, Carlos R. [*Rev. asoc. bioquim. argentina*, **12**, 15–28 (1945).]

The cerebrospinal fluids of 10 light cases of brucellosis have shown hypertension, a slight increase in glucose, and an indication of meningitis in the colloidal benzoin reaction. Chloride and albumin contents and the Lange reaction were normal.

F. FROMM (Chem. Abstr.).

The Occurrence of Lactoflavin, Nicotinamide, and p-aminobenzoic Acid in Cerebrospinal Fluid. Abderhalden, Rudolf, and Elsaesser, Karl H. [*Arch. ges. Physiol.* (*Pflüger's*), **247**, 325–35 (1943).]

Lactoflavin (I) could not be detected in free or combined form in human spinal fluid. The blood-spinal fluid barrier appeared to be impermeable to (I) but, injected cisternally, (I) disappeared rapidly from the spinal fluid. (I) added to spinal fluid *in vitro* was destroyed much more rapidly by ultraviolet light than (I) in aqueous solution. Spinal fluid contained 0–120, average 69 γ per cent., of nicotinamide (II). Nicotinic acid and codehydrase were not detected. Parenteral administration of (II) increased the concentration in the spinal fluid. Cisternally injected (II) disappeared within 12 hours. *p*-Aminobenzoic acid could not be detected in the spinal fluid in normal persons or after intravenous injection.

H. L. MASON (Chem. Abstr.).

Determination of Protein in Cerebrospinal Fluid. Nagel, W. [*Schweiz. med. Wochschr.*, **73**, 1299–1300 (1943).]

The advantages of Kafka's method (*cf. C.A.*, **27**, 744–5), using the centrifuge, include simplicity and the small quantity of fluid necessary for testing.

MAURICE M. RATH (Chem. Abstr.).

Ca Content of Human Serum and Cerebrospinal Fluid. Neto, Bento Magalhães. [*Anais soc. biol. Pernambuco*, **5**, 3–6 (1944).]

The average minimum and maximum Ca contents of 15 human serums and cerebrospinal fluids were: 9·37 (5·86–11·83) and 5·06 (3·73–6·00) mgm./100 c.c., respectively.

BRUNO VASSEL (Chem. Abstr.).

The Effect of Breathing Pure O on the N Dissolved in the Cerebrospinal Fluid. McArdle, B. [*J. Physiol.*, **103**, 35–6P (1945).]

The rate of disappearance of the N was such as to suggest its complete disappearance in about 6 hours. Approximately half of the N was removed in 40 minutes.

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

Comparison of the Effects of Pyridoxine and Pantothenic Acid Deficiencies on the Nervous Tissues of Swine. Follis, Richard H., Jr., and Wintrobe, Maxwell M. [*J. Exptl. Med.*, **81**, 539–52 (1945).]

When pigs were fed diets deficient in pyridoxine or pantothenic acid, ataxia developed and lesions were found in the sensory neurons. The morphological pattern of the lesions differed in the early stages of the two deficient states. Degeneration of the peripheral process of the sensory neurons was the initial and most prominent feature in pyridoxine deficiency. Chromatolysis was the first evidence of damage to the afferent neurons in pantothenic acid-deficient animals.

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

Changes in the Hypophysis During Avitaminosis. Giroud, C. A., and Desclaux, P. [*Compt. rend. soc. biol.*, **138**, 315–16 (1944).]

Histological, on guinea-pig hypophysis. L. E. GILSON (Chem. Abstr.).

Antipolyneuritic Value of Different Breads According to the Degree of Extraction of the Wheat in Flour Making. Mouriquand, G., Coisnard, J., and Edel, Mme. V. [*Compt. rend. soc. biol.*, **137**, 565–6 (1943).]

Pigeons fed exclusively on bread made from fine white flour representing a 70 per cent. extraction of the grain developed polyneuritic symptoms on the 35th day. Those fed bread made from flour of 85 per cent. or higher extraction appeared quite healthy on the 370th day (termination of experiment).

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

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Protective Power of Different Breads in a Diet Otherwise Completely Deficient in Vitamin B Complex. [*Ibid.*, 566.]

Pigeons were fed a mixture of heated polished rice 2 parts and bread 3 parts. With bread from flour of only 70 per cent. extraction they showed the first symptoms, a decrease in vestibular chronaxia, after 25–27 days. On a straight rice diet this occurs after 17–25 days. With bread from flour of 85 per cent. extraction the pigeons showed a decrease in vestibular chronaxia on the 41st day but no polyneuritis on the 140th day (end of experiment). With bread from flour of 98 per cent. extraction they showed possible slight symptoms on the 62nd day.

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

Studies on the Metabolism of Nicotinic Acid in the Horse. Pearson, P. W., and Luecke, R. W. [*Arch. Biochem.*, **6**, 63–8 (1945); *cf. C.A.*, **38**, 4013[8].]

Weanling Shetland ponies were observed to make normal growth on a diet containing 0·1 mgm. nicotinic acid (I) per kgm. body weight. More (I) was excreted in the urine and in the feces than was ingested when the ponies were fed a diet containing 0·01 mgm. (I) per kgm. body weight. Neither trigonelline nor N-methyl-nicotinamide was found in the urine.

VERNON L. FRAMPTON (Chem. Abstr.).

Action of Thiamine on Nerve Centers and the Oculopalpebral Reflex. Meidinger, F. [*Compt. rend. soc. biol.*, **137**, 600–1 (1943).]

In rabbits the intravenous injection of 0·04 gm./kgm. of thiamine produces a suppression of the oculopalpebral reflex almost as prolonged as that produced by an equal weight of morphine-HCl. L. E. GILSON (Chem. Abstr.).

Infiltrative Lesions of the Brain During Experimental Avitaminoses A and B_1 in the Rat. Bertrand, Ivan, Chauchard, Paul, and Mazoué, Henriette. [*Compt. rend. soc. biol.*, **136**, 716–17 (1942).]

The lesions described appeared 50–90 days after rats were deprived of either vitamin A or thiamine. L. E. GILSON (Chem. Abstr.).

