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 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.

Abh. Neur. Psychiat.
Abh. Psychother.
Acta Española Neur. y Psiquiat.
2, 4 *Acta Psychiat. et Neurol.*
3 *Acta Psychol., Hague.*
Acta Psychol., Keijo.
Aliéniste Français.
2 *Allg. Ztschr. f. Psychiat.*
Altersprobleme.
Am. Imago.
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 psicologia, Buenos A.
2, 3 *Année Psychol.*
2 *Ann. Méd. Psychol.*
2 *Ann. Osp. psichiatri., Perugia.*
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.
1, 2 *Arch. Neurobiol.*
4 *Arch. Neurol., Paris.*
Arch. de Neurol. de Bucarest.
1 *Arch. de Neurol.*
2 *Arch. di Antropol. Crim.*
Arch. di Crim. Neuropsiquiat. Disc. y Con., Quito.

* 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.

2, 4	*Arch. f. Psychiat.*
2, 3	*Arch. ges. Psychol.*
	Arch. Internationale 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.*
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. Psiquiatria, Rosario.
2, 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.*
3, 4	*Brit. J. Psychol. Monogr. Suppl.*
	Bull. Canad. Psychol. Ass.
2, 4	*Bull de la Soc. de Psychiatrie de Bucarest.*
2	*Bull. de la Soc. Roumaine Neur. Psychiat. Psychol. Endocrin.*
	Bull. du Groupement Français d'études de neuro-psychopathologie infantile.
2	*Bull. Los Angeles Neur. Soc.*
	Bull. Menninger Clin.
	Bull. Soc. Psihol. med. Sibiu.
4	*Canad. Journ. Occup. Ther.*
3	*Cath. Univ. of Amer. Studies in Psychol. and Psychiat.*
2	*Cervello.*
2, 3, 4	*Character and Per.*
2	*Child Develpm.*
	Child Develpm. Abstr.
	Child Develpm. Monogr.
	Child Study.
	Chin. J. Psychol.
3	*Comp. Psychol. Monogr.*
2	*Confinia Neurol.*
	Contr. del Lab. di Psichologia.
	Contr. psychol. Theor.
2	*Deutsche Ztschr. f. Nervenh.*
	Dis. Nerv. Syst.
	Educ. psychol. Measmt.
1, 2, 3, 4	*L'Encéphale.*
2	*Epilepsia.*
	Evolut. Psychiat.
	Fiziol. Th. S.S.S.R.
2	*Folia Neuropath. Esthon.*
2	*Folia Psychiat. et Neurol. Japonica.*
2	*Fortsch. Neur. Psychiat.*
3	*Genet. Psychol. Monogr.*
	Giornale di Psich. e di Neuropat.
4	*Hum. Factor.*
2, 3, 4	*Hyg. Ment.*
	Illinois Psychiat. J.
	Index Neurol. y Psiquiat, Buenos Aires.
3	*Indian J. Psychol.*
	Industr. Psychol.
	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, 3 *J. Comp. Psychol.*
J. Consult. Psychol.
J. Crim. Law and Criminol.
J. Crim. Psychopathol.
J. de Psychiatrie Infantile.
3 *J. Educ. Psychol.*
J. Except. Child.
3, 4 *J. Exp. Psychol.*
2 *J. f. Psychol. u. Neurol.*
3 *J. Gen. Psychol.*
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. Psychiat.*
J. Neuropath. and Psychiat., Leningrad.
J. Neuropath. Ex. Path.
2, 4 *J. Neurophysiol.*
J. Neuropsychiatrique du Pacifique.
J. Parapsychol.
J. of Psychical Research.
J. Psihoteh.
2 *J. Psycho-Asthenics.*
3 *J. Psychol.*
J. Psychol., Moscou.
J. Psychol. Neurol., Leipzig.
2 *J. Psychol. Norm. Path.*
J. Soc. for Psychical Research.
3 *J. Soc. Psychol.*
J. Speech Disorders.

Kriminalistik.
3 *Kwart. Psychol.*

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

Ned. Tijdschr. Psychol.
2 *Neopsichiatrica.*
2 *Nervenarzt.*
3 *Neue psychol. Stud.*
Neurbiol., Pernambuco.
Nevrasse.
Nevropath. i. Psikhiat.
Note e Riv. di Psichiat.
Nowiny Psychjaryczne.
Nuova Riv. di Clin. ed Assistenza Psichiatrica.

Obshch. Klin. Nevropat.
3 *Occup. Psychol.*
2 *Occup. Ther. and Rehabil.*

2 *Onderzoekingen Psychiat-Neur. Klin., Utrecht.*
2 *Ospedale Psichiatrico.*

Person. J.
Pisani.
Polsk. Arch. Psychol.
Prace Psychol.
Proc. Amer. Assoc. Stud. Ment. Def.
Proc. A. Research Nerv. and Ment. Dis.
Psichotec.
Psicoterapia (*Cordoba*).
Psyche.
Psychiat. Monogr.
2 *Psychiat. en Neurol. Bl., Utrecht.*
2 *Psychiat. et Neurol. Japonica.*
2 *Psychiat. Neurol. Wchnschr.*
Psychiatry.
1, 2, 4 *Psychiat. Quart.*
2, 3 *Psychoanal. Quart.*
1, 2, 3 *Psychoanal. Rev.*
2, 3 *Psychol. Abstr.*
3 *Psychol. Bull.*
Psychol. Clin.
Psychol. Exch.
3 *Psychol. Forsch.*
Psychol. Index.
Psychol. Monogr.
Psychol. Rec.
3, 4 *Psychol. Rev.*
3 *Psychol. Rev. Monographs.*
Psychol. Stud., Univ. Bp.
Psychol. wychow.
3 *Psychometrika.*
Psychometr. Monogr.
Psychosom. Med.
Psychosom. Med. Monogr.

Quart. J. Speech.
Quart. J. Stud. Alcohol.

Rass. Neurol. Veget.
Rass. Studi Psichiat.
Rev. Argent. Neurol. Psiquiat.
Rev. de Psicoanalisis, Argentine.
Rev. di Neur. e Psychiat., S. Paolo.
Rev. di Psiquiatria, Chile.
Rev. di Psiquiatria y Crim.
3 *Rev. Franç. Psychoanal.*
Rev. Ibero-Amer. de Anal. Biblio. de Neurol. y Psiquiat.
Rev. Mex. Neurol. Psiquiat.
1, 2, 4 *Rev. Neurol.*
Rev. Neurol. di Buenos-Aires.
Rev. Neurol. Psychiat., Praha.
Rev. Neuro-psiquiatr., Lima.
Rev. Oto-Neur.-Oftal. Cir. Neur. Sud-Am.
Rev. Neuropsiquiatr.
Rev. Psicol. Pädag.
Rev. Psihol.
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.
Ricerca Psichica.
2, 3, 4 *Riv. di Neurol.*
Riv. di Neuro-psiquiatria, Peru.
3 *Riv. di Psichologia.*
Riv. Ital. di Endocrin. e Neurochir.
2 *Riv. Patol. nerv. ment.*
Riv. Psichol. Norm. Pat.
2, 4 *Riv. Sper. Freniat.*

1 *Rocznik Psychjatryczny.*
Rorschach Res. Exch.

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

Tohoku Psychol. Folia.
Tr. Am. Neurol. A.
Tr. Beritov. Inst., Tiflis.
Tr. Kostchenko Ment. Hosp., Moscow.
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. Psychologie.
Z. Berufsbildung des Pflegepersonals.
Z. Individ. Psychologie.
2, 4 *Z. ges. Neurol. Psychiat.*
3 *Z. Pädag. Psychol.*
Z. Parapsychol.
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.*
Zbl. Psychotherap.

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AM. J. PATH.

VOL. XIX. MAY, 1943.

*Histochemical Studies of Tissue Enzymes. III: A Study of the Distribution of the Acid Phosphatases with Special Reference to the Nervous System. *Wolff, A., Kabat, E. A., and Newman, W.* 423
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Histochemical Studies on Tissue Enzymes. III: A Study of the Distribution of Acid Phosphatases with Special Reference to the Nervous System.

1. The histochemical technic of Gomori for demonstrating acid phosphatases in tissues was modified to insure optimal enzyme activity. A variety of substances including enzyme poisons were used to establish the properties of these enzymes in tissue sections.

2. Using this improved technic the distribution of acid phosphatases in normal and neoplastic tissues is described. Acid phosphatase activity was found in nuclei as well as in the cytoplasm of many cells. The nervous system was found to contain large amounts of an acid phosphatase, as did both the male and female genital systems, parts of the digestive, hematopoietic, urinary, and endocrine systems.

3. A series of tumors of the nervous system was studied, and the acid phosphatase content of the tumors correlated with the enzyme content of the cell types from which the tumors were derived.

4. The significance of the histochemical technic in relation to function of the enzyme in individual cells is considered. (Authors' abstr.)

SEPTEMBER.

*Effect of Vitamin E Therapy on the Central Nervous System in Amyotrophic Lateral Sclerosis. *Davison, C.* 883

Effect of Vitamin E Therapy on the Central Nervous System in Amyotrophic Lateral Sclerosis.

Ten cases of amyotrophic lateral sclerosis were treated with vitamin E and alpha-tocopherol and, except for one, none responded clinically to this form of treatment.

Histopathologically, however, in six of the intensively treated cases the destruction of the myelin sheaths and axis cylinders was found to be much less intense than in the untreated cases. The dense gliosis which is usually present in amyotrophic lateral sclerosis was diminished or almost absent in those that received vitamin E. The lessened myelin sheath and axis cylinder destruction and the faint gliosis in these instances were perivascular and insular in distribution. On one of these the lessened changes were limited to one side of the cord only. The nerve cells of the involved bulbar nuclei and anterior horns remained unchanged and showed no signs of reversibility. The ultimate cause of death was bulbar in nature.

The histopathologic processes in the other four less intensively treated cases, although less extensive, were considered to be about the same as those found in untreated cases.

There is a possibility that vitamin E therapy resulted in a reversal of the reaction of degeneration affecting simultaneously and nearly equally the damaged myelin sheaths, axis cylinders and glia in amyotrophic lateral sclerosis. (Author's abstr.)

NOVEMBER.

Experimental Brain Tumors. II: Tumors Produced with Benzpyrene. *Zimmerman, H. M., and Arnold, H.* 939

AM. J. PSYCHIAT.

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The Pain Threshold in Man. *Hardy, J. D., et al.* 744
Psychiatric Aspects of Obesity in Children. *Bruch, H.* 752

The Effect of Electrically and Chemically Induced Convulsions on Conditioned Reflexes.

Experiments are reported in which a conditioned response to the sound of a bell was established in 18 male rats. This response was then inhibited by lack of re-enforcement with the unconditioned stimulus. Although control experiments showed that conditioned responses thus inhibited do not recover spontaneously, it was found that the application of one or more metrazol convulsions or of electrically induced convulsions restored temporarily the inhibited conditioned response. The experimentally proved removal of inhibition by "shock treatment" is of interest in view of the effects of the shock treatment in psychoses. (Authors' abstr.)

Electric Shock Treatment in General Paresis.

Electric shock therapy proved to be a perilous procedure in patients diagnosed psychosis with syphilitic meningo-encephalitis.

Alarming cardiovascular and respiratory failure accompanying a major reaction or even a minimum reaction necessitated discontinuance of this kind of therapy before any clinical improvement was noticeable. Therefore no evaluation regarding therapeutic benefit can be ventured. Two factors are discussed that may be responsible for the severe complications. (Authors' abstr.)

On the Use of Strychnine in the Curare-aided Metrazol Treatment of Psychoses.

A modification of the metrazol treatment is described. The material consisted of 30 female patients, who received strychnine simultaneously with curare intramuscularly in amounts of $\frac{1}{120}$ gr. to $\frac{1}{30}$ gr. preceding the injection of the metrazol.

Strychnine reduces the metrazol requirement, the maximum average dosage being only 23·5 per cent. higher than the initial average dosage, compared to 62·7 per cent. increase without its use. It is assumed that strychnine sensitizes the central nervous system to metrazol. It has a beneficial action on the respiration which is impaired centrally, due to the effect of the metrazol convulsion, and which is impaired peripherally due to the effect of curare. This action is assumed to be due to the excitatory effect of strychnine upon the respiratory center and to the action of strychnine on the peripheral nerves. It is concluded that strychnine might be of value by virtue of its sensitizing effect in metrazol as well as in other shock therapies. (Author's abstr.)

Amnesia, Real and Feigned.

Three main groups of causes or types of amnesia are: First, pathological, which may follow certain induced conditions, such as head injury, fever, hyperglycemia, drugs and alcohol, or may be inherent, such as the amnesia associated with various types of epileptic seizure. Second are psychological amnesias, usually diagnosed as psychoneurosis or hysterias. Third is feigned amnesia.

The distinctive features and the legal complications of these various types of amnesia are

discussed. The EEG seems to provide evidence which in many cases may assist in distinguishing pathological amnesia from the other forms. In those cases in which an illegal act is the result of a period of amnesia, which in turn is accompanied by a disorder of the electrical waves of the brain, treatment by means of medicine instead of by incarceration seems reasonable. Intensive research on this point is urgently needed. (Author's abstr.)

MAY.

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A Follow-up Study of One Hundred and Eleven Non-hospitalized Depressed Patients after Fourteen Years.

1. A fourteen-year follow-up on 111 non-hospitalized depressive patients brought information from 84, 25 of whom are dead, 7 from suicide.

2. The suicide-rate in this group is many times that of the general population of the same age and sex.

3. There appeared to be more deaths from pneumonia among this group and perhaps fewer deaths from heart failure than are to be found in the general population.

4. At least four patients formerly given a diagnosis of depression are now regarded as schizophrenic; six patients have been in public institutions much of the fourteen-year period covered by this study.

5. Neurotic and hypochondriacal symptoms in combination with depression tend to accentuate the chronicity of the reaction.

6. Patients who recovered tended to have simpler disorders and some assets not usually found in those patients who were unimproved or worse.

7. None of these patients reported the use of shock therapy; this study may therefore serve as a basis of comparison with shock-treated patients.

8. Forty of 59 patients known to be alive are working in some degree.

9. Depression is a pathological state that deserves study as well as other damaging agents, such as neoplasms and infections, to the end of cure or prevention. (Authors' abstr.)

Prognostic Factors in the Involutional Psychoses.

1. During the period January, 1930, to January, 1940, 68 cases of involutional psychoses were admitted to the Norwich State Hospital, representing 0·8 per cent. of the total admissions. 17 died within 6 months, leaving 51 cases for the present study.

2. Twenty-three (45 per cent.) had left the hospital as recovered or improved at the expiration of this period. Twenty-eight (55 per cent.) were unimproved or worse.

3. The prognostic significance of sex, marital status, time of onset and elapsed period before hospitalization, positive family history, relationship to menopause, effect of treatment, and prepsychotic personality was investigated.

4. Depressive features, such as agitation, sadness, self-accusatory and self-depreciative ideas, somatic delusions, suicidal threats and attempts, predominated in 78 per cent. of those that got well.

5. Schizophrenic symptoms, such as auditory and visual hallucinations, ideas of persecution, systematized delusions and catatonic behavior were associated with an unfavorable outcome.

6. An analysis of the development and eventual outcome of the case material suggests the conclusion that involutional psychosis might more properly be diagnosed either manic-depressive psychosis or schizophrenia which has occurred late in life. (Author's abstr.)

On the Etiology and the Prevention of Mongolism.

(1) It is the authors' opinion that mongolism is not due to hereditary factors. If it were due to these factors the incidence of mongolism should increase in proportion to the number of offspring according to Mendelian expectation. Although many mongoloid children have 5 to 12 siblings, no multiple incidence of mongolism is found in any of these families. Mental deficiency in a family is no protection against mongolism, but the coincidence does not explain the particular growth disorder of the mongoloid child.

(2) The theory, based mainly on twin research, that mongolism is due to a germinal (plasmatic) disorder does not hold. It is demonstrated that the observations on mongoloid twins are open to various interpretations.