Disturbances of Neuromuscular Excitability During Dietary Imbalance and Avitaminoses. II. Role of Acidosis and Variations in Blood Sugar in the Changes in Chronaxia Observed During Total B-complex Avitaminosis in Pigeons and Thiamine Deficiency in Rats. Lecoq, Raoul, Chauchard, Paul, and Mazoué, Henriette. [*Bull. soc. chim. biol.*, **26**, 79–93 (1944); *cf. C.A.*, **38**, 2364[4].]

The progressive change in chronaxia in rats deprived of thiamine differs from that in pigeons deprived of thiamine by a preliminary increase in nerve chronaxia without change in muscle chronaxia. Muscle chronaxia increases later. The same order of changes occurs in pigeons deprived of the entire vitamin B complex. After several days the chronaxia of both muscles and nerves decreases in all cases. The avitaminotic animals develop acidosis and hypoglucemia, which later changes to hyperglucemia. Effects of administration of $NaHCO_3$, glucose, and insulin at different stages of avitaminosis are discussed. L. E. GILSON (Chem. Abstr.).

Chronaxial Signs of Hypervitaminoses. Chauchard, Paul. [*Compt. rend. soc. biol.*, **137**, 429–30 (1943).]

Rats were given subcutaneous injections of the vitamins. Repeated large doses of vitamin A produced decreases in nerve and muscle chronaxia and excitation of the central nervous system. 2 mgm. of thiamine or 50 mgm. of nicotinamide caused increases in all chronaxias and nervous depression of central origin. 50 mgm. of ascorbic acid decreased muscle chronaxia, increased nerve chronaxia, and depressed the central nervous system. These effects are like those of alkalosis. Vitamin D, 800 I.U., increased nerve and muscle chronaxia and produced symptoms of hypercalcemia. In most cases a second injection of vitamin D caused a transient return to normal chronaxia followed by an increase as before.

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

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What is the Antineuritic Vitamin? Wintrobe, Maxwell M., Miller, Mitchell H., Follis, Richard H., Jr., and Stein, Harold J. [*Trans. Assoc. Am. Physicians*, **57**, 55–9 (1942); *cf. C.A.*, **36**, 7081[8].]

Sensory neuron degeneration developed in young pigs only when they were deprived of pyridoxine or pantothenic acid. Induced thiamine deficiency resulted in vomiting, anorexia, impaired growth, and elevated blood pyruvic acid, but failed to produce nerve degeneration. H. L. MASON (Chem. Abstr.).

Studies on Choline Deficiency in Dogs. McKibbin, J. M., Ferry, R. M., Jr., Thayer, S., Patterson, E. G., and Stare, F. J. [*J. Lab. Clin. Med.*, **30**, 422–8 (1945); *cf. C.A.*, **39**, 731[9].]

The feeding of choline to choline-deficient dogs rapidly produces an increase in food consumption and weight, withdrawal of lipide from the liver, and improvement in liver function as shown by bromosulfalein elimination, plasma cholesterol, and prothrombin time tests. Determinations of creatine or creatinine excretion or of the excretion of methylated nicotinic acid derivatives are of doubtful value in testing the Me reserves of dogs, since excretion of these compounds does not appear to be influenced by choline deficiency. A. E. TEERI (Chem. Abstr.).

The Microbiological Determination of Choline. Siegel, Louis. [*Science*, **101**, 674–5 (1945).]

The method of Horowitz and Beadle (*C.A.*, **38**, 391[8]) based on the growth response of a *cholineless* mutant of *Neurospora crassa* gave erroneous results. By using fritted glass filters (30 ml.) of medium porosity, quantitative removal and washing of the mold growth are easily effected. The relation between the dry weight of the mold and choline concentration is then consistently linear. The dry weight of mold for a given choline concentration is reproducible within ± 2 per cent. Tests on biological materials gave good agreement with different assay levels. E. D. WALTER (Chem. Abstr.).

Acetylcholine Transmission at Nerve Endings. Singh, Inderjit, and Sehra, K. B. [*Current Sci.*, **14**, 72–3 (1945).]

The stomachs of certain frogs were found to be insensitive to otherwise effective concentrations of acetylcholine (I) even after treatment with eserine. The same was also found true of their hearts, but the rectus abdominis was sensitive; potency of solutions was proved by this as well as by tests on dog stomach and rabbit intestine. Refractory hearts were inhibited on stimulation of the vagus nerve, and refractory stomachs responded to direct electric stimulation. In some cases (I) produced temporary inhibition of the heart, followed by augmentation, then a return to normal in the presence of (I); refractoriness was retained on perfusion with strong fresh (I), but was lost when (I) was alternated with Ringer. Vagus stimulation was still effective in presence of acquired refractoriness to (I). Strong solutions (1 in 10^5) of (I) might produce augmentation of contractions, hyperirritability, even contracture of the frog heart. Inhibitory effect of (I) on heart was augmented by increase in initial length of the fibers (increased perfusion pressure). Small concentrations of (I) enhanced response of frog stomach to electric stimulation (*cf.* Singh, *C.A.*, **34**, 173[9]).

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

Effect of Amino Acids on Acetylcholine Synthesis. Torda, Clara, and Wolff, Harold G. [*Proc. Soc. Exptl. Biol. Med.*, **59**, 181–3 (1945); *cf. C.A.*, **39**, 1918[8], 1927[2].]

Low concentrations of most of the amino acids and of carnosine, glutathione and creatine increased the synthesis of acetylcholine by minced frog brain; glycine, leucine and creatinine had no influence, and NH_3 had a retarding action.

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

Effect of some Isocyclic, Aromatic and Heterocyclic Compounds on Acetylcholine Synthesis. [*Ibid.*, 183–4.]

The synthesis of acetylcholine by frog brain was not significantly affected by low concentrations of cyclohexane, inositol, C_6H_6, toluene, $C_{10}H$, and BzOH.

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Hydroquinone, PhOH, *p*-aminophenol, salicylic acid, α- and β-naphthol, BzH, camphor, and penicillin decreased the synthesis in concentrations of 10^{-5} M or higher. Conjugated products (K phenolsulfonate, phenacetin, diphenylamine, benzidine, acetylsalicylic acid, and the sulfonamides) either did not modify the synthesis or decreased it slightly. Indole, skatole, quinoline, and carbazole decreased synthesis more or less, 3-indoleacetic acid was nearly inactive, *dl*-tryptophan was inactive, and natural tryptophan increased the synthesis. Penicillin decreased the synthesis because being an unsaturated ketone it can react with the SH group, an active group of the enzyme involved in the synthesis of acetylcholine.