(3) The third theory to explain the occurrence of mongolism is that of a pathologic condition of the mother. The method of analysis which the authors adopted brings in their opinion conclusive evidence that the maternal condition at the time of pregnancy was at fault.

(4) A study of the birth order of mentally deficient children due to germinal factors shows that the birth of a defective child may be expected to occur at any place in the line of siblings. In an unbiased sample of families in which all children are analyzed, as many children are born before the individual with a given characteristic as after the affected individual. In some families the affected child may be born first, in other families last. These differences cancel each other in the long run, and a balance of siblings born before and after the affected child is demonstrable. This point is proven by two lines of control studies; one is made on a material of 4,316 mentally defective children of all types, and the other on a material of 255 hereditary cases at the Wrentham State School. In both independent studies the result was that mental defect as a characteristic is not associated with any particular disturbance of the birth order. In an ideal sample, 50 per cent. of brothers and sisters would be born before and 50 per cent. born after the affected child. In the authors' material, 48 per cent. were born before and 52 per cent. afterwards in one line of studies, and 54 per cent. were born before and 46 per cent. subsequently in the other investigation. This represents a variation which is well within expectation, and offers proof of the theoretical assumption.

(5) In a study of the birth order of mongoloid patients the striking result was found that 84 per cent. of the total number of brothers and sisters was born before the mongoloid and only 16 per cent. afterwards. Comparison with the control group shows that this is a significant deviation.

(6) The imbalance between the number of children born before and after a mongoloid suggests that the birth of a mongoloid indicates the development of a pathologic condition of the mother and bears a definite relationship to her ability to have children.

(7) It is indicated that the decline in the number of children after a mongoloid birth cannot be explained on psychological grounds.

(8) Mongolism occurs mainly under three conditions: (1) At the end of the child-bearing period, when the mother is approaching the menopause; (2) at the beginning of child-bearing, when the mother is immature or when the first child is born after a long period of waiting and the mother shows a delayed adaptability to the condition of pregnancy; (3) in the middle of the child-bearing period due to intercurrent extrinsic factors.

(9) The common denominator for the condition under which mongolism develops is the threshold of sterility. The sterility is caused by a hormonal imbalance, which manifests itself in abortions, bleedings during pregnancy, prematurity and incapacity for conception. The mongoloid deficiency develops in a baby on the threshold of complete maternal sterility. The authors' material indicates that the maternal inner secretory response to a pregnancy is at fault.

(10) A careful inquiry into the birth records of mongoloid children reveals that the birth of a mongoloid child may be expected or even predicted in a certain percentage of cases. From a medical point of view many mothers of mongoloids show indications that they were not in a perfect condition for pregnancy. The suggestion is made that pregnant women whose history indicates the possibility of a mongoloid baby should be subjected to careful biochemical and endocrine studies during prenatal care. Such examination will provide material to determine whether a mother suffers from an endocrine deficiency, and will enable the physician to single out eventually a mongoloid pregnancy. This approach might not secure every case of this disorder, but might serve to reduce the number of mongoloids to a reasonable extent.

(Authors' abstr.)

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The Spirogram in Certain Psychiatric Disorders.

A rapid method of scoring irregularity in the spirogram tracing is described. This method makes use of seven variables, which are added to obtain a numerical score. A series of tracings obtained from 50 anxiety neuroses, 40 hysterics and 10 wartime depressions, 60 schizophrenic patients and 103 normal control subjects were scored. The highest mean score was found for the anxiety group, and the lowest mean scores were found for the schizophrenic and normal groups. The mean values of hysterias and reactive depressions fall between the extremes. Statistically valid differences were found on comparing the anxiety group with the schizophrenic and with the normal control group. The incidence of sighing respirations was 60 per cent. for the anxiety group, 54 per cent. for the group of hysterias and reactive depression, 37 per cent. for the schizophrenic patients, and 21 per cent. for the normal control subjects. The mean value for sighing respiration was significantly greater for the anxiety neuroses when compared with the schizophrenic and normal controls. Major fluctuations (large waves in the tracings) were found significantly greater for the anxiety neuroses than for schizophrenic and normal controls.

The schizophrenic group showed very little difference from the normal control subjects for all of the variables studied with the exception of points off the upper line. In this item the schizophrenic group had a lower mean value, which was statistically significant.

(Author's abstr.)

Bilateral Prefrontal Lobotomy.

The writer collected information from 19 different clinics in the United States and Canada from 1936 to July, 1943, with the following results:

Number operated on	618
Died as the result of the operation	12
Died subsequent to the operation (2 committed suicide)	18
Rendered clinically worse	8
,, ,, unimproved	62
,, ,, slightly improved	109
,, ,, much improved	194

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Recovered, all symptoms disappeared	214
„ patient better than ever	1
Still in hospital (but some working)	277
Outside hospital but unable to work	60
„ „ working part or full time	251

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Electroencephalographic Foci Associated with Epilepsy.

Electroencephalographic studies were carried out on a random sample of 1,161 epileptic patients. Simultaneous records from six cortical areas were made with monopolar leads. In 15 per cent., or 160 cases, electroencephalographic foci were found. In 58 per cent. of these 160 cases clinical localizing signs were present, and in all these cases the clinical and electroencephalographic localizations were in agreement. A corroborating electroencephalographic focus was noted in 87 per cent. of 106 cases with clinical localizing signs or symptoms.

Clinical evidence of localized damage to the brain was fifty-eight times as common in epileptic patients with electroencephalographic foci as in patients in whom the disturbance was generalized or absent. The same types of seizure discharge or other electroencephalographic abnormality were encountered in cases with focal electroencephalographic activity as in cases with non-focal disorders. However, certain types of abnormality, notably irregular ½ to 3 per second activity, spikes and 2 per second waves and spikes, were much commoner in focal than in non-focal records. The presence of one of these three types of abnormality is presumptive evidence of localized damage to the brain. (Authors' abstr.)

Interaction of Electric Shock and Insulin Hypoglycemia: Experimental Investigations.

That electrical stimulation is effective in reducing the loss of weight of denervated muscle has been demonstrated conclusively by a number of workers. With electrical stimulation at maximal strength, the present experiments led to the following conclusions:

(1) Of the types of current tried, the 25 cycle alternating (sinusoidal) current produces the best results with respect to retention of weight, and the 60 cycle current is second best.

(2) Neither galvanic nor faradic current performs consistently better than the other. Both are inferior to the 25 and the 60 cycle sinusoidal current.

(3) The effectiveness of the treatments increases with the number of treatments daily. This relationship is apparently linear.

(4) No sensible differences in results are obtained by varying the length of the treatment within the limits employed (one to five minutes). (Authors' abstr.)

Experimental Swelling of the Brain.

Acute swelling of the brain was produced in dogs by lesions of the lower part of the fourth ventricle and the medulla. This swelling usually appeared with a simultaneous rise in blood pressure, but later the swelling persisted in spite of the fall in blood pressure.

The blood flow through the brain did not show any marked or persistent change in the majority of the experiments.

There was an increase in water content of the gray and the white matter of the swollen brain.

The intravenous injection of hypertonic solutions reduced swelling of the brain in most of the experiments.

The only significant histologic change was dilatation of the perivascular spaces.

The possible explanation of this experimental swelling of the brain induced by lesions of the fourth ventricle is discussed. (Authors' abstr.)

Schizophrenic Language.

1. In standard language usage the frequency of occurrence of the different words in a given sample is mathematically related to the ranks of the words when arranged in order of decreasing frequency, this mathematical relation being a close approximation to an equilateral hyperbola.

2. Utilizing this criterion, by means of its straight line expression on logarithmic graphs, the authors have studied the language behavior of a child (reported by Uhrbrock) and also the speech production of three psychiatric patients with different types and durations of psychoses, as exhibited in spontaneously written personal letters. They found that the curves for all subjects approximated roughly the equilateral hyperbola, but that certain significant deviations therefrom characterized the different subjects.

(*a*) In the intimate personal letters of the patients (as also in considerable control material from personal letters of normal persons) the 10 most common words (essentially articulatory words) were used with considerably less frequency than in more formal discourse directed toward several persons, probably because there was less need for explanatory and definitive terms. This phenomenon was shown on the graphs by a bend toward the left at the top, here called the " top concavity."

(*b*) The child's language production curve was characterized by a slight general concavity, or slightly bow-shaped distribution, the bend (or region of greatest excess frequency) occurring about the region of words of the thirtieth or fiftieth rank.

(*c*) One of the patients, who had a brief schizo-affective type of illness, and who has shown before, during and after her psychotic periods a childishly dependent attitude toward parent surrogates, showed in her language behavior graphs a slight general concavity comparable to that of the child, with the principal bend occurring usually about the region of the fiftieth to the one-hundredth rank. This patient's graph showed also a consistent downward bend at ranks 11, 12 and 13.

(*d*) A paranoid patient showed in his language behavior some small irregular deviations, not very constant from one sample to another.

(*e*) A patient with paranoid schizophrenia showed in her language behavior graph a rigidly systematic deviation from the normal curve in the direction of a consistent, straight and uniform steepness, interpreted by us as an expression of an autistic speech tendency.

3. As a tentative working hypothesis the authors have interpreted their data in terms of opposing tendencies to repetitiousness and to diversification, which they have derived from considerations of economy and convenience; the tendency to repetitiousness tends to increase frequency of use and to diminish the number of different words, whereas the tendency to diversification tends to increase the number of different words and to diminish the relative frequency, the net resultant being a relatively steady proportionality, represented in the equilateral hyperbola. These two hypothetic tendencies have further been illustrated in terms of an analogy with a set of mechanical tools, and our quantitative data have been interpreted in the light of these tendencies and this analogy.

4. The authors have indicated the hypothetic possibility that these two tendencies are equivalent to the consideration of egocentric and allocentric convenience respectively. When they interpreted this type of verbal egocentricity as autism they found that the material of the patient with paranoid schizophrenia was definitely autistic as compared with all the other material presented.

5. The authors have further pointed out how an autistic person could go astray into a distortion of meanings by employing the normal mechanisms of linguistic and semantic changes for his own case, without bothering to meet the normal prerequisite of a social serviceability and a social understandability as necessary for all linguistic and semantic innovations, and that he might then find himself thereby verbally and conceptually handicapped in attempting to solve " neutral problems " set by a tester, and also in dealing with real problems in an actual world. (Authors' abstr.)

Oral and Intravenous Dextrose Tolerance Curves of Patients with Manic-Depressive Psychoses.

In none of the 34 intravenous dextrose tolerance curves obtained on 30 manic-depressive patients were high blood-sugar values exhibited two hours after the intravenous injection of dextrose, except for two curves for patients who also had symptoms of overactivity of the thyroid. The 32 curves which were not prolonged demonstrate that the removal of sugar from the blood stream is not retarded in manic-depressive patients.

In 6 of 30 oral dextrose tolerance curves obtained on 20 manic-depressive patients, the sugar was elevated decidedly above 100 mgm. per 100 c.c. of blood two hours after the ingestion of sugar. These prolonged oral dextrose tolerance curves were observed for patients who had normal intravenous dextrose tolerance curves. It may be concluded that abnormal oral dextrose tolerance values for manic-depressive patients are attributable to delayed absorption

of dextrose from the gastro-intestinal tract, and cannot be accepted as evidence of an intrinsic disorder of carbohydrate metabolism. (Authors' abstr.)

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Effect of Metrazol Convulsions on Conditioned Reflexes in Dogs.

The course of twelve metrazol convulsions gave varying results, depending on the type of animal. The effect was much more pronounced on the higher, conditioned reflex function than on the lower unconditioned activity. In general there was impairment of cerebral function in the direction of (1) decrease of excitatory conditioned reflexes; (2) loss of inhibition, resulting in lack of differentiation between positive and negative stimuli; (3) lengthening of the latent period; (4) predominance of the activity of some lower centres at the expense of the higher ones; and (5) a long period of recovery. The impairment of function lasted from one to six months, even in the stable dogs. In one extremely excitatory dog, in which inhibition was poor, the lessening of the excitatory conditioned reflexes resulted in apparent improvement in the behavior, rather than in impairment. (Authors' abstr.)

Clinical and EEG Studies on Criminal Psychopaths.

Seventy-five criminal psychopaths were studied both from an EEG and a clinical approach. The characteristics of the group were described. EEG studies revealed 80 per cent. abnormal or borderline abnormal tracings. Survey of the psychopath's developmental history showed that 80 per cent. had psychologically unhealthy factors in childhood. From the available data the following conclusion seems warranted: Psychopathic personality is a mental illness resulting from inborn or early acquired cerebral dysfunction and disturbed parent-child relationship. (Author's abstr.)

Integrated Facial Patterns Elicited by Stimulation of the Brain Stem.

Stimulation of designated areas in the tegmentum of the brain stem of the macaque monkey with the Horsley-Clarke stereotaxic technic produces facial patterns integrated with other somatic and autonomic components into purposeful acts.

The facio-ocular synkinesias of contraction of the orbicularis oculi muscles, upward rolling of the eyeball and constriction of the pupils can be elicited from the reticular substance of the pons 1·5–2·5 mm. lateral to the midsagittal plane.

Contraction of the orbicularis oris muscle in a sucking, swallowing movement is associated with elevation of the base of the tongue, raising of the uvula and inhibition of respiration in the inspiratory phase. This pattern is elicited from the reticular formation of the medulla ·5–1·5 mm. from the midsagittal plane dorsomedial to the rostral part of the inferior olive. A facio-respiratory complex simulating laughter and consisting of retraction and elevation of the corners of the mouth, depression of the lower jaw, lowering of the base of the tongue and uvula and cessation of respiration in the expiratory phase can be elicited from an area ·5–2·0 mm. from the midsagittal plane dorsomedial to the inferior olive.

It is suggested that the facio-ocular and facio-respiratory synkinesias are integrated in the reticular formation of the brain stem. (Authors' abstr.)

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Electroencephalographic Classification of Epileptic Patients and Control Subjects.

The electroencephalograms of 1,000 adult control subjects and of 1,260 epileptic patients have been distributed on a scale of classifications based primarily on frequency. Each electroencephalogram is assigned to one of 18 categories, 9 of which are regarded as normal, 2 as slightly abnormal and 7 as very abnormal. The distribution for the control subjects forms a simple curve, with the mode at 10 per second. The distribution for a random sample of 730 adult epileptic patients is bimodal, with modes to the fast and the slow side of 10 per second.

No final and absolute value can be ascribed to the incidence of a given pattern in normal subjects, in epileptic patients or in subjects with other clinical classifications because the incidence of all types of normal and abnormal electroencephalograms varies with age and with the criteria used in diagnosis and classification. The greatest difference between the encephalograms of the normal subjects and those of the epileptic patients appears in the five electroencephalographic types classified as paroxysmal, i.e. those manifesting an abrupt and specific alteration of pattern. As compared with the records for the adult controls, the records of epileptic adults classed as paroxysmal are thirty-three times as numerous, those with very slow or very fast frequencies are twenty times as numerous, and those with moderately slow or moderately fast frequencies are twice as numerous. Among children with epilepsy, the *petit mal* variant type of discharge occurs five times, the *petit mal* type two and one-half times, and the *grand mal* type of discharge one and three-tenths times as commonly as among adult epileptic patients, whereas the psychomotor type of discharge and normal rhythms occur one-half and records with fast frequencies one-third as commonly. (Authors' abstr.)

Metabolic Studies on Epileptic Patients Receiving Azosulfamide and Phenobarbital.

1. Adminstration of azosulfamide is accompanied by a decrease in the carbon dioxide content and the carbon dioxide tension of the serum.

2. The decreased carbon dioxide content and the lowered carbon dioxide tension of serum accompany the anticonvulsant effect.

3. The anticonvulsant effects of both azosulfamide and phenobarbital coincide with a positive potassium balance.

4. Ammonium chloride produces the same degree of " acidosis " as does azosulfamide, without alteration of potassium exchange, and does not have an anticonvulsant effect.