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

Effect of Fatty Acids on Acetylcholine Synthesis. [*Ibid.*, 246–8.]

The synthesis was not modified by presence of glycerol, AcOH, Me_2CO, and palmitic, stearic, and acetoacetic acids. It was increased by butyric, propionic, valeric, and caproic acids, and decreased by formic, caprylic, capric, lauric, oleic, and linoleic acids and by AcH, glyceraldehyde, and β-hydroxybutyric acid.

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

Curare Superimposed on the Vascular Effects of Acetylcholine and Adrenaline. *de Moraes, J. Lacaz.* [*Anais faculdade med. univ. S. Paulo*, **20**, 191–200 (1944).]

In the isolated rabbit ear perfused with Ringer-Locke solution curare (2 c.c. of 1 per cent. solution) abolished the effects of adrenaline (1 : 1,000) and of acetylcholine (1 : 10,000).

B. V. (Chem. Abstr.).

Interference of the Local Dilating Effect of Acetylcholine with Central Nervous Vasoconstriction in the Peripheral Vascular System. *Mercker, H.* [*Arch. ges. Physiol.* (*Pflüger's*), **247**, 336–41 (1943); *cf. C.A.*, **37**, 4800[2].]

Increased CO_2 tension causes, by stimulation of the central nervous system, a vasoconstriction which counteracts the vasodilating effect of acetylcholine.

H. L. MASON (Chem. Abstr.).

Influence of Akuammine on the Cardiovascular Action of Acetylcholine. *Raymond-Hamet.* [*Compt. rend. soc. biol.*, **138**, 199–201 (1944); *cf. C.A.*, **39**, 2569[4].]

Akuammine-HCl was prepared from extract of the seeds of *Picralima nitida*, Stapf. In chloralosed bivagotomized dogs the hypotensive action of acetylcholine was only slightly augmented, but greatly prolonged by previous injection of 7 mgm./kgm. of akuammine-HCl.

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

Depression of Acetylcholine Synthesis by Serum from Working Muscle. Healthy Subjects and Myasthenia Gravis Patients. *Torda, Clara, and Wolff, Harold G.* [*Proc. Soc. Exptl. Biol. Med.*, **59**, 13–16 (1945); *cf. C.A.*, **39**, 1918[8].]

Further experiments on the synthesis of acetylcholine by frog brain in the presence of serum are reported. Synthesis was much greater in presence of serum from a healthy subject than with serum from a myasthenia gravis patient, and in either case synthesis was greater with serum from a rested arm than from an arm fatigued by repeatedly clenching the fist (circulation occluded with a sphygmomanometer cuff while samples were taken, in all cases).

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

The Formation of Acetylcholine, the Freeing of Aneurine, and the Metabolism of Peripheral Nerves in vitro. *Sanz, Manuel C.* [*Arch. ges. Physiol.* (*Pflüger's*), **247**, 317–24 (1943).]

In a suspension of finely ground nerve in Locke solution containing glucose at 37° there was no change in the total acetylcholine (I) content but a large increase in bound (I). Without glucose, free and bound (I) decrease at first, then increase again. O consumption in the presence of glucose was 15 c.c./gm./hr.; without glucose O utilization was large in the first hour, but in 4 hours the total utilization was less than with glucose. Aneurine was set free from cocarboxylase with and without glucose. The respiratory quotient with glucose was 0·92–0·96; without glucose 0·82–0·87. Glycolytic formation of acid was greatly increased by addition of glucose.

H. C. MASON (Chem. Abstr.).

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Role of Acetylcholine and Vitamin B_1 in Nervous Excitation. Muralt, A. v. [*Nature, Lond.*, **154**, 767–8 (1944).]

Stimulation of the vagal supply to the frog's heart was found to liberate, in addition to acetylcholine, a second substance regarded as a special form of aneurin or aneurin compound (evidence from chemical assay, polarographic analysis, comparison with the properties of vitamin B_1) probably concerned with the recovery processes of nerve (evidence from photomicrographs, Wallerian degeneration, etc.). A. C. HOFFMAN (Psychol. Abstr.).

Spontaneous Cessation of the Inhibiting Effect of Acetylcholine on the Isolated Frog Heart. Cause of the Phenomenon. Tiffeneau, Robert, and Beauvallet, Marcelle. [*Compt. rend. soc. biol.*, **136**, 745–6 (1942).]

It is suggested that acetylcholine is fixed by certain receptors in the cells; it is then hydrolyzed to choline, which continues to occupy the receptors, and while exerting no important pharmaco-dynamic action itself, prevents access of new molecules of acetylcholine. L. E. GILSON (Chem. Abstr.).

Inhibition of Acetylcholine Apnea in Dogs by Procaine and by Atropine. Hazard, René, Corteggiani, Elisabeth, and Cheymol, J. [*Compt. rend. soc. biol.*, **138**, 78–9 (1944).]

In dogs acetylcholine, 5 mgm./kgm. injected intravenously, produces a transient drop in arterial pressure accompanied by apnea, then a short period of polypnea and a second and longer period of apnea. Procaine, like atropine, paralyzes the vagus nerves and also acts directly on the bronchial musculature, inhibiting the apnea. L. E. GILSON (Chem. Abstr.).

Procaine-HCl and Acetylcholine. Hazard, René, and Cheymol, Jean. [*Compt. rend. soc. biol.*, **137**, 280–1 (1943); *cf. C.A.*, **38**, 5592[8].]

In dogs anesthetized with chloralose, large doses of procaine-HCl (25–50 mgm./kgm. given intravenously) partially inhibited the muscarinic (cardioinhibitor) action of acetylcholine (1–2 mgm./kgm.), and diminished, suppressed, or reversed the nicotinic (hypertensive) action of acetylcholine.
L. E. GILSON (Chem. Abstr.).

The Influence of Acetylcholine on the Distribution of K in Muscle Tissue. Kometiani, P. A., Dolidze, Sh. V., and Klein, E. E. [*Biokhimiya*, **9**, 218–28 (1944).]

The action of acetylcholine, eserine, caffeine, nicotine, and veratrine was studied on frog preparations by perfusion through Ringer solution. Acetylcholine does not act in the same manner as the other substances causing muscle contraction. Caffeine, like acetylcholine, transforms part of the K into a form possessing the property of diffusion. This caffeine contraction, however, is similar to that caused by indirect tetanic stimulation. No matter how prolonged the action of acetylcholine, no phosphagen is decomposed although K is liberated in the process.
H. PRIESTLEY (Chem. Abstr.).

Synthesis of Acetylcholine by Tissue of the Central Nervous System. Feldberg, W. [*J. Physiol.*, **103**, 367–402 (1945); *cf. C.A.*, **38**, 1778[8].]

Some acetylcholine (I) is released and replaced by synthesis in fresh brain tissue during grinding. These processes continue in a suspension of the brain material in eserine-saline at 36°, so that (I) increases in the system while the quantity in the tissue particles remains practically constant. Dried and powdered brain substance, suspended in saline, is still capable of synthesis of (I). If eserine is present, (I) accumulates in this system. Ether reduces the (I) content of suspensions of brain tissue, but accelerates (I) synthesis when eserine is added. In a system composed of dried brain, saline, eserine, and ether, synthesis of (I) at room temperature is greater than under any other conditions so far observed. Within the temperature range 3–37° increase of temperature has a two-fold effect; the initial rate of (I) formation is increased, but during incubation the synthesizing power of the brain material declines at a rate which also increases with temperature. Synthesis of (I) occurs under anaerobic conditions, but not to the same extent as

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under aerobic conditions. The addition of glucose increases the synthesis of (I) by fresh brain suspension, but is without effect when powdered brain is used. NaCN has no effect in concentrations usually used to inhibit tissue respiration, but has a slight inhibitory effect in higher concentrations. Iodo-acetate and Ca^{++} decreases the synthesis of (I), while K^{+} increases the synthesis. These data are discussed. The inhibitory effect of glucose at its normal blood concentration is discussed in relation to the effects of hypoglycemia.

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

Effect of Cobra (Naja naja) Venom and its Constituents on the Synthesis of Acetylcholine by the Brain Cells of the Rats and Pigeons. Ghosh, B. N., De, S. S., and Sarkar, N. K. [*J. Ind. Chem. Soc.*, **21**, 93–6 (1944).]

Minced brain was allowed to respire in oxygenated Locke-phosphate solution containing 1 : 7,000 eserine sulfate at a temperature of 37°. After shaking for 2–3 hours the pH was brought from pH 7·4 to 3·0. At the end of 30 minutes the contents of the flask were neutralized, and the acetylcholine (I) was determined by measuring the contraction of the dorsal muscle of the leech in oxygenated Locke-bicarbonate-glucose solution. Cobra venom did not interfere with the action of leech muscle. Glucose strongly favored synthesis of (I) by rat and pigeon brain. Dried cobra venom in doses of 2–4 times minimum lethal dose (m.l.d.) (0·1 mgm. for pigeon) markedly inhibited the formation of (I). Neurotoxin (R) isolated from cobra venom by Ghosh and De (*C.A.*, **36**, 2288[7]), and which was shown to inhibit respiratory movement, had no effect on synthesis of (I) in doses of 2–3 times m.l.d., which was 0·0065 mgm. for pigeons. A fraction of venom containing a principle that inhibited respiration and the formation of lactic acid from glucose by brain was isolated. This fraction was much more active than cobra venom in suppressing the synthesis of (I) by brain. The authors suggest that this principle in the venom is responsible for the synthesis of (I). J. D. TAYLOR (Chem. Abstr.).

The Stimulating Action of Acetylcholine on the Heart. McDowall, R. J. S. [*J. Physiol.*, **103**, 33 (1945).]

If acetylcholine concentration in Ringer solution reaching the perfused cat, frog, rabbit, or rat heart exceeds 1×10^{-6}, the typical slowing is seen, but this is followed by a marked increase in the force of the beat which may or may not be associated with an increased rate. The stimulative stage is associated with increased sensitivity to adrenaline, a reduced response to acetylcholine and a tending to extrasystoles. Both the stimulation and depression are abolished by atropine. The stimulation is abolished by ergotoxine. Very minute doses of acetylcholine show stimulation only, associated with increased coronary flow.

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

A Comparative Study of the Cholinesterase Activity of the Vertebrate Nervous System, with Especial Reference to its Relationship to Motor Ability. Lindeman, Verlus F. [*Am. J. Physiol.*, **143**, 687–91 (1945).]

A quantitative study of the cholinesterase activity of the central nervous system was made on 8 different animals representing 3 classes of vertebrates. The enzymic activity was determined by means of a microchemical method which involved the titration of the acid equivalent (ml. 0·01 N HCl) formed by the hydrolysis of acetylcholine. When the cholinesterase activity was computed per cell, for a unit of the nuclear surface and for a unit of the whole mass, a consistent correlation existed between the activity of the enzyme and the general motor ability of the animal within each of the classes.

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

Cholinesterase. 1. The Specificity of the Enzyme in Nerve Tissue. Nachmansohn, David, and Rothenberg, Mortimer A. [*J. Biol. Chem.*, **158**, 653–66 (1945); *cf. C.A.*, **39**, 716[8].]

Several esterases, including cholinesterase, were tested on a number of substrates and the resulting patterns used to distinguish the specific cholinesterase from other esterases. Specific esterases, including cholinesterase, have the characteristic

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that no substrate is split at a higher rate than is the substrate which is specific for the enzyme involved. The esterase in all nerve tissue (mammalian brains of various species, abdominal chain of lobster, squid ganglion and axon, and fish electrical tissue) is exclusively or predominantly cholinesterase. No difference is found between the properties of the esterase of freshly homogenized tissue and that after high purification. This observation supports the concept that the parallelism between voltage and enzyme activity in electrical fish indicates a parallelism between voltage and acetylcholine metabolism. The esterase of human serum is nonspecific, whereas that of red blood cells is cholinesterase. The esterases of nerve ending-free striated and heart muscles show a cholinesterase pattern. Curves are shown of hydrolysis rate as a function of substrate concentration.