5. Phenobarbital produces no " acidosis," but a positive potassium balance, and has an anticonvulsant effect. (Authors' abstr.)

Measurement of Intellectual Functions in the Acute Stage of Head Injury.

The status of consciousness immediately following injury to the head was determined in 190 patients by subjecting them to a series of psychologic tests. Complete failure, failure on serial subtraction alone and impaired performance on several tests represent three degrees of intellectual defect.

Patients with severe head injuries leading to intracranial hematoma, fracture of the skull and a bloody spinal fluid have a higher incidence of total intellectual incapacity, of varying duration,

than patients with short loss of consciousness only. Prolonged coma, delirium and confusion were much more frequent with the severe lesions, and did not occur in patients with simple loss of consciousness.

Examination of 85 patients on three consecutive days by the 100–7 test revealed that accuracy of performance improves more during this period than speed. Complete restitution, however, required a period of weeks. (Authors' abstr.)

Histogenesis of the Early Lesions of Multiple Sclerosis. II: Acute Multiple Sclerosis.

The essential features of the acute lesions of multiple sclerosis may be summed up as follows:

Macroscopically the patches appear as small areas of softening and necrosis. Microscopically they are characterized by (1) a destructive process in which myelin sheaths as well as axis-cylinders are severely damaged; (2) formation of circumscribed areas of softening and necrosis; (3) excessive cellularity, due to an abundance of gitter cells mixed with lymphocytes and cytoplasmic glia cells; (4) absence of glial fibrosis; (5) a slight degree of repair through moderate proliferation of connective tissue; and (6) pronounced congestion and thrombosis of small veins.

Lesions closely resembling those described in cases of acute multiple sclerosis have been observed in typical cases of chronic multiple sclerosis in which an acute exacerbation of the clinical symptoms preceded death.

The view is expressed that the acute and the chronic form of multiple sclerosis are varieties of the same morbid entity. The structural difference in their lesions can be explained by the difference in intensity and duration of the same morbid process. (Author's abstr.)

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Tuberous Sclerosis.

The authors present a study of a series of 25 patients with tuberous sclerosis in which the frequency of many of the conditions associated with this syndrome is further established. Two additional anomalies not previously reported are described. A detailed description of the pathologic features of the retinal tumors present in one patient is added. The chief diagnostic roentgenographic change, that of patchy zones of increased density in the skull, is conclusively shown to be located in the calvarium. Further evidence is adduced that tuberous sclerosis is a developmental tissue dysplasia. (Authors' abstr.)

Histologic Studies of the Brain Following Head Trauma. III: Post-Traumatic Infarction of Cerebral Arteries, with Consideration of the Associated Clinical Picture.

Attention is called to the incomplete clinical understanding of the edema and hemorrhage resulting from trauma to the brain and of the associated disturbances in circulation of the cerebrospinal fluid.

Six cases of epidural and subdural hematoma in which the mesial portion of the temporal lobe was displaced over the free edge of the tentorium are described, including the clinical history and the gross and histologic changes in the brain.

In two of these cases classic infarctions in the distribution of the posterior cerebral artery were displayed. In two cases, in addition to the well-known uncal herniation, herniation of the supracallosal gyrus under the free edge of the falx was present. There resulted therefrom infarction in the course of the anterior cerebral artery, in addition to the infarction in the course of the posterior cerebral artery related to the uncal herniation.

In the fifth case, in which the uncal herniation was unusually full, interference with flow in the middle cerebral artery resulted, producing infarction in the distribution of that vessel, in association with a lesser degree of infarction in the course of the posterior cerebral artery.

In the first, fourth, fifth and sixth cases there were associated histologic changes in the brain stem, and physiologic changes were also present, as indicated by signs of decerebration of varying degrees.

The role of edema in the production of the herniations is emphasized.

It is argued, on histologic grounds, that reduction of flow in any one of the major cerebral arteries is of itself not an adequate explanation of the resultant red infarction of portions of a hemisphere. To the arterial disturbance must be added interference with free venous outflow from the affected area.

The same mechanism, reduction in arterial inflow and interference with venous outflow, is thought to be an adequate explanation of the hemorrhages in the brain stem so often seen in association with epidural and subdural hematomas.

Attention is drawn to the importance of edema of the brain stem, a precursor of hemorrhage.

The clinical picture presented by these cases is discussed, and an effort is made to draw practical lessons from the information derived from consideration of the histologic picture. Most important is the early evacuation of the clot. Decerebration is a bad prognostic sign. Administration of oxygen and suction of material from the bronchi by an endotracheal tube are important steps in emergency treatment. The value of hypertonic solutions is thought to be questionable. Lumbar puncture, if employed at all, must be used with full realization of the mechanical factors and the risks involved. (Authors' abstr.)

Genealogic and Clinicopathologic Study of Pick's Disease.

This study lends support to the view expressed by some previous investigators that Pick's disease is a heredo-degenerative disorder. Such a conclusion is based on the definite pattern of dominant inheritance in the two families the authors report, and on the evidence that the condition develops as a system disease in the genetically youngest cytoarchitectonic regions, with corresponding disturbances in the highest cortical functions. The relatively minor discrepancies in the anatomic picture can in no way invalidate the significance of the principal observations. (Authors' abstr.)

Convulsant Shock Treatment of Patients with Mental Disease by Intravenous Injection of Acetylcholine; Electroencephalographic and Electrocardiographic Observations.

1. The effect on patients with mental disorders of the intravenous injection of large doses of acetylcholine chloride has been investigated.

2. These doses of acetylcholine produced mild convulsions associated with cardiac arrest and loss of consciousness, lasting 30 to 50 seconds.

3. A series of convulsions produced by acetylcholine had no ameliorating effect on the mental condition of the patients studied.

4. The significance of the studies with regard to the mechanisms of shock therapy in general is discussed.

5. Acetylcholine convulsant therapy does not appear to be a desirable procedure. (Authors' abstr.)

OCTOBER.

*Conduction of Cortical Impulses and Motor Management of Convulsive Seizures. *Hoefer, P. F. A., and Pool, J. L.* 381
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Conduction of Cortical Impulses and Motor Management of Convulsive Seizures.

Groups of electrical discharges originating in the resting motor cortex under barbiturate anesthesia are conducted in the large projection systems of the cortex, the pyramidal tracts and the corpus callosum.

The impulses conducted in the pyramids do not reach, or at least do not stimulate, the lower motor neuron; those conducted in the corpus callosum, similarly, do not appear on the opposite motor area.

Cortical discharges during convulsive seizures and those following the application of strychnine or picrotoxin to the cortex result in conducted axonal spike activity in the pyramidal tracts and in a number of extrapyramidal pathways running through the medial and lateral reticular substance. The activity in the pyramidal tracts occurs in bursts and groups of spikes synchronous with the cortical discharges, while the extrapyramidal activity is more continuous.

On several occasions groups of impulses were recorded from the area of the nuclei of the posterior column and from the region of the medial lemniscus. This activity is considered to be proprioceptive sensory return.

Section of the corpus callosum causes a rise in the seizure threshold and appears to shorten the duration of the seizure. During generalized seizures in these instances cortical discharges were equal on the two sides.

Section of one or both pyramids causes pronounced changes in threshold and duration of the seizures, but the pattern of tonic and clonic movement is not abolished, even by complete bilateral pyramidotomy.

The use of various anesthetics resulted in appreciable modifications of both the cortical discharge patterns and the clinical seizure patterns.

The anatomic origin of the large cortical projection systems is discussed in conjunction with present knowledge of the origin of the electrical discharges of the cortex at rest and during seizures.

An attempt is made to outline the functions of various structures involved in the motor management of convulsive seizures. (Authors' abstr.)

Effects of Morphine on Learned Adaptive Responses and Experimental Mental Neuroses in Cats.

1. In four out of five cats morphine in doses of approximately 1 mgm. per kilogram of bodyweight regularly produced refractoriness to stimuli and diminution in activity, lasting from one-half to two hours, after which the animal became more restless and evinced notable distractibility over a period of about six to seven hours. The fifth cat exhibited only the latter type of behavior with this dose of morphine.

2. In all animals learned adaptive responses were greatly affected. The more recently acquired and most complex learned responses disappeared first, and then reappeared last, as the effects of the drug wore off. The disintegration of learned complex responses was usually complete within ten minutes after injection, while reversal of this process began three or four hours later in most cases.

3. "Experimental neuroses" were produced by creating an impasse between conflicting motivations of hunger and fear. The complex "neurotic" behavior abated with injection of morphine, and was replaced by previous adaptive patterns about five or six hours after the administration of the drug. However, in three of the animals the "neurotic" behavior reappeared in full force after the effects of morphine had worn off further, although a cat which had been made only mildly "neurotic" showed notable diminution in its abnormal reactions the next day. In contrast, an animal with a reprecipitated and severe neurosis showed no improvement with doses sufficiently large to cause its death. (Authors' abstr.)

Prognosis of Multiple Sclerosis.

A clinical study of the prognosis of multiple sclerosis based on the life charts of 55 patients, beginning with the initial episode, is presented. Three clinical types of disseminated sclerosis are recognized: the acute, the remittent and the chronic progressive.

The clinical course in a case of Devic's disease (neuromyelitis optica) did not appear to differ from that of the remittent type of multiple sclerosis.

Twenty-seven patients had optic neuritis at some stage of their disease. In only one patient, however, were both optic nerves affected at the same time. The prognosis for the optic neuritis of multiple sclerosis is generally good; only one of the patients became completely blind. Optic neuritis may usher in the disease or, contrary to some opinions, may occur later in its course, years after other episodes have supervened. Seven patients showed visible swelling of the optic nerve.

The prognosis is good for the individual attack in the remittent form of multiple sclerosis. The prognosis with respect to life is good in both the remittent and the chronic progressive form. The prognosis for life is hopeless in the acute form. Persons suffering from the remittent type may be able to lead useful lives for many years; in rare instances complete recovery occurs.

Apoplectic episodes are not uncommon, having been experienced by 12 of 50 patients with the remittent type. The percentage probably would be higher if apoplectic episodes were sought for diligently in the history of all patients.

No type of therapy advocated at present is of any value. (Authors' abstr.)

Muscular Tension in Psychiatric Patients: Pressure Measurements on Handwriting as an Indicator.

A method of measuring the grip pressure and the point pressure during the continuous movement of handwriting was used for a series of 40 patients with various psychiatric and neurologic diagnoses and for a series of 12 normal control subjects.

On writing the same standard sentence the patients showed higher values for grip pressure, a greater number of phases and a longer writing time than did the control subjects. These differences were statistically significant.

The patients gave a greater number of positive answers to questions concerned with feelings of excitement, nervousness, tiredness, trembling inside, shaking and tension in the arms and fingers.

A significant correlation was found in the psychoneurotic and the psychotic patients between feelings of neuromuscular tension and high values for point pressure. No correlation was found between feelings of general tension and any of the pressure readings. (Authors' abstr.)

Prevention of Hemorrhages in the Brain in Experimental Electric Shock.

Preparatory injections of atropine sulfate, synthetic vitamin K, calcium gluconate, a thromboplastic suspension of brain substance and various combinations of the last three preparations prior to electrically induced convulsions failed to prevent hemorrhages in the brains of experimental rats. Since no hemorrhages were seen in animals in which convulsions had been completely prevented by ether narcosis, it was concluded that the changes in pressure accompanying the convulsion, and not the current itself, represent the causative factor in the formation of such lesions. (Author's abstr.)

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Hypertensive Disease of the Brain.

The characteristic histologic features of hypertensive encephalopathy observed in 25 cases are reported and two cases are described in detail.

Typical vascular alterations, confined to the arterioles and capillaries, were observed in all cases, and consisted of hyaline degeneration and fibrotic thickening of the walls associated with narrowing or obliteration of the lumens. These arteriolar changes should be considered as a special form of arteriolopathy typical of hypertension, and different from those found in the usual case of arteriosclerosis. A working hypothesis presumes that the characteristic arteriolar change may be due to functional vascular disturbance of prolonged duration or of repeated occurrence.

Changes in the parenchyma of the brain consisted of diffusely scattered, circumscribed small foci of old and recent softening, perivascular hemorrhage, massive hemorrhage and diffuse or localized edema of the brain. The view is expressed that the alteration of the brain-tissue is secondary to the arteriolar changes. (Author's abstr.)

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On the Mode of Representation of Movements in the Motor Cortex, with Special Reference to Convulsions Beginning Unilaterally.

The so-called "classic" theory of the cortical representation of movements proposes a cortical mosaic of "points" in the excitable motor cortex, each of which represents a single small movement, sometimes one activating but two muscles reciprocally. Leyton and Sherrington suggested that it is the function of the motor cortex as a whole to synthesize these fractional components into those combinations and sequences of larger movements that characteristically make up the normal motor activities of the organism. They also pointed out that a given cortical point responds to stimulation in various ways, determined by the stimulation factors to which it is exposed. Thus a point that at one moment yields no response may be responsive at another; repeated threshold stimuli have two effects—they augment the responses from the point stimulated and may alter ("deviate") the response from adjacent points; even reversal of response may be obtained. This implies an instability of localization, a breaking down, as Dusser de Barenne puts it, of the relations between cortex and musculature. There is yet another assumption in the theory, namely, that the item of movement revealed by a brief threshold stimulation of the cortex is a normal unit of co-ordinated movement.

It is submitted that this theory does not adequately generalize the facts of clinical or experimental observation. These indicate that it is the normal movement combinations and sequences of normal activity that are represented, and this not on the plan of a mosaic of contiguous "localizations" but on a plan of wide and overlapping fields, each of which has a focus wherein the movements of a given motile part are mainly, but not exclusively, localized. The variations in response of a given cortical point to stimulation are not due to any breaking down of the localization, but to variations in the threshold of excitability of the different movements "localized" at this point. Facilitation is the process underlying this variation, and deviation of response is a consequence of this facilitation.

The phenomena of Jacksonian convulsions and of hemiplegia also afford support to the hypothesis of widespread fields of localization that Jackson formulated, and are inexplicable on the basis of the punctate theory of localization. (Author's abstr.)

Reflex Studies in Electrical Shock Procedure.

The electrical shock procedure produces considerable though transitory changes in the normal reflexes, and originates many pathological reflex phenomena.

The deep reflexes reveal a range of susceptibility in which the knee-jerk is the most inclined to suffer.

The behaviour of the supinator jerk is at variance with the reactions of all other deep reflexes and occupies a singular position among them.

A similar scale of susceptibility could be observed in the superficial skin reflexes, the abdominal being the most vulnerable.

The corneal reflex does not change at all, thus representing the only exception among all other common clinical reflex phenomena.

The occurrence of Babinski's sign is the rule. Different features of this reflex could be observed and brought into a quantitative sequence.

In spite of the spasticity of the legs and a strong ankle-clonus Rossolimo's sign could never be obtained.

In a large proportion of cases a grasp phenomenon has been found, and its occurrence has been related to the character of the mental disorder.

The behaviour of the phalangeal joint reflex is described and its relationship to the grasp phenomenon and Babinski's sign discussed.

A comparison is made between reflex phenomena in the post-convulsive phase of electrical shock procedure and those in organic disorders of the central nervous system.

(Author's abstr.)

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The Repression and the Return of Bad Objects.

In the past the attention of analysts has been successively focused, first upon impulse and later upon the ego. The time is now ripe for a psychology of object-relationships—that is, a study of the relationships of the ego to its internalized objects. The view is formulated that what are primarily repressed are neither intolerably guilty impulses nor intolerably unpleasant memories, but intolerably bad internalized objects. Only when repression fails to prove an adequate defence against internalized bad objects and these begin to threaten the ego are psychopathological defences called into operation. Much of the rest of the paper is concerned with the defence of the super-ego, defence of guilt or moral defence with special reference to military cases. S. M. COLEMAN.

Principles of Aetiology.

A review of some theories of causation and their application in medical practice, general and psychiatric; more particularly the mechanismic theory, the biological theory and the theory of final causes are examined. There is also a short reference to Hume's opinions regarding cause and effect. S. M. COLEMAN.