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

Cholinesterase. Chowdhury, D. K. [*Ann. Biochem. Exptl. Med.*, **4**, 77–86 (1944); *cf. C.A.*, **37**, 1458[8].]

Cholinesterase from the venom of two varieties of *Naja tripudians* was purified by fractional precipitations with $(NH_4)_2SO_4$. Activity was increased twentyfold, and the product was twenty-two times more active than that prepared by Stedman and Stedman (*C.A.*, **30**, 3002[9]). Cataphoretic and adsorption procedures failed to produce further increase in activity. Cholinesterase from the venom of *Bungarus fasciatus* was purified elevenfold by the same process.

HOWARD S. MASON (Chem. Abstr.).

Activity of Cholinesterase in Intact Mammalian Heart Muscle and Influence of Various Drugs, Especially Narcotics, on Its Activity. Genuit, H., and Labenz, K. [*Arch. exptl. Path. Pharmakol.*, **198**, 369–89 (1941); *Chem. Zentr.*, **1**, 1019 (1944).]

Isolated rabbit hearts were perfused in closed circuit with Ringer-Locke solution by Langendorff's method. No cholinesterase passed into the perfusion liquid. The hydrolysis of added acetylcholine by the heart muscle varied with the temperature and with the coronary minute volume. The time course of the reaction is exponential. Prostigmine and physostigmine in very high dilutions completely inhibited the cholinesterase activity; prostigmine was 10 times as active as physostigmine. Cholinesterase activity was also inhibited, but to a relatively small extent, by barbital Na, evipan-Na, chloral hydrate, urethan, EtOH, iso-AmOH, and urea in physiologically active concentrations. It was completely inhibited by tetanus toxin in 1 : 100,000–1 : 300,000 dilution.

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

The Use of Cholinesterase in Shock. Schachter, R. J. [*Am. J. Physiol.*, **143**, 552–7 (1945).]

Dogs in hemorrhagic shock responded well to beef plasma administered in appropriate volumes by recovering from shock. Dogs in traumatic shock were benefited by plasma only temporarily. When dogs in traumatic shock were given intravenous injections of cholinesterase, the blood pressure usually returned to normal and remained there for the duration of the experiment.

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

Mechanism of Enzyme-inhibitor-substrate Reactions. Cholinesterase-eserine-acetylcholine System. Goldstein, Avram. [*J. Gen. Physiol.*, **27**, 529–80 (1944).]

The mechanism of enzyme-inhibitor-substrate reactions is analyzed from the theoretical viewpoint and illustrated by data from the cholinesterase-eserine-acetylcholine system. Competitive enzyme-inhibitor-substrate systems show the same characteristic " zones of behavior " as non-competitive systems. The three zones determine the mathematical function relating activity of an enzyme to concentration of added substrate or inhibitor, or both. The effects of suboptimum substrate concentration in these systems are discussed. The zone-behavior phenomenon is useful in determination of the number of molecules of substrate or inhibitor combining reversibly with a single enzyme center. Kinetics of competitive inhibition, dilution effect, combination of inhibitor or substrate with enzyme, and destruction of inhibitor or substrate by enzyme are analyzed and verified, and absolute velocity coefficients are determined. Inhibition of cholinesterase by

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eserine is competitive, and one molecule of eserine or acetylcholine combines with one center of cholinesterase. No definite value can be assigned to the molar concentration of enzyme centers, but in 4·54 per cent. serum (dog) it is less than $1{\cdot}8 \times 10^{-8}$. Competitive displacement of inhibitor by substrate and *vice versa* introduce considerable error in the normal 20-minute determination of activity of an inhibited enzyme unless a correction is applied. Dissociation of enzyme-inhibitor complex proceeds moderately slowly on dilution, so that full corrections for dilution cannot be applied unless time has been allowed for complete dissociation. Combination of eserine with cholinesterase is slow at all but high concentrations of inhibitor. Destruction of eserine or acetylcholine by cholinesterase follows the predicted curve; kD for destruction of eserine is greater than 0·00182, while for destruction of acetylcholine it is greater than 3,500. There is no evidence of inhibition of destruction by excess of substrate or inhibitor. The assumption that enzymic activity follows or nearly follows a unimolecular course is true only under certain definite limited conditions; it is generally invalid for enzymic destruction of an inhibitor. B. C. P. A. (Chem. Abstr.).

Cholinesterase of Human Blood. Rumma, K., and Sibul, I. [*Z. ges. exptl. Med.*, **112**, 686–701 (1943).]

Serum-cholinesterase activity varies widely in different diseases. It varies inversely with the K/Ca ratio of the serum. High cholinesterase activity usually accompanies a high lymphocyte count. No relation was found between cholinesterase activity and the total cholesterol content of the serum.
L. E. Gilson (Chem. Abstr.).

Effects of Inorganic Ions on Activity of Serum Cholinesterase. I. In Horse Serum in vitro. Frommel, Ed., Herschberg, A. D., and Piquet, J. [*Helv. Physiol. Pharmacol. Acta*, **2**, 169–91 (1944) (*in French*).]

The cholinesterase of horse serum is activated by Ca, Na, and Mg hyposulfites and by Ca, Mg, and NH_4 chlorides. Its activity is inhibited by ionic Pb, Hg, Ag, Au, Li, Fe, Ba, Cu, K, Zn, and Al, and by bromides, iodides, borates, hypophosphites, and As and Sb compounds. The Na, Ni, manganous, NO_3, and PO_4 ions have no effect on activity. L. E. Gilson (Chem. Abstr.).

II. In the Guinea-Pig in vivo. [*Ibid.*, 193–201.]

The effects were practically the same as *in vitro* for those ions which could be studied in live guinea-pigs. L. E. Gilson (Chem. Abstr.).

Occurrence of Different Types of Cholinesterase in Human Organs. Langemann, H., [*Helv. Physiol. Pharmacol. Acta*, **2**, C17–18 (1944) (*in German*).]