The Psychology and Treatment of Alcohol Addicts.

(*a*) The addiction neuroses differ from the other groups of neurosis, not in kind but in degree only:

By the extremely strong self-destructive element, both bodily and mental, which finds its psychological expression in the addict's neurotic habit of indulging in death-fantasies.

By the extraordinarily narcissistic glorification and expansion of the ego.

By the ever-increasing and finally complete identification of the patient with the world of illusion, in the final stages of which no compromise with reality is possible.

(*b*) The treatment of the poisoned mind consists in the systematic indefatigable application of exact psychotherapy, especially of psychoanalysis. S. M. COLEMAN.

Tests in the Diagnosis of Mental Deficiency.

Performance tests have a special value in that they disclose orectic as well as intellectual factors relevant to a diagnosis of mental deficiency.

Performance tests of the type used are of value for diagnostic purposes because they make little demand on abstract or symbolic thinking, and only a limited demand upon imaginal or memory control, and enable a differentiation of men to be made according to their capacity to deal with material present to the senses.

Performance tests are of value in differentiating the intellectual defective from the personality defective and from the scholastically undeveloped. S. M. COLEMAN.

The Scope of Speech Pathology.

On the basis of evolutionary considerations an attempt is made to demonstrate in outline the principal speech and voice disorders, which cover a wider field than is usually assumed. S. M. COLEMAN.

The Vagina Dentata Legend.

The discovery of the Vagina Dentata dream and legend in the remoter states and districts of central India is of great interest as establishing parallel psychological development among people as diverse as the Baiga of India, the Chilcotin of north-west America and the Ainu of Siberia.

All the stories testify to a very widespread belief that sexual intercourse is often defiling and often dangerous. It does not appear that here this danger is due to the infection of hymeneal blood, but is the result of a complex psychological situation, in which a recognition of the toxic character of menstrual blood, the possibility of venereal contagion, the exposure of both male and female to hostile magic and witchcraft at the moment of sexual congress, the universal latent dread of castration and the fear of impotence with all its social and domestic embarrassments are contributory factors. S. M. COLEMAN.

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Concerning Rigidity.

Primary and secondary rigidity must be distinguished.

Primary rigidity involves sequelae of an abnormality of the Einstellung mechanism, most frequently observed in lesions of the subcortical ganglia. Each performance in action immediately becomes so rigid that responses to extraneous stimuli cease. Secondary rigidity is due

to a primary defect of the higher mental processes occurring in cortical damage and cortical malformations, such as feeble-mindedness. It occurs only if the individual is confronted with tasks beyond his capabilities.

The following theoretical interpretation is offered: (1) Rigidity occurs when an organism is unable to come to terms with " its " environment in an " adequate " way. It is a means of protection against " catastrophic conditions." (2) Rigidity is one type of reaction to a situation to which the individual is inadequate. Distractability and other types of reactions may also result from catastrophic conditions. Rigidity in feeble-minded children is a consequence of a mental deficiency, especially of the impairment of abstract attitude.

Normal individuals may also exhibit rigidity under certain conditions, namely, in performances beyond their capacities.

The implications of this theory for education of feeble-minded children are stressed.

(Author's abstr.)

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Cerebral Anoxia.

Cerebral anoxia, always vital, is becoming increasingly important with the development of flight at high altitudes. Various causes of cerebral anoxia have the same clinical, pathologic and physiologic effect. This effect depends on the severity and duration of anoxia. Cerebral anoxia may produce a number of mental and neurologic signs and symptoms. At first there may be no recognizable pathologic change; later, chromatolysis and other similar associated changes may occur which may be considered reversible. If anoxia is severe and prolonged, irreparable brain damage will occur, from which there is little hope of recovery. Residual symptoms may indicate involvement of peripheral nerves, spinal cord, basal nuclei, or cerebral or cerebellar structures. Pathologic changes in such cases may consist grossly of necrosis of the lenticular nuclei, and also of small foci of degeneration of the cerebral cortex and white matter. Nerve cells disappear or become pyknotic. There may be proliferation of glia and blood vessels. Axones may degenerate. The microscopic changes are pronounced throughout the brain. They are most severe in the basal nuclei; and they may be marked in the olivo-cerebellar system. (Authors' abstr.)

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Extensive Unilateral Cerebral Removals in the Primate: Physiologic Effects and Resultant Degeneration.

1. Until the level of the posterior commissure is reached, progressively more extensive unilateral cerebral removals produce a gradually progressive degradation in the motor performance of simians rather than an abrupt paralysis.

2. Monomanual feeding with the involved hand is impaired after frontal lesion, but does not completely disappear until the striatum (J 33) is removed. There is also impairment in the full extension and flexion of the joints, except during struggling.

3. There is much less "spasticity," as measured by resistance to passive movement, the assumption of specific postures, lowering of reflex threshold, increase in the force of reflexes, extension of the reflexogenous zone and spreading of reflexes, after hemidecortication alone than after removal of both cortex and caudate and/or putamen.

4. Superposition of striatal ablation upon hemidecortication causes little specific further loss of motor capacity (it does destroy monomanual feeding), and animals so affected still preserve a rather full complement of associated movements, including bimanual feeding and the ability to climb. It is important to observe that there is a new and notable tendency for the affected limb to participate in useless gestures and antic activity when movements are initiated in the sound limbs. Such animals never develop fibrous contractures.

5. The additional removal of the pallidum impairs the ability to perform associated movements, notably the use of the affected hand in climbing up and bimanual feeding. It also initiates a slowly progressive resistance to passive movement. Immediately after removal of cortex, striatum and pallidum, from one side, the animal shows no marked difference aside from the impairment in associated movements from one lacking only cortex and striatum but, as time goes on, the amplitude of a reflex such as the patellar is progressively restricted and the easy hinge-like freedom of reflex movement at the knee-joint is impaired, the whole leg hopping at the hip instead of being extended at the knee. Such animals usually carry the affected upper limbs in a specific posture of semi-flexion when not in use. There is notable resistance to passive movement, but fixation of the joints, as a result of fibrous contractures, does not occur. The affected limbs engage in activities in which, in the unoperated animal, they normally remain at rest. Their participation in these activities impairs the efficiency of performance of the unaffected limbs.

6. Removal of one half of the cerebrum, at the level of the posterior commissure, results in the immediate loss of movements in all the joints of the affected extremities except a small amount of activity at the axial-appendicular junctions. The position of the limbs with the animal in the vertical position is nearly identical with that seen in lesions producing unilateral rigidity, excepting that the contralateral extremities are affected and the lower extremity is forcibly flexed by the animal's weight when sitting. These positions are immediately produced by the operation, and are actively retained as a result of the sustained contraction of the muscles producing them. In the early post-operative days the activity of the musculature can still be overcome by the examiner, but fixation of the joints as a result of fibrous contractures rapidly ensues. Attempts to move the limbs, passively, then become unfruitful and painful.

7. The foregoing conclusions indicate that, in the monkey, the thalamo-cortical circuit is

required, not only for discriminating movements of the small musculature, but also for the fullest utilization of large muscle masses; that elaborate automatic and complex associated movement patterns require the integrity of the thalamo-pallidal circuit, but that relatively simple automatic and associated movements, such as walking, do not; that these latter simple automatic movements become lost or submerged in a state of sustained resistance to passive movement when the subthalamus is lost, and that the highest degree of overactivity of the patellar reflex is associated with combined cortico-striatal loss rather than with loss of the cortex alone.

8. Of the cortical fibers to the striatum, approximately half come from frontal and half from non-frontal cortex. Only about one-fifth of all those from the frontal region originate in area 4.

9. There is little evidence that the thalamus projects upon the striatum, but all of the diffuse and lateral parts of the substantia nigra appear to discharge on it.

10. The pallidum appears to receive fibers from the centromedian nucleus. The compact part of the substantia nigra also discharges upon it. (Author's abstr.)

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A Study of " Experimental Neurosis " in the Rat by the Conditioned Response Technique.

The present experiment is concerned with studying the type of experimental neurosis described in higher animals by such investigators as Pavlov and Liddell. Specifically, it is designed to employ a previously established conditioning methodology for an evaluation of the determining conditions of experimental neurosis as described by the Anderson-Liddell theory. According to the formulation, this behavior disturbance is a function of tension, capacity for tension, and restraint. Four animals were taken from the regular stock used in the Psychological Laboratory of the State University of Iowa and four from a strain of non-emotional rats. This procedure was used in an effort to learn if a relationship exists between capacity for tension and emotionality as defined by Hall. To vary degree of restraint, half the animals were subjected to more physical restriction, namely, having the hind legs tied, than is ordinarily used in the method. The major part of the experiment was devoted to measuring specific and general behavior changes on evidences of tension as the difficulty of the discrimination problem was increased and when punishment was added.

Findings concerning the development and effect of increasing the difficulty of discrimination are summarized as follows:

(1) In terms of the median number of trials required to reach the criterion of differentiation, the first level was most difficult; the others were learned at a steadily increasing rate through the middle ranges, and then with a decreasing rate as the threshold was reached. This is in agreement with Pavlov's findings.

(2) An increase in the difficulty of the discrimination was accompanied by an increase in excitable behavior, which was heightened further by the introduction of shock.

(3) At the limit of differentiation there was an increase in frequency and variability of responses to the negative stimulus.

(4) The introduction of increased punishment (shock) for errors at the limit of differentiation led to the development of avoidance reactions.

(5) Following prolonged training at the limit of discrimination, three of eight subjects failed to relearn the primary differentiation after 100 trials.

Findings relative to the effect of increased restraint are:

(1) Excitable behavior was more pronounced in the leg-restricted than in the leg-free animals during most of the phases of the experiment.

(2) There was no relationship between degree of restriction and loss of previously established habits after training at the limit of discrimination.

And finally, findings concerning differential behavior of the type of animals used are as follows:

(1) Excitable behavior was more pronounced in the non-emotional animals during most phases of the experiment.

(2) One animal's behavior was more extreme than the other, and for this reason was studied under special conditions.

(3) In terms of habit change there was no marked difference between types of animals.

In general, the behavior observed in the present experiment was similar to that reported by Liddell and Pavlov, who used the conditioned response technique. It was pointed out that although only excitable behavior was displayed in this experiment, in a previous study with a similar set-up only inhibitory behavior was revealed. These different forms of behavior were obtained under conditions which would be described by Pavlov as involving different amounts of internal inhibition.

The results are further discussed in relation to the Anderson-Liddell theory of experimental neurosis. (Author's abstr.)

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The Effect of Electroshock Convulsions on the Acquisition of a Simple Running in the Rat.

Twenty-two albino rats were given seven early learning trials in a simple running situation. Eleven of these animals, comprising an experimental group, were subjected to a series of ten electroshock convulsions. Eleven, comprising a control group, were accorded identical treatment during the inactive period with the one exception of the shock. When placed back in the learning situation, no difference in habit retention was recorded. A temporary discrepancy in learning ability was explained in terms of emotional rather than cognitive disturbances. (Author's abstr.)

Symptoms of Experimental Catatonia in the Audiogenic and Electroshock Reactions of Rats.

The authors describe the motor phenomena in the audiogenic and in the electroshock reactions of rats. Hyperkinesia in different forms, catalepsy and negativism observationally identical with any other occurrence of experimental catatonia were demonstrable.

In the electroshock reactions it is of interest that the catatonic phenomena appeared not only in the subconvulsive reactions but also were manifest transitorily after generalized seizures. This observation is in accordance with other instances of experimental catatonia, where a quantitative relationship exists between epileptic reactions and catatonia. In the case of chemically induced experimental catatonia, for example, epileptic features occur when an overdose is given. The same relationship holds true for the catatonic phenomena evoked after experimental anoxemia. So, too, as indicated elsewhere by one of us, the audiogenic reaction, or the reaction of abnormal behavior with the " molding, plastic " features described by Maier and others, is characterized primarily by the behavior which the authors have here specifically related to the syndrome of experimental catatonia, but occasionally this noise-induced reaction is marked by a convulsive phase with a well-defined tonic state and other features of a generalized or epileptic convulsion. (Authors' abstr.)

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Problem Solution by Monkeys Following Bilateral Removal of the Prefrontal Areas. II: Delayed Reaction Problems Involving Use of the Matching-from-Sample Method.

(1) Two rhesus monkeys, following bilateral removal of the prefrontal areas, were tested on spatial and non-spatial delayed reaction problems. These were run using a matching-from-sample technique.

(2) Both animals solved spatial delayed reactions using the matching-from-sample method of stimulus presentation. The maximal delay intervals successively bridged were 30 seconds and 10 seconds for Subjects 54 and 55 respectively.

(3) Both monkeys responded effectively to short non-spatial delayed reactions when a variation of the matching-from-sample method was used. Subject 54 solved 10-seconds non-spatial delayed reactions and subject 55 solved 5-seconds non-spatial delayed reactions.

(4) The data of this paper indicate that monkeys following bilateral removal of the prefrontal areas can respond successfully to delayed reaction problems when tested by means of a matching-from-sample technique.

(5) The data of this paper in conjunction with the data of similar researches do not support the hypothesis that bilateral prefrontal lobectomy destroys any particular ability, but suggest that a number of functions are impaired. (Authors' abstr.)

The Production of Audiogenic Seizures by Interrupted Tones.

The effectiveness of intermittent sound stimulation has been studied in an attempt to define further the stimulus conditions required for eliciting audiogenic seizures in rats. The stimulus used in the present experiment was a 4,000-cycle tone at 134 ± 8 db. (above 10^{-16} watts per cm.^{2}), interrupted in such a way that a known interval of silence followed a known interval of sound. The duration of the sound-silence cycle was varied as well as the ratio of sound to silence.

At a sound-to-silence ratio of 1 : 1, the stimulus becomes more effective as the sound-silence

cycle decreases from 10 seconds (5 seconds on, 5 seconds off) to about 1 second (1/2 seconds on, 1/2 seconds off). Cycles shorter than 1 second are just as effective as a steady tone in eliciting seizures.

At a ratio of 1 : 3, the 1-second cycle (1/4 seconds on, 3/4 seconds off) is practically ineffective, but cycles shorter than this cause progressively more seizures. At a given cycle duration the 1 : 1 ratio always elicits more seizures than the 1 : 3 ratio.

The latent period for the seizure was approximately the same for all the different types of stimuli. (Authors' abstr.)

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Cortical Localization of Symbolic Processes in the Rat. III: Impairment of Anticipatory Functions in Prefrontal Lobectomy in Rats.

In his development of a conditioning theory of maze behavior Hull has postulated a " goal gradient " responsible for an increase in rate of speed as an animal approaches a goal, and a fractional goal reaction (" anticipatory gradient ") considered to underlie a terminal retardation in rate of running which appears near the goal in the later stages of maze training. The first, we thought, involves simple conditioning processes, and the second symbolic processes at a higher level. Since other experiments had indicated that symbolic functions in the rat depend primarily upon the prefrontal areas, the hypothesis was formulated that prefrontal lesions in the rat should abolish the anticipatory gradient, but leave the goal gradient, in the speed of locomotion in the maze.

Eight rats were operated for removal of the prefrontal areas, and eight normal animals were matched with them in respect of age, sex, and weight. After preliminary training and adjustment to a 24-hour feeding schedule, the two groups were run on an enclosed maze 18·4 ft. long and consisting of eight right and eight left turns in single alternation. Five trials a day were given for 13 days. Time was taken on three sections of the maze.

During the first few days (1–5) the normal rats showed a goal gradient throughout all five trials. In the next days (6–9), a terminal retardation (anticipatory gradient) appeared toward the end of the run, and especially in the later trials of the day. Then, in the last four days of testing (10–13), the goal gradient tended to be abolished and the anticipatory gradient was operative throughout the whole run. The prefrontal rats, on the other hand, showed a goal gradient in the first few days, just as did the normal rats, but as training was continued, the goal gradient became even more pronounced and there was no sign of an anticipatory gradient.

The experiment confirms, moreover, the hypothesis that the fractional goal reaction in maze behavior involves symbolic processes, and that such processes are mediated by the prefrontal cortical areas of the rat. The differential effect of cortical lesions upon goal gradient and anticipatory gradient points to the conclusion that different types of psychological function are reflected in these respective gradients. The results were presented as an illustration of the way in which psychoneural investigations can contribute to learning theory by the sorting of behavioral functions into classes in a way not possible in behavioral studies alone.

(Authors' abstr.)

Problem Solution by Monkeys Following Bilateral Removal of the Prefrontal Areas. III: Test of Initiation of Behavior.

(1) Two rhesus monkeys following bilateral removal of the prefrontal areas and two intact rhesus monkeys were tested on a test of " initiation of behavior." This problem required only that the subject remove food from one of two metal plates in a limited time interval.

(2) The operated animals made significantly poorer scores than the normal animals on those trials in which food was exposed on the food platform for a single second. This difference did not result from lack of familiarity with the problem, as indicated by the fact that significant difference did not appear at the longer exposure intervals. No significant difference was found between normal and operated subjects in the percentage of errors made on the reversal as compared with the non-reversal trials at any exposure intervals.

(3) These data show that bilateral removal of the prefrontal areas in monkeys may produce loss in a simple problem not involving the formation of new associations or the utilization of any symbolic process. (Authors' abstr.)

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The Course of Acquisition of a Conditioned Response of the Occipital Alpha Rhythm.

The acquisition curve for the conditioned response of the occipital alpha rhythm to voluntary clenching of the fist was determined by using a conditioning procedure in which one-half of the trials were reinforced. The curve was an accelerated one, nearly the mirror-image of the extinction curve. The curves of acquisition and extinction for EEG conditioning are similar to those obtained when peripheral responses are conditioned. The effect of a conscious attitude of "expectancy" was investigated by telling the *Os* whether or not to expect a light. It was found that, after a short reinforcement series, responses were given when a light was not "expected." These trials yielded an extinction series. Responses were always given when light was expected. It was concluded that the effect of conscious "expectancy" in the formation of the conditioned response is limited. (Authors' abstr.)

A Comparison of Eyelid Responses Conditioned with Reflex and Voluntary Reinforcement in Normal Individuals and in Psychiatric Patients.

A comparison of eyelid responses conditioned with reflex and voluntary reinforcement in normal individuals and psychiatric patients indicates that—

Although the same wink movement was under study in each case, the type of conditioning which arises through voluntary reinforcement differs from that arising through reflex reinforcement in its descriptive characteristics, its course of development and in its type of extinction. VCRs exhibit the post-extinction recovery, with lapse of time of a characteristic fashion, as do RCRs.

There are negligible differences in the course of acquisition of either the RCR or the VCR between normal individuals and psychiatric patients.

There is some evidence of a greater perseveration of the learned activity of the VCR in psychiatric patients. (Authors' abstr.)

Maze Behavior of the Rat after Electroshock Convulsions.

Twenty-eight rats which had learned a two-decision point, right-left T maze under hunger and food reward motivation, were divided into two groups of 12 and 16 animals. One group was given one electroshock convulsion every day for 30 days, and both groups were put back in the maze 20 days after the last convulsion of the electroshock animals.

The only objective evidence of maze habit retention in the electroshock rats was seen in the relearning-time scores relative to the initial learning-time scores of the same group. The relearning-time scores of the experimental animals, however, were significantly greater than those of the control group.

Relearning error scores of the electroshock rats relative to initial learning errors of the same animals were not significantly different. Relearning error scores of the electroshock group were significantly greater than the relearning errors of the control group.

The possibility that the errors of relearning of the electroshock animals were conditioned by the " emotional " behavior induced by the electroshock convulsions must be considered before it is concluded that a long series of electrically-induced convulsions effects an enduring organization of the finely discriminative cognitive structural trace of a recent maze habit.

(Author's abstr.)

OCTOBER.

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*A Psychiatric Contribution to the Problem of Morale. *Sillman, L. R.* 283
*Cardiovascular Response to Acetyl-Beta-Methylcholine (Mecholyl) in Mental Disorders. *Altman, L., Pratt, D., and Cotton, J. M.* 296
*Disorders in the Body-Image in the Clinical Pictures of Psychoses. *Bychowski, G.* . 310

Research in Schizophrenia.

Previous psychological investigation has tended to single out an individual psychological capacity or a clinically outstanding symptom, instead of placing changes in the total personality in the foreground.

Applying his method of investigating patients with irreversible organic brain lesions, the writer finds that in schizophrenia, also, there is impairment of abstract thinking. It is shown that many of the bizarre symptoms become intelligible when it is realized that these are reactions to the changed world of the schizophrenic, a world that is pathologically concrete and void of abstract interpretation. The level and kind of concreteness in schizophrenia is not identical with that of somatic cases, the schizophrenic world being richer and more animated with personalized ideas.

It is, as yet, not possible to say whether this impairment is a primary or secondary phenomenon. The similarity between the findings in organic and schizophrenic patients suggests that in the latter, also, a somatic factor is involved. S. M. COLEMAN.

Psychiatry and Morale.

The writer holds that, in total war, intensive psychological mobilization of the nation is of the utmost importance. Education for war requires that the individual's loyalty to country should be intensified and that his aggression should be directed towards the enemy. Enlarging on the above, the principles of war propaganda, as laid down in *Mein Kampf*, are reissued in psychological terminology. S. M. COLEMAN.

Mecholyl in Mental Disorders.

Forty-nine normal, psychoneurotic and psychotic male subjects were tested for cardiovascular response to the subcutaneous administration of acetyl-beta-methylcholine (mecholyl). It is suggested that the systolic pressure curves obtained may be a measure and function of autonomic compensation, low scores indicating deficient and high scores adequate or increased compensatory ability. S. M. COLEMAN.

Disorders in the Body Image.

The literature is reviewed and the complex structure of the body image, as it develops from early childhood, studied. The evidence is that distortion of the body-image can result, not only from organic changes, but also from essentially psychodynamic moments. The clinical material includes involutional psychosis of depressive and schizophrenic character, where the disorders of body-image are considered the " generating trouble." These are elaborated in the clinical picture in the form of delusions and hallucinations.

Depersonalization of the whole body or else of some organs may originate in psychogenic mechanisms ; then it constitutes a result of partial withdrawal of libido. The problem of total or partial projection of body-image seems to include manifold implications. It ranges from the phenomenon of phantom through projection of non-injured parts of the body and ends in total projection of the entire body-image (autoscopy). S. M. COLEMAN.

APRIL.

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*The Influence of Indian and Negro Blood on the Manic-Depressive Psychosis. *Fischer, S.* 409
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Cryptorchidism and the Cremasteric Reflexes. *Hess, L.* 423
A Traumatic Neurosis of World War I 23 Years After : Psychiatric and Rorschach Investigations. *Miller, J. S., and Gair, M.* 436
Observations of the English in War Time. *Matte, I.* 447

Pathology Among Psychotics.

Autopsy material from 420 examinations among institutionalized psychotics is reviewed and the frequency of the pathological findings tabulated. Organic visceral changes were present in 96·3 per cent. of the cases. Demonstrable cerebral lesions occurred in 30·4 per cent. of the series of 324 brains examined.

This study demonstrates again the importance of toxemia, metabolic disturbance and oxygen deficiency as direct etiological agents in the problem of mental disease.

S. M. COLEMAN.

Significance of Body Image.

A technique of drawing the " body image " with the eyes closed is described and some 700 such drawings were examined. It is concluded that it is possible to determine from a " normal " population five distinctive types of elaboration and representation of the body image (with various sub-types arising from their several combinations). 250 individuals furnished the material for this appraisal. These five basic patterns into which the mass of drawing examples grouped themselves were found to agree fairly closely with specific patterns given by five groups among the psychoses, whose outstanding personality types had already been determined independently by psychiatric interview. These cases were of known diagnoses and ranged from mania to paranoia. S. M. COLEMAN.

Indian and Negro Blood in Manic Depressives.

On the basis of twelve cases it seems very probable that mixture with Indian blood toned down the symptoms of mania and depression. The manic states prevailed.

In mixed cases (Indian, white and negro) the manic symptoms, though intensified by the mixture with negro blood, were not influenced to such an extent that the typical manic state of the white race developed.

The symptoms of the depressive states were hardly influenced by the mixture with negro blood.

These observations agree with the finding that suicides are rare among the people of Panama.

S. M. COLEMAN.

MAY.

*Notes on the Personality of Patients with Migraine. *Trowbridge, L. S., Cushman, D., Gray, M. G., and Moore, M.* 509
*Peyote Intoxication. *Bromberg, W., and Tranter, C. L.* 518
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A New Single-Unit Portable Electrostimulator of Nerves and Muscles. *de Jong, H.* . 563
*Ambulatory Insulin Shock Technique in the Treatment of Schizophrenia. *Polatin, P., and Spotnitz, H.* 567

Personality of Patients with Migraine.

The adult form of the Bell Adjustment Inventory was given to four male and twelve female patients who came to the Migraine Clinic at the Boston City Hospital.

Analysis of the material showed that the group was well adjusted to their homes; unsatisfactorily adjusted regarding health; showed slight social maladjustment, timid and retiring; was unsatisfactorily adjusted at the emotional level; well adjusted to their occupational environment.

It is concluded that the migraine patient tends to be similar to the psychoneurotic as far as personality make-up is concerned, and that one does not find any significant psychotic trends.

S. M. COLEMAN.

Peyote Intoxication.

Peyote, in its psychological aspects, is related to basic anxieties for survival, and furnishes a tie to nature with the promise of power to combat life's problems for the individual Indian user. It has been seen also that the physiological effects are such as to evoke anxiety which soon gives way to euphoria; here the personality of the individual user and the cultural orientation are factors. A potent influence in the religious use of the drug is the promise of power which is implicit in Father Peyote. This promise contains many psychological elements of a particular ethnic derivation. It is because of these traits introjected into the Peyote cult in its widest sense that Peyote carries the influence it does. In view of this it is apparent that the focus of attention could well be on the central emotional constellations in the Indian which allow Peyote to be invested with such omnipotent force by its adherents. This basic human function of projection of feelings to inanimate objects or institutions needs to be understood by any band of individuals interested in elevating the lot of the Indian, for the opportunity for the educational work among the Indians is in direct proportion to their receptivity. The removal of rationalizations, projections and evasions of real problems, physical and psychological, must occur before sounder beliefs can be inculcated. S. M. COLEMAN.

Ambulatory Insulin Shock Technique.

An ambulatory method of giving insulin shock therapy is described.

Forty-four patients with a definite diagnosis of schizophrenia were treated over a period ranging from one week to more than three years. Thirty-six patients (82 per cent.) showed definite clinical improvement, either slight or marked. Twenty-one patients (48 per cent.) showed a marked improvement or were considered recovered. Six out of 18 patients (33 per cent.) who had a psychosis of less than one year's duration were considered completely recovered.

S. M. COLEMAN.

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*The Present Status of Convulsive Shock Therapy. *Bennett, A. E.* 23
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*Pubertas Praecox in a Female Infant Caused by Ventricular Cyst. *Flicker, D. J.* . 42
*Cataplexy and Its Treatment. *Dynes, J. B.* 48
*Observations in Electric Shock Therapy Applied to Problems of Epilepsy. *Kalinowsky, L. B., and Kennedy, F.* 56

Convulsive Shock Therapy.

Traumatic skeletal and visceral complications are so serious from any form of straight convulsive shock that its use either with drug or electrical methods is contraindicated. The only safe preventive of traumatic complications for any type of convulsive shock is preliminary curarization. S. M. COLEMAN.

Pubertas Praecox in a Female Infant.

A case of macrogenitosomia praecox in a female infant is reported. The pathology found was a third ventricle cyst. Neighbourhood symptoms involved the epithalamus, thalamus, hypothalamus and adjacent structures. The pineal syndrome is most spectacular. The simultaneous involvement of the thalamic control, the hypothalamic disturbance of fat metabolism, the bilateral optic atrophy, the involvement of the pyramidal control and the hyperalgesia are all explainable on a basis of pressure. S. M. COLEMAN.

Cataplexy and Its Treatment.

Cataplexy is frequently associated with narcolepsy. Benzedrine in appropriate doses relieves most narcoleptics of symptoms, but has little or no influence on their cataplectic disorder. Potassium chloride in doses of 30 to 75 gr. daily by mouth succeeded in relieving all patients with severe cataplexy of their disabling symptoms but had no favourable influence on the narcoleptic disorder. S. M. COLEMAN.

Electric Shock Therapy and Epilepsy.

Electric shock and metrazol seizures have been compared in the same patient; certain differences are noted in the pre- and post-convulsive phenomena. Convulsions and post-convulsive behaviour follow the predetermined pattern of the individual, nor are these influenced by type of stimulus or previous medication. S. M. COLEMAN.

AUGUST.

*Electric Shock Therapy in the Psychoses: A Study of 100 Cases. *Epstein, J.* . . . 115
Dysmorphopsia During the Course of Sulfanilamide Therapy. *Savitsky, N., and Weitzen, H.* 130
Protocol of an Individual Play Session. *Despert, J. L.* 133
Some Remarks on Russell Brain's Article Concerning Visual Object-Agnosia. *Goldstein, K.* 148
*Environment and Heredity in the Light of Modern Biology: A Critical Review. *Karpman, B.* 154
*Introduction to the Growth Concept of Nervous Integration (conclusion). *Schneider, D. E.* 164

Electric Shock in Psychoses.

Electro-cerebral shock causes mass cerebral and automatic nervous system irritation, the manifestations of which are profound effects upon the heart rate, blood pressure, pupils, state of muscular tonus, mental equilibrium, etc. Convulsive reactions are most desirable for treatment purposes, but *petit mal* reactions can be utilized in certain instances.

In a series of 100 cases, manic depressives and involutional melancholias responded best. Schizophrenias and mixed psychoses in which paranoid and delusional trends predominated did poorly. S. M. COLEMAN.

Environment and Heredity.

The writer reminds us that the struggle between the concepts of function and structure has been going on from times immemorial. The opinion of the investigator will be determined by the particular way he views what he thinks and feels are facts. Biologists tell us of the meaning of function in the development of structure. For more than a generation Jelliffe and White have been teaching that function precedes structure. Even organic pathologists have come to realize that diseases begin with functional changes which proceed, if not interfered with, to structural changes. The writer concludes that life is functioning and structure is organized function. S. M. COLEMAN.

Growth Concept of Nervous Integration.

The growth concept of nervous integration is introduced in outline form. It depends basically on two ideas: the parenchymatous nerve-cell acts as a tension-relaxation electrochemical battery; and the somatic cells, in their growth, act as the mechanism for charging the nerve-cell, through the blood-stream, by providing chemical substances for the building-up of potential energy (tension) and kinetic energy (relaxation). The tension-relaxation mechanism, thus created by the growth of the somatic organs, in turn dynamically restrains and models the function and architecture of the soma. A brain-organ equilibrium essential to life is thus brought about. S. M. COLEMAN.

SEPTEMBER.

*Alterations in Communicability, Content of Thought and Affective Response During Irritative (Camphor) Therapy. *Friedman, E.* 229
Agranulocytosis Following Malarial Therapy in General Paresis. *Heldt, T. J., and Goder, G.* 248
The Principle of Evolution of Nervous Function. *Riese, W.* 255
*Mental Symptoms in Multiple Sclerosis. *Sugar, C., and Nadell, R.* 267
A Neuropsychiatric View of German Culture. *Brickner, R. M., and Lyons, L. V.* . . 281
Psychiatry and Neurology One Hundred Years and Fifty Years Ago. *Stanka, H.* . 294

Irritative (Camphor) Therapy.

A group of 70 chronically institutionalized male patients were segregated and subjected to camphor therapy. In the opinion of the writer the increased productivity and anxiety which follow this treatment should be made use of psychotherapeutically. S. M. COLEMAN.