There are two types of cholinesterase, the s-type or pseudocholinesterase, and the the e-type or true cholinesterase. The s-type has no substrate optimum concentration, and is strongly inhibited by 0·001 M percaine but only slightly inhibited by 0·001 M caffeine or papaverine. The e-type has a very definite substrate optimum concentration and is strongly inhibited by caffeine. The cholinesterase of human skeletal muscle is pure e-type, that of brain and hypophysis probably all e-type, that of heart probably a mixture of both types, and that of ovary pure s-type. In the thymus of very young infants only e-type is present, but both types are present in thymus of children 2–10 years old. L. E. Gilson (Chem. Abstr.).

Differentiation of Types of Cholinesterase. Zeller, E. A. [*Helv. Physiol. Pharmacol. Acta*, **2**, C23–4 (1944) (*in German*); *cf. C.A.*, **37**, 1135[5].]

Differences between true cholinesterase (e-type) and pseudocholinesterase (s-type) are discussed. The cholinesterases of guinea-pig, horse, and human serums are all of the s-type. L. E. Gilson (Chem. Abstr.).

Serum Choline Esterase in Barbiturate Addiction and Epilepsy. Schutz, F. [*Quart. J. Exptl. Physiol.*, **33**, 35–52 (1944).]

During the period of withdrawal of the slow-acting barbiturates after prolonged administration, a predominantly cholinergic status apparently exists because of a relative lack of choline esterase. Rachel Brown (Chem. Abstr.).

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Studies on Choline Acetylase. (1) *Effect of Amino Acids on the Dialyzed Enzyme. Inhibition by α-keto Acids. Nachmansohn, David, and John, Hedda M.* [*J. Biol. Chem.*, **158**, 157–71 (1945); *cf. C.A.*, **39**, 1179⁹.]

Choline acetylase in extracts of rat or guinea-pig brain is able to catalyze the formation of 100 to 150γ of acetylcholine per gm. per hour under anaerobic conditions. This is coincidental with the rapid splitting of adenosine triphosphate even in the presence of fluoride. The enzyme requires K ions, the optimal concentration of which is 0·08 M. Choline acetylase is inactivated by dialysis (80 to 85 per cent. in 2 hours) and is reactivated partly by K^+ and further by *l*(+)-glutamic acid, but not by *d*(−)-glutamic acid. The enzyme is also activated by cysteine, glutamic acid plus CN^-, and *l*(+)-alanine, in the order named. Dicarboxylic acids have no effect, but citric acid reactivates almost as well as does glutamic acid. The enzyme is inhibited by α-keto acids in 10^{-3} to 10^{-4} M concentrations. Choline acetylase can be separated from cholinesterase by treatment with acetone, which destroys the latter enzyme. WILLIAM M. GOVIER (Chem. Abstr.).

3. Pharmacology and Treatment.

Convulsive Factor in Commercial Penicillin. Walker, A. Earl, and Johnson, Herbert C. [*Arch. Surg.*, **50**, 69–73 (1945).]

The application of commercial penicillin to the cerebral cortex of cats, dogs, monkeys, and human beings gives rise to convulsive manifestations. The antibiotic and convulsive factors seem closely related, since they are about equally affected by ageing, boiling, and acidifying the penicillln solution, and by dissolving penicillin in alcohol. In the human subject, application of 10,000–20,000 Oxford units of penicillin to the cerebral cortex may produce convulsive manifestations.
JOHN T. MYERS (Chem. Abstr.).

The Effect of Intracranial Penicillin on Brain Involvement in Experimental Relapsing Fever. Schuhardt, V. T., and O'Bryan, Billie E. [*J. Bact.*, **49**, 312–13 (1945).]

Penicillin injected intracranially is capable of curing the brain involvement in experimental relapsing fever of the white rat.
JOHN T. MYERS (Chem. Abstr.).

Effect of Amphetamine (Benzedrine) Sulfate on Higher Nervous Activity. Alpern, E. B., Finkelstein, N., and Gantt, W. H. [*Johns Hopk. Hosp. Bull.*, **73**, 287–99 (1943).]

Amphetamine sulfate administered orally to dogs caused a moderate loss of differentiation in conditioned reflexes (secretory, motor, and autonomic). It increased the conditioned secretion relative to the unconditioned secretion to food, and thus was an excitatory stimulant of the supra-segmental nervous system. The latent period of conditioned secretory responses was shortened, while that of conditioned motor defense reflexes was unaltered or lengthened. The unconditioned secretion to food and the unconditioned sexual reflexes were decreased. The effects on the nervous system began in about ½ hour, reached a maximum in 1–2 hours, and could be detected up to 6 hours after administration of the drug. There are thus 3 effects: loss of differentiation, excitation of the supra-segmental system, and the possible inhibition of at least part of the segmental or peripheral nervous systems (secretory). Since theoretically each effect may be dominant under various conditions, this is a possible explanation for the variable action of the drug. M. E. MORSE (Psychol. Abstr.).

Influence of Analeptics on Respiration in KCN Poisoning. Shvarsalon, N. S. [*Farmakol. i Toksikol.*, **7**, No. 3, 29–39 (1944).]

After intravenous injections of KCN in dogs the use of stimulants for the central nervous system during cessation of respiration is contra-indicated. In the period of deep, infrequent respiration lobeline and cytitone stimulate respiration, but since they are cardiac depressants their doses must be small. Cytitone (dose

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0·1 ml./kgm. equivalent to 0·015 mgm. cytisine per kgm.) is preferable because of lower cardiac activity. Large intravenous doses of adrenaline are beneficial to test animals in KCN poisoning; ephedrine is less effective. Sympatol sometimes stimulates respiration. Like adrenalone, its effect is variable and adrenaline is preferable. Cordiamine and spiramine are ineffective unless the test animal is already in a coma. In the stage of rapid, shallow breathing respiratory stimulants are superfluous. Respiration charts are shown, and some tests with metrazole are reported.

JULIAN F. SMITH (Chem. Abstr.).

Anticonvulsant Effects of Steroids. Wycis, H. T., and Spiegel, E. A. [*Am. J. Med. Sci.*, **209**, 548–9 (1945); *cf. Spiegel, Federation Proc.*, **2**, *No.* 1, 47 (1943).]

Androstenedione (I), dehydroandrosterone (II), desoxycorticosterone acetate (III), acetoxypregnenolone (IV), progesterone (V), and testosterone (VI) produced anticonvulsant effects in female white rats. The anticonvulsant dose lies close to, or is identical with, the hypnotic dose for (III), (V), and (VI). A definite margin between these doses exists for (I), (II), and (IV). The following steroids had no or only questionable anticonvulsant action: cholesterol, allocholesterol, cholesteryl bromide, epicholestanol, stigmasterol, stigmasteryl acetate, α-spinasteryl acetate, ergosterol, ergosteryl acetate, α-ergostenyl acetate, dehydrocholic acid, desoxycholic acid, Δ^5-3-acetoxycholenic acid, sarsasapogenin acetate, pseudosarsasapogenin acetate, diosgenin acetate, pseudodiosgenin acetate, α-estradiol benzoate (progynon B), theelin in oil, 6-α-acetoxyprogesterone, etiocholan-3(β)-ol-17-one acetate, 5-pregnen-3(β)-ol-20-one acetate, 5, 16-pregnadien-3(β)-ol-20-one acetate, and stilbestrol.

RACHEL BROWN (Chem. Abstr.).

KCNS in the Treatment of Alcoholism. Carratala, Rogelio. [*Rev. asoc. med. argentina*, **59**, 34–6 (1945).]

Injections of 5 per cent. KCNS (0·05 gm. per kgm.) were given to dogs habituated to alcohol and 0·2 to 0·4 gm. per day was given to human beings by gastric tube. The alcoholic habit was not altered by the drug.

E. S. G. BARRON (Chem. Abstr.).

Influence of Lactoflavin and the Antipellagra Factor on Glutathionemia. Murano, Giulio. [*Pediatria* (*Riv.*), **49**, 469–501 (1941).]

From a study of 16 children, aged 5 to 30 months, injection of 0·5 mgm. of lactoflavin intramuscularly for 10 days gave a distinct decrease in the amount of reduced glutathione after 5 days. The significance of these observations is discussed.

WILLIAM F. BRUCE (Chem. Abstr.).

Does the Iodomethylation of Quinoline Modify its Action on the Sympathetic Nervous System? Raymond-Hamet. [*Compt. rend. soc. biol.*, **138**, 88–90 (1944).]

In dogs, quinoline iodomethylate is sympathicolytic in large doses (77 mgm./kgm.) and sympathicosthenic in small doses (7 mgm./kgm.).

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

Method for Studying the Central Action of Analeptics in Raising Blood Pressure. Hahn, Fritz. [*Arch. exptl. Path. Pharmakol.*, **198**, 472–90 (1941); *Chem. Zentr.*, **1**, 1019–20 (1944); *cf. C.A.*, **38**, 2109[9], 2731[3].]

Method and preliminary report on the action of metrazole in cats.

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

The Response of the Central Nervous System of the Rat to Methylcholanthrene. I. The Induction of Tumors Derived from Nervous Tissue. Russell, Wm. O. [*Cancer Research*, **5**, 140–51 (1945).]

Intracranial tumors were produced in 21 of 42 rats after implantation of pellets containing 30 per cent. methylcholanthrene (I) in cholesterol in the right cerebral hemispheres. In 14 of the 21 rats the growths were derived from nervous tissue, in 10 the growths were fibrosarcomas, and in 3 both types were present.

E. R. MAIN (Chem. Abstr.).

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II. The Effect of a Diet Deficient in Thiamine and Riboflavin on the Induction of Tumors Derived from Nervous Tissue. [*Ibid.*, 152–6.]

The periodic removal of thiamine and riboflavin from the diets of rats with intracranially implanted pellets of (I) shortened the period of induction of tumors derived from nervous tissue to 230 days from 370 days for rats on control diets. The tumor incidence was not affected. The dietary deficiencies affected neither the incidence nor the induction time of tumors derived from connective tissue.

E. R. MAIN (Chem. Abstr.).

Production of a New Type of Poison for the Sympathetic Nervous System by Iodomethylation of a Sympathicolytic Agent. Raymond-Hamet. [*Compt. rend.*, **218**, 425–7 (1944).]

Upon iodomethylation, hydroxycinchonidine in large doses maintains its sympathicolytic activity, while in small doses it has a sympathicosthenic action.

RACHEL BROWN (Chem. Abstr.).

Influence of Excitants of Parasympathetic Nerve Endings on Anaphylactic Shock in Rabbits. Vallery-Radot, Pasteur, Mauric, G., and Holtzer, Mme. A. [*Compt. soc. biol.*, **138**, 123–4 (1944).]

Pilocarpine neither increased nor decreased the severity of serum shock, eserine sulfate had no protective action, and the influence, if any, of acetylcholine was slight and uncertain. L. E. GILSON (Chem. Abstr.).

Effects of Morphine, Pentobarbital, Ether, and Eserine on Two-neuron and Multineuron Reflexes in the Cat. Wikler, Abraham. [*Proc. Soc. Exptl. Biol. Med.*, **58**, 193–6 (1945); *cf. C.A.*, **38**, 2115⁹.]

In the spinal cat, small doses of morphine (5 mgm./kgm.) enhanced two-neuron arc reflex discharges and depressed those traversing multineuron arcs. After doses of 15 mgm./kgm. depression of multineuron arc discharges was followed by enhancement of these discharges. Na pentobarbital depressed all discharges, and these effects were unaltered by previous injection of eserine or morphine plus eserine. Ether depressed all discharges. Eserine enhanced two-neuron arc discharges, but had little effect on multineuron arc discharges. Eserine after morphine enhanced both types of discharges. L. E. GILSON (Chem. Abstr.).

Action on the Nervous System of Venom of the Scorpion Tityus serrulatus. *Sampayo, R. R. L., and Odoriz, J. B.* [*Rev. soc. argentina biol.*, **20**, 569–80 (1944).]

Experiments made on rabbits anesthetized with nembutal showed that the venom is a neurotoxin which acts on the central nervous system, as demonstrated by the simultaneous recording of the electrical activity of cerebral cortex and striated muscle. L. E. GILSON (Chem. Abstr.).