Mental Symptoms in Multiple Sclerosis.

Twenty-eight patients with multiple sclerosis, of more than 10 years' duration, observed for six to eight months, were studied with special emphasis on their emotional affective symptomatology.

In general, there was found in this series of patients (1) a change in the emotional content or prevailing mood, most often in the direction of increased cheerfulness; (2) a marked sense of well-being out of proportion to their physical condition; (3) a tendency towards an increase of the affective expression, which at times was incongruous with the underlying mood.

S. M. COLEMAN.

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The Nuclei of the Cranial Nerves in a Human Case of Cyclopia and Arhinia. *Marburg, O., and Mettler, F. A.* 54
Pathological Changes in the Brain of a Case, Clinically Diagnosed Dementia Praecox. *Ferraro, A.* 84
A New Method to Demonstrate Pathogenic Yeasts and Fungi. *Kernohan, J.* . . . 95
A Modification of the Horsley-Clarke Stereotoxic Apparatus. *Bailey, P., and Davis, E. W.* 99

Post-motor Foci Influencing the Gastrointestinal Tract and Their Descending Pathways.

1. In acute experiments on dogs the gastrointestinal tract could be influenced not only from pre-motor area 6 but also from foci in a " post-motor " region (areas 5 or 3 respectively). Reactions of the gastrointestinal tract were obtained in some animals only from one of these areas (either the pre- or post-motor) ; in others this system could be influenced from both foci. Simultaneous records of stomach, small intestine and colon showed that the whole gastrointestinal tract may receive impulses from the pre- as well as the post-motor area. The effect may be synergic in all parts of the gastrointestinal system, or increase of activity in one part may be associated with inhibition in other parts of the gastrointestinal system. Sometimes, however, the effect is restricted to a limited part of this system.

2. In chronic experiments circumscribed lesions were placed in the post-motor area and the descending pathways traced by the Marchi method into the cerebral peduncle and the pyramidal tract. (Authors' abstr.)

APRIL.

On Diffuse Carcinomatous Metastases in the Nervous System. *Uspensky, E.* . . . 103
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Diffuse Meningeal Sarcoma. *Rottino, A., and Poppiti, R.* 190
Cysticercus Cellulosae of the Brain. *Neumann, M. A.* 197
Effects of Electrical Stimulation of the Human Cerebellar Cortex. *Pool, J. L.* . . 203

Action of Metrazol on the Motor and Sensory Nuclei of the Brain Stem.

The action of local injections of metrazole on motor and sensory nuclei and on supranuclear centers in the brain stem of the decerebrate cat has been studied.

Metrazol has a direct excitant action on motor neurons, which leads to tonicoclonic contractions of the musculature that they innervate.

Metrazole also excites sensory neurons, the discharge of which leads to motor activity through reflex channels. In addition it induces a hyperesthesia characterized by an exaggerated response to peripheral afferent stimulation.

The application of metrazole to supranuclear mechanisms both induces motor behavior and greatly facilitates the responses of lower motor neurons to local metrazol.

These observations suggest that the metrazol convulsions which follow minimal intravenous doses are due to the summation of a great number of local stimuli, those from sensory and supranuclear mechanisms augmenting and facilitating the direct action of the drug on motor neurons. No evidence has been found for a general convulsant center. (Author's abstr.)

JULY.

Patchy Blastomatous Infiltration of the Central Nervous System (Patchy Schwannosis ?). *Ferraro, A., Jervis, G. A., and Sherwood, W. D.* 207
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*The Influence of Electric Current Application on the Structure of the Brain of Dogs. *Globus, J. H., van Harreveld, A., and Wiersma, C. A. G.* 263
Innervation of the Blood Vessels of the Rabbit's Iris. *Langworthy, O. R., and Ortega, L.* 277
Landry's Paralysis. *Hassin, G. B.* 293
Cerebral Vascular Changes Associated with Azosulfamide and Sulfamethylthiazole Therapy. *Scheinker, I. M.* 301
*Cerebral Patchy Demyelination. *Holt, E. K., and Tedeschi, C.* 306

The Influence of Electric Current Application on the Structure of the Brain of Dogs.

A careful gross and microscopic study of brains of dogs subjected to electronarcosis disclosed no pathologic alterations. The brains of the experimental animals did not differ anatomically from that of the normal control. There were no changes in the size, the consistency and the vascularization of the brain tissue, nor were there any alterations in the nature or number of the nerve cells. There were no changes in the glial elements nor in the structure, content and the environment of the blood vessels, and no abnormal accumulation of pigment or of fatty products of dissolution were found. It is significant that the histologic structure of the brain in the animal killed by electrocution did not differ from that in the other experimental and control animals.

The initial current used in most of the electronarcoses to which the experimental animals were subjected was of sufficient strength to have produced the characteristic symptoms of electroshock even when applied for only a fraction of a second. Instead, in each treatment, this current was continued for 30 seconds, and for several minutes in the cases in which the animal was killed by this method. It seems, therefore, that if electroshock were capable of producing undesirable effects on the structures of the brain, due to the current passage itself, these effects would have been more pronounced in the present experiments. However, no histological alterations were detected in the material under investigation. The absence of significant changes, therefore, indicates that with current of the strength used, the current passage itself is not an injurious factor. (Authors' abstr.)

Cerebral Patchy Demyelination; Case Report.

A case of cerebral patchy demyelination in a man, aged 56, presenting a clinical picture suggestive of a catatonic type of dementia praecon, is described. The anatomical studies revealed features typical of a primary demyelinating process, characterized by (*a*) sharp demarcation and limitation of the lesions to the white substance of the brain; (*b*) marked destruction of the myelin sheaths and breaking down of the axis cylinders; (*c*) relative integrity of the overlying cortex down to and including the arcuate bundles; (*d*) a reaction on the part of the astrocytes, microglia, and oligodendrocytes in the affected areas; and (*e*) lack of evidence of an inflammatory reaction. (Authors' abstr.)

J. NEUROPHYSIOL.

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*The Monkey (*Macaca mulatta*) after Hemisection and Subsequent Transection of Spinal Cord. *Grayson, P. McC., Hughes, J., and Stewart, W. B.* 155
*The Effect of Insulin Hypoglycemia on Conditioned Reflexes. *Gellhorn, E., and Minatoya, H.* 161
*Cortical Localization of Symbolic Processes in the Rat. II: Effect of Cortical Lesions upon Delayed Alternation in the Rat. *Morgan, C. T., and Wood, W. M.* . . . 173
*Motor Response to Stimulation of Cerebral Cortex in Absence of Areas 4 and 6 (*Macaca mulatta*). *Kennard, M. A., and McCulloch, W. S.* 181
*Sweat Gland Responses to Sympathetic Stimulation Studied by the Galvanic Skin Reflex Method. *Richter, C. P., and Whelan, F.* 191
*Localization of the Salivatory Center in the Medulla of the Cat. *Wang, S. C.* . . . 195
*Localization of Enzymes in Nerves. II: Respiratory Enzymes. *Nachmansohn, D., et al.* 203
*Mechanism of Temporal Fusion. Effect of Photic Stimulation on Electrical Activity of Visual Structures. *Walker, E. A., et al.* 213

The Monkey (Macaca mulatta) *after Hemisection and Subsequent Transection of Spinal Cord.*

A series of 14 monkeys (*Macaca mulatta*) and one *Macacus mordax* have been studied after hemisection and subsequent transection of the spinal cord.

Reflex recovery was always more rapid in the previously paretic extremity.

Three animals developed crossed reflexes on the chronic side in response to stimulation on the acute side. Crossed flexion of digits was recorded a few hours after transection; crossed extension of the leg two or more days later.

Crossed inhibition may be more effectual when driven from the chronic side affecting the acute side than vice versa.

Only exceptionally is asymmetry reflected in internuncial potentials; never to the degree obtaining in the corresponding reflex responses.

The significance of the asymmetry observed is discussed in relation to spinal shock.

(Authors' abstr.)

The Effect of Insulin Hypoglycemia on Conditioned Reflexes.

The chronic effect of insulin hypoglycemia on the central nervous system has been studied by means of conditioned reactions.

Normal rats which jump from a compartment A across a small partition to a compartment B in a response to an electric shock applied to the grid of the compartment (unconditioned response) are trained to react in a similar way in response to a conditioned stimulus (bell). This reaction is inhibited by lack of re-enforcement. Under such conditions no spontaneous recovery occurs, but insulin hypoglycemia restores the inhibited conditioned response. The action of insulin is cumulative and may lead to a permanent recovery. This effect of insulin depends upon the number of insulin administrations and the degree of hypoglycemia, coma being the most effective procedure. The reaction is specific, since no positive responses are elicited when stimuli are used to which the animal had not been conditioned previously.

The chronic effects of insulin coma are not restricted to disinhibition of conditioned responses, but influence also the excitatory processes which are the basis of conditioning. This is shown by the fact that a partial conditioning leading to an average of only 20 per cent. positive reponses in the control group causes 82 per cent. conditioned responses in the experimental group subjected to two insulin hypoglycemias during the training period. (Authors' abstr.)

Cortical Localization of Symbolic Processes in the Rat. II: Effect of Cortical Lesions upon Delayed Alternation in the Rat.

The experiment was designed to determine whether or not there are limited areas in the anterior cortex of the rat which subserve symbolic processes, and in particular recent memory, as has been found to be the case in primates.

In a T-maze in which rats spontaneously alternate, 17 rats were run for 60 trials each, pre- and post-operatively. Between each trial there was an interval of 15 seconds, and single alternation significantly greater than a chance level of 50 per cent. was taken as an index of the use of recent memory.

Following completion of post-operative tests brains were removed and the size and location of the lesions reconstructed upon standard diagrams. The majority of the lesions were in either the prefrontal or the occipital areas. Animals with the prefrontal lesions, except for one with a small lesion, lost their ability to use recent memory, whereas those with occipital lesions showed little difference in performance. Too few " pure " motor lesions were available to determine whether these also affected the recent memory. Parietal lesions, on the other hand, gave inconsistent results.

Some " localization " of recent memory in the anterior areas of the rat is definitely indicated, although more work is required to tell us how precise it may be. Considering the other cases of functional localization of specific functions established in recent years, the rat's cortex appears not to be so poorly differentiated as earlier maze studies led us to believe.

(Authors' abstr.)

Motor Response to Stimulation of Cerebral Cortex in Absence of Areas 4 and 6 (Macaca mulatta).

1. Stimulation of the cerebral cortices of *Macaca mulatta* from which areas 4 and 6 had previously been removed has revealed marked differences in excitability of the cortex from which the motor areas have been removed in infancy as compared to that from which motor areas have been removed later in life.

2. The cortex of the animal with motor areas removed in infancy has greater excitability in the regions surrounding areas 4 and 6, namely, the posterior lip of the central sulcus, areas 6b and 6a than has either the normal macaque cortex or that of the animal from which the motor areas have been removed at a later age.

3. Movements elicited from these regions are more diffuse, and require a higher threshold stimulus than do these regions in the intact hemisphere.

4. No regions other than those known to be excitable in the normal animal were found to be excitable in these preparations.

5. The changes in excitability in the animals operated on in infancy are consistent with the well developed motor performance of such animals during life.

6. They are consistent with functional reorganization within a partially destroyed motor system. There was no evidence of anatomical reorganization. (Authors' abstr.)

Sweat Gland Responses to Sympathetic Stimulation Studied by the Galvanic Skin Reflex Method.

1. Single induced shock applied to the sympathetic chain (L_2 and L_3) of cats caused a galvanic current to be given off by the large central pad of the hind foot. This response, which was monophasic, had an average latent period of 0·6 and a duration of 5 seconds.

2. The threshold for " make " currents was much higher than that for " break " currents. With larger currents the amplitude of the " make " response finally surpassed that for the " break."

3. Induced shocks at a rate of 136 to 375 per minute or 2 to 6 per second sufficed to obtain complete tetanization of the sweat glands, as indicated by the galvanic responses.

(Authors' abstr.)

Localization of the Salivatory Center in the Medulla of the Cat.

The lower brain stem of 35 cats has been stimulated with the aid of the Horsley-Clarke stereotaxic instrument. It was found that a copious salivary flow is easily elicited from the homolateral glands when the medulla is stimulated with a weak current.

Analysis of the responsive locations reveals that salivary secretion can be obtained by stimulation of the intramedullary visceral (oral) afferent system, such as the solitary fasciculus and its nucleus and certain portions of the spinal trigeminal nucleus and tract (mandibular division ?). On the efferent side, the distribution suggests that the salivatory nuclear masses might be either in the medial position caudal to the facial genu, or more likely, in the dorso-lateral region of the lateral reticular formation, dorso-medial to the spinal trigeminal nucleus, and dorsal to and at the level of the facial nucleus. In the latter case the efferent fibers must travel dorso-medially before they turn and make their exit in the ventro-lateral portion of the medulla. In any event, there is no sharp divison of the centers of the salivatory nerve fibers carried in the seventh and ninth cranial nerves. The rostral portion supplies the submaxillary glands, and the caudal portion the parotid. There exists an intermediate portion, stimulation of which yields both submaxillary and parotid secretion. (Author's abstr.)

Localization of Enzymes in Nerves. II: Respiratory Enzymes.

1. The distribution of cytochrome oxidase in nerve tissue of the squid has been studied. In the head ganglion the concentration is remarkably high, the QO_2 at 23° C. being −9·0 to −13·0. In the axoplasm extruded from the trunk containing the giant axon the concentration is lower, but relatively high compared with that of the remaining tissue. This finding is evidence for the previous assumption that the bulk of the respiratory enzymes is confined to the axoplasm, while in contrast practically all of the choline esterase is found at the neuronal surface.

2. Oxidation of pyruvic acid in the minced head ganglion occurs at a rate similar to that of p-phenylenediamine, the QO_2 being about −7·0 to −9·0. On the other hand, in a ground suspension of the head ganglion the activity of pyruvic oxidase falls off rapidly even if the following substances known to be of consequence in pyruvic acid oxidation are added: cytochrome c, adenosinetriphosphate, diphosphothiamin, diphosphopyridine nucleotide and succinate. In the axoplasm the activity of pyruvic oxidase was small, although in the whole trunk if minced, the rate of O_2 uptake is about the same with pyruvate as with p-phenylenediamine. The axoplasm dissolves rapidly in isotonic solution. Therefore the low QO_2 values must be attributed to the rapid loss of activity if the cell structure is destroyed.

3. Pyruvic dehydrogenation is strongly increased in the presence of diphosphothiamin. In view of the concentration of this coenzyme at the neuronal surface this incomplete breakdown, yielding acetic acid and carbon dioxide, may be of significance for the formation of acetylcholine. (Authors' abstr.)

Mechanism of Temporal Fusion. Effect of Photic Stimulation on Electrical Activity of Visual Structures.

The driving effect of intermittent photic stimulation on the electrical activity of the optic nerve, lateral geniculate body, tectum mesencephalon, optic radiations and cortex has been explored in monkey (*Macaca mulatta*).

(i) At an intensity of 10 fc., the optic nerve and lateral geniculate body could be driven at a maximum rate of 62 c.p.s. and 59 c.p.s. respectively, a rate that is well above the maximal critical fusion frequency for man and probably for monkey.

(ii) The cortex of the striate area could be driven at a maximum rate of 34 c.p.s.

(iii) While a driving effect could be obtained from the tectum mesencephali and from the optic radiations, it was not sufficiently stable to permit a determination of maximum rate.

(iv) The possibility is considered that our findings indicate a fusion mechanism in the cortex, which limits the temporal resolving power of the primate visual system. (Authors' abstr.)

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Temperature Effects on Reflexes of Isolated Spinal Cord. Heat Paralysis and Cold Paralysis.

1. In preparations of isolated spinal cord and legs from American frogs, spontaneous co-ordinated movements are observed if the temperature is between 3·5° and 21° C.

2. Differences are noted between American and Brazilian frogs in the form of reflexes, when the spinal medulla is subjected to different temperatures.