Action of Scorpion Venom on the Vasomotor System. Del Pozo, E. C., Anguiano, G. L., and González, J. [*Q. Rev. inst. salubridad enfermedad. trop. (Mex.)*, **5**, 227–40 (1944).]

Intravenous injection of scorpion venom elevates the blood pressure in normal, decerebrate, acute spinal, and adrenalectomized cats. The effect is not observed if the spinal cord is destroyed. Curare does not abolish the effect. Vasoconstriction is caused in the sympathectomized pinnae of cats and rabbits, but not after adrenalectomy. There is also bradycardia which is not observed after section of the vagi. Vascular reflexes in response to central stimulations of the sciatic and vagus are not affected by the venom. Conclusion: The action is largely stimulation of the pre-ganglionic neurons of the sympathetic which control vasoconstriction and adrenal secretion. H. L. WILLIAMS (Chem. Abstr.).

Comparative Actions of Barbiturates, Hydantoins and Bromides on Epileptic Convulsions from Electric Shock in Rats. Delay, Jean, and Soulairac, A. [*Compt. rend. soc. biol.*, **138**, 60–1 (1944).]

Tonic convulsions lasting 5–10 seconds followed by clonic convulsions lasting 20–30 seconds were provoked by 170 v., 0·1–0·5 microampoules from electrodes

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applied to the head. Hyperglucemia was produced. Previous subcutaneous injection of 0·3 gm./kgm. of phenobarbital prevented the convulsions and the rise in blood sugar. After injection of 0·3 gm./kgm. of 5, 5-diphenylhydantoin it was necessary to increase the power to 230 v., 0·6–1·2 microampoules to obtain convulsions. The tonic phase was very short and the clonic phase prolonged. Hyperglucemia was marked. After injection of 3·0 gm./kgm. of NaBr the tonic phase of convulsion was prolonged to 30–40 seconds, with marked hyperglucemia.

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

Action of Certain Anticonvulsants on Smooth Muscle. Gayet-Hallion, Th. [*Compt. rend. soc. biol.*, **138**, 332–4 (1944).]

In 1 : 70,000 or higher concentrations, Na diphenyl-hydantoin antagonized the action of minimal effective concentrations of histamine, acetylcholine, pilocarpine, and $BaCl_2$ on isolated guinea-pig intestine and uterus. Of other hydantoins (not named) tried some were effective in higher concentrations and some were without action. Benzophenone was more active than diphenylhydantoin, acetophenone was much less active, and phenobarbital had a very low activity.

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

Action of Hypnotics on Thalamic Centers. III. Effects of Sodium Barbital on Hunger Contractions and the Hypermotility of the Stomach After Insulin. La Barre, J., and Vesselovsky, O. [*Arch. intern. pharmacodynamie*, **66**, 414–20 (1941).]

Na barbital (100–150 mgm./kgm.) causes immediate cessation of hunger contractions in dogs, but has no effect on the post-insulin contractions. The latter are affected only by doses of 250 mgm./kgm. (Cf. *C.A.*, **38**, 4029[7].)

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

Influence of Various Salts on Metrazole Reactions. Wastl, H. [*Arch. intern. pharmacodynamie*, **66**, 397–408 (1941).]

Ca salts (150 mgm./kgm.) injected intraperitoneally into guinea-pigs, either before or with 75 mgm./kgm. metrazole, decrease the incidence of convulsions and the mortality rate. Ca gluconate and lactate are most effective in reducing the mortality rate, and Ca benzoate and salicylate in reducing the incidence of convulsions.

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

Experiments in the Group of Sympathomimetics. V. Relation Between Chemical Constitution and Pressor Activity of Possible Sympathomimetics Derived from the Benzene, Naphthalene, Phenanthrene, and Isoquinoline Rings. Rajagopalan, S., and Venkatachalam, K. [*Proc. Indian Acad. Sci.*, **20A**, 175–86 (1944); *cf. C.A.*, **39**, 2742[3].]

In experiments on pressor effect in the spinal cat, with tyramine as a control, the α-naphthylmethylamines and benzylamine showed little activity. Fair activity was shown by the ω-aminoacetonaphthones, β-naphthylethanolamines, and the β-naphthylethylamines. Rules governing structure and pressor activity relationships apply to members of the naphthalene series only to a limited extent. Naphthalene derivatives usually, but not always, are more active than are benzene derivatives. The naphthalene and acenaphthene nuclei are about 7 times as effective as the benzene ring, but the phenanthrene ring is only twice as effective. The naphthalene ring series may be a promising source of new potent pressors.

LEONARD WALKER (Chem. Abstr.).

Effects of Prolonged Action of Aniline in Small Doses on the Permeability Coefficient of the Hemato-encephalic Barrier. Shakhnovskaya, S. B. [*Farmakol. i Toksikol.*, **7**, *No.* 4, 51–3 (1944).]

Prolonged exposure of dogs to the approximate concentration of $PhNH_2$ vapor occurring industrially caused a break in the permeability coefficient of electrolytes (K^+, Ca^{++}, and Cl^+) and wide fluctuations of the ratio K : Ca in spinal fluid and in blood serum. The amount and direction of the shift in the coefficient for K,

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Ca and Cl, together with the stimulant effect observed in some dogs, indicate that chronic $PhNH_2$ poisoning acts on the vegetative nervous system.

JULIAN F. SMITH (Chem. Abstr.).

Relations Between Chemical Constitution and Pharmacological Effects of Barbituric Acid Derivatives. Zakrividoroga, S. P. [*Farmakol. i Toksikol.*, **7**, *No.* 4, 7–11 (1944).]

Amination of 5-alkylbarbituric acids does not yield soporifics; neither does conversion of thiobarbituric acid to sulfide type derivatives. In speed and intensity of soporific effect, and also in toxicity, 5-propyl-5-furfuryl-barbituric acid ranks higher than barbital; the corresponding thio compound is soporific but highly toxic. Propylcyclohexylbarbituric acid has first a stimulating and then a slight, transient, soporific effect on white mice. The activity of N-methylbarbital is fully equal to that of barbital. JULIAN F. SMITH (Chem. Abstr.).

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