3. The time of resistance of spinal reflexes at different temperatures, in American frogs, as in frogs previously studied (Brazilian and European frogs), form curves with a maximum for a mean temperature. Below and above this temperature the time of resistance decreases.

4. Position and value of this maximum are dependent on habitual temperatures and conditions in which the frogs are living.

5. Reflex exhaustion is permanent when the spinal cord is subjected to temperatures between 14° and 29° C.

6. Above 29° C., before exhaustion, the spinal centres are paralysed after intervals of time decreasing with increasing temperatures. Recovery is obtained if the spinal medulla is put again in the mean temperature. Heat paralysis is not due to asphyxia, and recovery does not depend on any exchange between nervous centres and the outside atmosphere.

7. Below 14° C. cold paralysis is observed, and the time for it to be produced is shorter the lower is the acting temperature. Recovery also is obtained, after paralysis, when the medulla is placed again in the mean temperature. Cold paralysis, as heat paralysis, intervenes before the exhaustion of the centres.

8. Heat and cold paralysis are not due to an interruption of conduction in the nerve or to any action on peripheral organs. Under the action of low or high temperatures the nervous centres cease their functions long before peripheral nerves and organs.

9. The time of disappearance and the time of resistance of the reflexes after recovery from paralysis when the spinal cord is again at room temperatures may give available indications upon conditions of nervous centres at the moment when cold and heat paralysis are produced. At high and low temperatures, nervous centres are paralysed by concentrations of metabolic products, which are ineffective in mean temperatures. The intensity of action of these products is dependent on the temperature. (Author's abstr.)

Electroencephalogram of Decorticate Monkeys.

1. Electrical potentials have been recorded from cortex and subcortical nuclei in decorticate and hemidecorticate monkeys.

2. Simultaneous EEGs made from these areas may be independent of one another and the patterns from cortex, basal ganglia, thalamus and hypothalamus are characteristic for each specific area.

3. Each cellular complex, however, influences the other complexes. In particular lesions of the subcortical nuclear complexes affect cortical potentials.

4. The EEG obtained from basal ganglia of a hemidecorticate preparation shows low-voltage eight-per-second background potentials. Only when all of the cerebral cortex is removed do spontaneous bursts of high-voltage activity appear.

5. The pattern obtained from thalamus has a medium-rate component, as in the cortex. At times records of thalamus and post-central cortex are synchronous. Lesions of thalamus alter the pattern of cortical EEGs in general, but most markedly in the post-central areas.

6. There is little activity within the normal hypothalamus, but its ablation profoundly alters cortical EEGs.

7. Partial ablation of thalamus or hypothalamus temporarily alters cortical EEGs, but only when both thalamus and hypothalamus are completely extirpated are these cortical potentials abolished. (Author's abstr.)

Spontaneous Electrical Activity of Thalamus and Other Forebrain Structures.

1. The spontaneous activity of subcortical forebrain areas was recorded by means of bipolar electrodes oriented with a stereotactic instrument. Spontaneous bursts of 5–10 per second waves similar to those seen in the cortex were recorded in various thalamic areas, chiefly in those associated with the internal medullary lamina, but never in the "relay nuclei." These and other data suggest that several thalamic areas presumably giving rise to "non-specific cortical afferents" have a tendency to produce spontaneous rhythmic bursts, but that they may be under the additional control of a master area associated especially with the internal medullary lamina.

2. Characteristic spontaneous activity in other subcortical regions was recorded and is briefly noted. (Authors' abstr.)

Acute Physiological Effects of Gunshot and other Penetrating Wounds of the Brain.

1. Penetrating wounds of the brain were produced in dogs under morphine analgesia by means of a mechanical drill, pellet shot, 22 BB revolver and a 22 BB rifle.

2. A sudden, intense, increased intracranial tension of brief duration at the instant of injury was observed to accompany gunshot injuries of the brain by the 22 BB revolver and BB rifle. It is felt that this increased intracranial tension is the cause of the acute physiologic effects observed.

3. The results of the injuries could be classified into profound, moderate and minimal physiologic effects. Profound effects were characterized by loss of respiratory and palpebral reflex

activity, hypertension and death, the result of injury with the 22 short rifle (970 ft. per second). In the moderate group the reflexes and respiratory function were temporarily interrupted; a rise in blood pressure usually occurred; some of the animals survived. This degree of injury was produced by the 22 BB revolver (780 ft. per second). Those in the minimal group showed no significant change in the vital functions, and these animals all survived the acute experiment in which injury was produced by a penetrating drill or pellet shot. (Authors' abstr.)

Experimental Investigation of Visceral Afferent Synapses in Coeliac Ganglia.

1. The intestino-intestinal inhibitory reflex can be still obtained after any of the following procedures: bilateral vagotomy, bilateral splanchnicotomy, or bilateral abdominal sympathectomy.

2. So long as one splanchnic nerve or one lumbar sympathetic chain is left intact, the reflex persists.

3. Complete sympathectomy (removal of both sympathetic chains from above the stellate ganglion down to the level of the brim of the pelvis) abolishes the reflex.

4. Immediately after bilateral splanchnicotomy and bilateral lumbar sympathectomy the reflex can rarely be elicited. The procedure may leave some intact connections between the coeliac ganglia and the central nervous system. The possibility of preganglionic axon-reflexes has also to be considered.

5. No support is found for the postulated existence of true reflexes through the decentralized coeliac ganglia.

6. A vasopressor reflex following intestinal distension is still present after complete sympathectomy, but is markedly diminished by bilateral vagotomy below the diaphragm. Presumably the afferent pathway is largely vagal, but somatic nerves in the abdominal wall may participate to a lesser degree. (Authors' abstr.)

Pressure Block in Nerves Provided with Arterial Sleeves.

The strangling effect of sleeves of artery pulled over peripheral nerve on the underlying nerve fibers was investigated in limb nerves of the rat. Adrenalin applied to an arterial sleeve over a nerve produces rapid constriction and, as a result, progressive pressure block of conduction. The development of this block was studied oscillographically by stimulating the nerve proximal to the sleeve with "maximal" stimuli, and recording the decline of the action potential led off from distal levels during various phases of the constriction. Most or all of the fibers are blocked within 10 minutes after the application of the adrenalin. The block is reversible after washing, but conductivity returns only very slowly.

Sleeves pulled over nerves of much larger caliber and left for from one to two weeks produce pressure block with total or partial degeneration of the nerve fibers distal to the level of compression. The nerve proximal to the constriction is characterized by edema, resulting from the damming up of endoneural fluid, and by swelling of the axis cylinders. Degeneration within the compressed area itself is restrained, but becomes extensive at levels distal to the sleeve. Numerous fibers may persist throughout the compressed area in histological integrity in spite of chronic pressure block. Likewise, fiber regeneration occurs throughout the compressed area.

Sleeves of wide caliber, which have not affected the enclosed nerve during the period of transplantation, produce reversible pressure block upon application of adrenalin much as do freshly transplanted sleeves.

The bearing of these findings on the method of splicing severed nerves by arterial sleeves is discussed. (Authors' abstr.)

Note on Organization of the Tactile Sensory Area of Cerebral Cortex of Chimpanzee.

Although few, the observations here reported indicate that the tactile sensory area is organized in the same way in the chimpanzee as it is in the monkey. In the latter, analysis of the cortical pattern in terms of metameres showed that all spinal cord segments below C_8 are projected to the cerebral cortex in their spinal sequence, whereas the cervical segments on projection are reversed *en bloc*. This produces two regions of segmental discontinuity in the cortical sequence. These regions coincide with the boundary lines separating Dusser de Barenne's face, arm and leg areas. (Authors' abstr.)

Neuron Patterns Controlling Transmission of Ipsilateral Hind Limb Reflexes in Cat.

The reflex function within the hind limb of myelinated afferent fibers has been examined. Three sub-groups of these fibers are recognizable. The large fibers form direct connections with the motoneurons, the medium and small fibers connect with interneurons.

Reflex discharge mediated through the direct (two-neuron-arc) connections reflects only into the muscle, head of a muscle, or combination of muscles, the large afferent fibers of which are subjected to stimulation. Because of the identity of distribution holding for the two-neuron-arc discharge and the myotatic reflex, it is concluded that the two-neuron-arc pathways are reserved for mediation of the myotatic reflex.

Multineuron-arc discharges, evoked by stimulation of medium and small afferent fibers, are directed for the most part into the nerves of flexor muscles, and represent the flexor reflex proper. The minimum central pathway devoted to this reflex is one of three neurons.

Under appropriate conditions the flexor muscles receive excitation through arcs of two neurons as well as through the multineuron reflex arcs. The conditions are exactly those governing the transmission of two-neuron-arc excitation to extensor muscles. It is concluded that the flexor two-neuron-arc reflex represents the flexor tendon-jerk, or "pluck" reflex in contradistinction to the flexor reflex proper.

The segmental reflex discharge recorded from a ventral root on stimulation of the dorsal root of the same segment contains three major elements—an extensor two-neuron-arc, a flexor two-neuron-arc and flexor multineuron-arc discharges. Reflex activity through extensor two-neuron-arcs is inhibited, that through flexor two-neuron-arcs facilitated by the transmission of multi-neuron-arc reflex action. (Author's abstr.)

Conduction and Synaptic Transmission of Reflex Response to Stretch in Spinal Cats.

The afferent response to brief stretch of the gastrocnemius muscle is mediated by large (group 1) fibers at an average maximum velocity of 116 M per sec.

There is little if any true delay at the sensient organs responding to stretch.

The reflex response to brief stretch of the gastrocnemius muscle is transmitted through arcs of two neurons.

It was previously shown that the distribution of two-neuron-arc discharges accords with that of the myotatic reflex. For these several reasons it appears that the two-neuron-arc pathways are reserved for the mediation of myotatic reflexes.

The calculated overall minimum latency for the tendon jerk reflex of the gastrocnemius muscle is approximately 5·95 msec. (Author's abstr.)

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An Analysis of Shock Therapy in Schizophrenia on the Basis of a Nitrogen Inhalation Control Series.

1. In 62 cases of schizophrenia unsuccessfully treated with nitrogen inhalation there was a 52 per cent. improvement with insulin and metrazol therapies.

2. Utilizing the nitrogen anoxemia period as a control, it would seem that special attention, fear of death, satisfaction of the need to be punished, transient depression of brain metabolism, gross stimulation of the autonomic nervous system, unconsciousness, and subcortical motor phenomena are not influential in the therapeutic results of insulin and metrazol shock therapies.

3. It is suggested that further refinements of therapeutic measures be focused on improving methods for effecting the integration of consciousness with motility, preception and ideation.

(Authors' abstr.)

Observations on Electric Shock Treatment.

It seems probable that organic pathological changes are produced by the treatment. This view is supported by observation of physiopathological changes following electric shock. Most of these changes are reversible, as shown by electroencephalographic studies and clinical observation. It appears that electric shock is a severe stimulant to the vegetative nervous system. In at least two cases irreversible damage has been observed, while in another case transient signs suggestive of basal ganglia involvement were seen. In one of these cases trophic changes were prominent. Unfortunately, no pathological studies are available.

The similarity of electrically induced *grand mal* convulsions with those of epilepsy is stressed,

and there is speculation as to whether electric shock may create or modify an epileptic predisposition of the brain.

In the writer's experience a second series of convulsions usually will not result in the same degree of improvement as a first course of treatment.

It has been observed that most delayed convulsions are unusually severe.

(Author's abstr.)

Effects of Age on the Bellevue Intelligence Scales in Schizophrenic Patients.

1. The Bellevue Intelligence Scale tests were given to two groups of 20 and 30 schizophrenic patients with each group matched for sex, age and I.Q. to normal subjects. There was approximately 19 years' difference in age between the younger groups of 20 subjects each and the older groups of 30 each. It was, therefore, possible to compare the patients to their matched normals, and to study the younger patients in conjunction with the older patients with reference to traces of deterioration.

2. Although full I.Qs. are similar, the patients' verbal I.Qs. are higher on the whole than the performance I.Qs., while slight differences are found in favor of the performance I.Qs. for the normal subjects. These differences are not so exaggerated for the older population as is evident for the younger subjects.

3. For the younger group of subjects, the Digit Symbol test discriminates between the schizophrenic and the normal groups, occupying the lowest place in the former category, but contributing the highest score to the latter.

4. For the older subjects, the Digit Symbol test, the Object Assembly, and the Picture Arrangement tests are statistically significantly different as between the patient's and the normals' psychometric test results.

5. More subtests of the Bellevue Scale can detect with reliability the deterioration that shows itself in schizophrenia among the older patients, and these differ significantly from normals with respect to certain functions. (Author's abstr.)

Indications and Results of Electric Shock Therapy in Menial Disorders.

Seventy psychotic patients have been treated with electric shock; there were 56 schizophrenic patients; 9 belonged to the manic-depressive group and 5 suffered from involutional melancholia. A total of 1,333 electric shocks was administered. One patient suffered a fracture of the femur.

At the present time, two to ten months after completion of shock therapy, 30 per cent. of the schizophrenic patients are improved and 70 per cent. unimproved; of the 9 patients with manic-depressive psychosis, 6 recovered and 3 are unimproved; out of 5 involutional melancholia patients, only one did not improve. All four unimproved patients in the last two groups had some schizophrenic coloring in their psychoses.

Results reported by the author in 1940 in a group of 100 schizophrenic patients treated with metrazol were about the same—that is, 32 per cent. improved and 68 per cent. unimproved.

Electric shock therapy is preferable to metrazol because of less fear and apprehension, amnesia for the treatment and somewhat milder convulsive seizures.

Its greatest value is in the treatment of involutional melancholia, the manic-depressive psychosis and agitated depressions.

In schizophrenia, electric shock does not seem to produce permanent or lasting recovery; while amelioration of psychotic symptoms occurs in many patients, the essential schizophrenic pattern remains unchanged. Electric shock therapy may be utilized in preparing unco-operative, inaccessible, schizophrenic patients for other therapeutic measures, such as occupational and recreational therapy and psychotherapy.

The best results in schizophrenia are obtained in cases of short duration which do not show any deterioration. In the manic-depressive psychosis and involutional melancholia improvement results in spite of long duration of mental illness. (Author's abstr.)

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The Increase of Mental Disease.

The increase in mental disease presents a serious medical and social problem. It does not add to its significance, however, to exaggerate the rate of increase. Taking mental disorders

as a whole, there has been a slow upward trend over many years. The slope of the trend is not sufficiently steep to justify the alarmists, who ascribe the increase in mental disease to the rapid multiplication of defective stock. Society is becoming more and more complex, and each decade adds new and increasing stresses. As these stresses multiply, more individuals are incapable of sustaining them—individuals who under simpler circumstances might have maintained mental health. The problem of mental health is consequently a part of a larger program of maintaining a healthy social organism. Elements of this program must be social rather than medical, as, for example, in the control of the manufacture and use of alcoholic beverages, or in the guidance of pre-schizophrenic children. Other measures must await a better understanding of the degenerative diseases and of the physical changes accompanying senescence. As the science of geriatrics advances, one may look to the development of methods of preventing senile and arteriosclerotic mental disorders. (Author's abstr.)

Attempted Suicide: A Comparative Study of Psychopathic and General Hospital Patients.

1. Data in regard to 150 patients who attempted suicide prior to admission to the Syracuse Psychopathic Hospital were compared with the statistical findings in a similar group of 150 patients observed in two general hospitals with respect to whom the writers had previously reported.

2. While no general conclusions or theoretical considerations are offered, the following observations are of interest:

A strikingly higher percentage of patients was admitted to the Psychopathic Hospital because of suicidal attempts.

1. In regard to personality and diagnostic classification, while the degree of the psychic aberration was greater in those patients observed at the Psychopathic Hospital, marked personality deviations were found to occur in a large percentage of both groups. Psychoneuroses predominated in the general hospital group and functional psychoses in the mental hospital group.

2. The number of cases with organic illness comprised a little less than one-third of all the cases in each group. Lesions of the central nervous system were found more frequently in the Psychopathic Hospital series, while somatic disease was observed to occur more often in the general hospital patients.

3. Approximately three-fifths of the patients in each group were females.

4. Sixty per cent. of the suicidal patients observed in the Psychopathic Hospital were over 40 years of age, while more than 60 per cent. of the individuals studied in the general hospitals were under 40. Self-destructive attempts on the part of psychotic women observed at the Psychopathic Hospital occurred more often during the involutional period, while the psychoneurotic females found in the general hospitals were more prone to attempt suicide in the earlier decades of life. Male patients in both groups are more likely to commit suicide with advancing years.

5. Skilled workers were observed more often in the Psychopathic Hospital series, while unemployed persons or unskilled laborers were found to predominate in the general hospital series.

6. Members of the less common creeds or cults—hardly religious—were more frequently encountered in the Psychopathic Hospital series. Religious conflicts were more often elicited there.

7. In regard to methods employed, the history of patients admitted to the Psychopathic Hospital revealed a number of previous bizarre, partial or aborted attempts. Hanging, drowning and self-destructive endeavors involving injury by motor vehicles were not encountered in the general hospital patients, while these methods were employed by individuals at the Psychopathic Hospital. The general hospital patients inclined toward the use of phenol derivatives, iodine, illuminating gas, firearms and incisions with sharp instruments. The Psychopathic Hospital patients preferred to employ a combination of methods, or jumping from a height, or blunter instruments—generally more indecisive or indirect attempts.

8. Except for the presence of hallucinations and delusions of ill-defined fears and for the presence of a greater degree of anxiety in the Psychopathic Hospital patients, the apparent motives elicited from patients in both groups were similar. The underlying reasons given by the Psychopathic Hospital patients were more concealed. Because of the more bizarre nature of their apparent motives and actions, these patients gave more advance notice of their intentions.

Sexual maladjustment was given as a cause by slightly more than one-third of the patients of each group, while economic difficulties were mentioned by slightly less than 15 per cent. of either group. (Authors' abstr.)

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Artificially Induced Fever as a Therapeutic Procedure.

1. Of 122 cases of general paresis treated by the methods described, there was some improvement noted in 67 per cent. There is an estimated remission-rate of 46·5 per cent. Of the patients treated, 15 per cent. are dead.

2. Of 17 cases of cerebral syphilis treated there was some improvement noted in 76 per cent. There is an estimated remission-rate of 53 per cent.; 12 per cent. of the patients treated have died.

3. When sulfa drugs fail, artificial fever offers a method of control in acute cases of gonorrhoea.

4. Patients suffering from pulmonary tuberculosis and general paresis have been treated by fever without any apparent harm to their chest conditions.

5. Considering any death occurring during treatment, or three months after the completion of treatment, as a treatment death, regardless of what the cause of death might be, there was a crude treatment death-rate of 6·6 per cent.

6. There were two deaths definitely associated with treatment, giving a mortality-rate of 1·6 per cent.

7. It is concluded that the optimum hours of fever in the treatment of general paresis are 70, with two-fifths of this period at a temperature of 106° F. or over.

8. Artificial fever is a comparatively safe procedure, but requires the supervision of trained personnel.

9. In those cases of general paresis having a history of convulsive seizures, phenobarbital has been used before and during artificial fever treatment. In all such cases treatment has been successfully concluded without complication. (Author's abstr.)

Experience with 3,057 Administrations of Curare to 232 Psychotic Patients Treated with Metrazol.

After using curare on approximately 3,000 occasions, it is concluded to be an excellent drug for preventing complications associated with metrazol therapy. Only occasionally patients are encountered who cannot tolerate the drug to an extent where it is useful. More rarely still is there an unpredictable reaction to the drug. The only difficulty encountered to date of this writing was the occasional occurrence of respiratory embarrassment, which in each incidence was readily and spectacularly controlled by intravenous administration of prostigmin.

Compressions of the vertebrae are even more unlikely to occur if the use of curare is supplemented by hyperextension of the spine.

Restraint of the patient during the convulsion is essential but should be limited.

The undesirable feature of fear associated with metrazol therapy may be largely overcome by proper attention to dosage.

Mild cases of diabetes are no contraindication to the use of metrazol.

In this series schizophrenics treated three times a week showed a higher recovery-rate than those treated twice a week.

No deaths have occurred with the use of these drugs to date at the Ontario Hospital.

(Author's abstr.)

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The Description of Personality. I: Foundations of Trait Measurement.

(1) All traits are really unique, but in a population with common racial and cultural backgrounds a majority are so nearly common that they can be treated as common traits, measurable on common axes.

(2) It is contended, with Gordon Allport, that " it is more important to discover intelligible traits than independent ones," i.e. mathematically independent ones, for the former have functional existence in the personality and society, and can be more widely used in prediction. Such intelligible unities seem to be of three kinds—dynamic, constitutional and social mould. Co-nascent and logical trait unities also have utility in special circumstances, but their present too facile and frequent use in education and guidance seems mistaken.

(3) These three kinds of traits manifest themselves as mathematical factors (not necessarily, or even probably, of an independent kind) in the factor analysis of trait element intercorrelations. To discover them, however, it will be necessary to collate a variety of static factor analyses with a well chosen variety of differential factor analyses, thereby evolving criteria for the rotation of axes distinct from the unpsychological methods—such as " simple structure "—now employed.

(4) Dynamic traits alone may be supplementarily investigated, both as unique and as common traits, by temporal sequence studies which are longitudinal, intra-individual methods.

(5) Clusters (of highly positively inter-correlating trait elements) are unlikely to be traits. Dynamic traits, one may deduce, are likely to manifest themselves as general factors with superimposed bi-polar factors. Constitutional traits will appear as simple general factors, probably with a more even saturation of behavior elements than is found for dynamic general factors. Social mould traits are likely to appear as much restricted group factors. Such considerations contribute towards, but do not provide a unique determination of trait unities by factor analysis. The possibility of a truly unique solution to a factor analysis, yielding the psychologically real trait unities in personality, is discussed in a later article.

(6) All traits, being relations between a changing organism and a changing environment, are only temporary patterns. The common traits, however, are likely to be at least as stable as a culture pattern.

(7) Common traits can be measured in either metric or normative (population relative) units; but unique traits, having to be defined by logical dimensions, can only be expressed in metric units. (Author's abstr.)

PSYCHOSOM. MED.

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The Electroencephalogram in Psychopathic Personality.

Forty-four patients diagnosed psychopathic personality were studied electro-encephalographically. Of these, 23 (52 per cent.) were found to have EEGs which did not meet the criteria of " normal." (Authors' abstr.)

Changes in the Electroencephalogram during a Cycle of Morphine Addiction.

The assumption of a cortical excitatory state satisfactorily explains the action of repeated doses of morphine. Morphine acts to depress the cortical excitation, but this is not necessarily accompanied by a change in the level of alertness. Tolerance to the cortical depressing effect appears to be developed at quite different rates in different individuals. (Author's abstr.)

JULY.

Fundamental Concepts of Psychosomatic Research: Psychogenesis, Conversion Specificity. *Alexander, F.* 205
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On So-called War Neuroses.

" Nervous breakdown " due to war events differs from genuine neurosis. It is characteristic of a neurosis that at the center of the illness there is a personality change that hinders the individual from eliminating the escape mechanisms built up as a protection against danger and anxiety. The anxiety states observed in war are acute conditions of catastrophe that show the direct reactions to the situations of danger and that clear up if the latter is eliminated. Personality change need not necessarily develop. The situation is not essentially different in the cases of conversion states. Indeed, they are the more similar to neurosis by very reason of the fact that the patient develops more escape mechanisms for protection against danger and anxiety. But his personality need not change so deeply and permanently that the mechanism cannot be given up if they become useless, i.e. if the individual regains security. The symptoms then disappear. For the most part, therefore, no neurosis develops. This occurs only if the man remains in the situation of insecurity. Then the mechanisms become fixated and the personality undergoes change.

There are symptoms due to war events that have the characteristics of reactions to be observed in neurotics. They occur in the individual affected by special wartime conditions in principle in the same way and for the same biologic reasons as in neurotics. But they are not neuroses because there is usually no permanent personality change, and so no fixation of symptoms takes place. Personality change occurs only when causes are effective which maintain insecurity. Therefore we should not speak of war neuroses, but of anxiety states and conversional states due to war situations. It must be our endeavour to prevent the fixation of the protective mechanisms and the personality change, i.e. the development of real neuroses.

(Author's abstr.)

RORSCHACH RES. EXCH.

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The Application of the Rorschach Method in a Family Case Work Agency. *Krafft, M. R., and Vorhaus, P. G.* 28

Recent Research on the Group Rorschach Test.

The author briefly reviews some of the problems raised by group Rorschach and some of the results obtained through its use. The outstanding technical problem is that of evaluating the effect of differences in method of administration. The important fact is not that of difference *per se*, but of difference in results obtained for varying conditions, subjects, and purposes. " What may appear as gross differences in method may actually be functional equivalents or near equivalents." The problems of slide production, time limits, trial blots, slide rotation, type of inquiry, and other variations in method must all be approached from this point of view. Results of several experimenters agree that in the group test percentages of W's, WM's and P's are greater, whereas D responses are less frequent. Recent experimentation has shown the utility of the group test for screening out convicts requiring psychiatric attention, for the selection of mechanical workers, and for the indication of changes in adjustment under high altitude conditions.

E. M. L. BURCHARD (Psychol Abstr.).

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1. Biochemistry, Physiology and Pathology.

Acetylcholine and the Physiology of the Nervous System. *Fulton, J. F., and Nachmansohn, D.* [*Science*, **97**, 569–71 (1943).]
Discussion and review, with 18 references. E. D. WALTER (Chem. Abstr.).

The Action and Sphere of Usefulness of the Humoral Transmitter Acetylcholine. *Hueber, E. F.* [*Deut. med. Woch.*, **68**, 483 (1942).]
A review of the actions and clinical indications for acetylcholine (I), mecholyl and doryl on the basis of the literature and personal experience of the author. Slow infusion of (I) reduced the O_2 consumption of human subjects. Blood levels of Na, K and Cl remained unaltered. On the other hand, the excretion of K in the urine and the Na : K ratio were elevated. Adrenaline gave the reverse effects. A. GROLLMAN (Chem. Abstr.).

Significance of Acetylcholine as a Humoral Transmitter of Nerve Stimulation in the Central Nervous System. (I–III.) *Utunomiya, Sansyo.* [*Okayama Igakkai Zassi (Mitt. med. Ges. Okayama)*, **53**, 823–40 (*in German*, 840) (1941).]
In order to determine whether acetylcholine (I) acts as a humoral transmitter of nerve stimulation in the central nervous system as in the peripheral nervous system, the effects of vagostigmin (II), an anticholine esterase, were studied on the pinna reflex upon sound stimulation in guinea-pigs, on the eyelid reflex upon electrical stimulation of the eyelid in guinea-pigs, on the pupil reflex upon light stimulation in pigeons, and on the deglutition reflex upon electrical stimulation of the central stump of N. laryngeus suppressed in rabbits. Each reflex was intensified and the reflex time was shortened by injection of (II). (II), however, did not influence the deglutition reflex when painted on the ganglion nodosum. This shows perhaps that (II) in the above reflexes acts chiefly on the synapse in the central nervous sytem. The tongue reflex time upon electrical stimulation of the central stump of N. glosso-pharyngeus in the frog is shortened by injection of small doses of (I) or (II), but is prolonged by injection of a large dose of (I).
RUTH BERGGREN (Chem. Abstr.).

Does Blood Contain Free Acetylcholine? *Classen, Paul H.* [*Z. ges. exptl. Med.*, **109**, 688–95 (1941); *Chem. Zentr.*, **1**, 1153 (1942).]
Serum from fresh eserinized human blood did not contain free acetylcholine as shown in a test with the highly sensitive isolated lung of the frog. A control with 10^{-11} concentration of acetylcholine produced a response. In hemolyzed blood a substance was present causing contraction of the frog lung; that however was not acetylcholine, since the action was not influenced by cholinesterase or atropine. A. E. MEYER (Chem. Abstr.).

The Influence of Acetylcholine and Adrenaline on the Spinal Reflex. *Oti, Yukio.* [*Okayama Igakkai Zassi (Mitt. med. Ges. Okayama)*, **52**, 2389–95 (*in German*, 2395) (1940).]
Acetylcholine and adrenaline inhibit the irritability of the spinal reflex in toads and frogs. Ergotamine also inhibits the irritability of the spinal reflex in toads, while ergotamine together with acetylcholine or adrenaline has the opposite effect.
RUTH BERGGREN (Chem. Abstr.).

The Effect of Acetylcholine and Adrenaline on the Spinal-reflex-increasing Action of Strychnine. *Oti, Yukio.* [*Okayama Igakkai Zassi (Mitt. med. Ges. Okayama)*, **52**, 2591–7 (*in German*, 2597) (1940).]
In toads and frogs the increase in spinal reflex produced by strychnine was inhibited by acetylcholine and adrenaline. RUTH BERGGREN (Chem. Abstr.).

Sweat Response to Acetylcholine. *Kahn, David, and Rothman, Stephen.* [*J. Investigative Dermatol.*, **5**, 431–44 (1942).]
The local sweat response to intradermally injected acetylcholine (I) diminishes or disappears after sympathectomy. This is an exception to the rule of sensitization of structures after denervation (Cannon). The local sweat response to (I) is greater in men than in women.
PHILIP D. ADAMS (Chem. Abstr.).

The Colorimetric Determination of Choline. *Marenzi, A. D., and Cardini, C. E.* [*J. Biol. Chem.*, **147**, 363–70 (1943).]
The method is based on the oxidation of Cr to the chromic state by means of alkaline H_2O_2 (perhydrol), followed by the colorimetric determination of chromate by means of the color produced in acid solution with diphenylcarbazide (Cazeneuve's reaction). The method determines choline in samples of 1–3 ml. containing between 15–100γ.
EUGENE MAIER (Chem. Abstr.).

Inhibition of Cholinesterase and Pharmacological Action of Local Anesthesia. *Ammon, I., and Zipf, K.* [*Klin. Wochschr.*, **20**, 1176–7 (1941); *Chem. Zentr.*, **11**, 1146 (1942).]
Experiments *in vitro* showed that local anesthetics, as procaine (I), cocaine (II), larocaine (III), tutocaine (IV), percaine (V) and pantocaine (VI) distinctly inhibited cholinesterase. The

action was weakest with (I) and of about the same order with (II); it was 12·7, 15·6, 78 and 234 times greater with (III), (IV), (V) and (VI) respectively than with (I). The action of eserine was 14,000 times greater. There is a certain but by no means complete parallelism between the intensity of the cholinesterase inhibition and the local anesthetizing activity and also the general toxicity, effect in paralyzing respiration and hemolytic activity.

RUTH BERGGREN (Chem. Abstr.).

Cholinesterase I: Cholinesterase and Pseudo-cholinesterase. Mendel, B., and Rudney, H. [*Biochem. J.*, **37**, 59–63 (1943).]

Blood and certain tissues contain a non-specific cholinesterase which promotes the hydrolysis of various esters besides acetylcholine. In brain and in red blood cells of some mammals a specific cholinesterase is present which acts exclusively on choline esters. The non-specific cholinesterase exhibits maximum activity only in high concentrations of acetylcholine (300 mgm. per cent.), whereas the specific cholinesterase is inhibited by high acetylcholine concentration and has maximum activity in a low concentration (3 mgm. per cent.). The former is designated pseudo-cholinesterase.

S. MORGULIS (Chem. Abstr.).

Specificity of Cholinesterase. Riechert, W., and Schmid, E. [*Arch. exptl. Path. Pharmakol.*, **199**, 66–73 (1942); *cf. C.A.*, **37**, 3774[2].]

Cystine, ascorbic acid and fumaric acid inhibit the action of cholinesterase more or less. Methylene-blue, safranine, Nile blue and janus green have equal inhibiting actions on cholinesterase in leech extract, while in human serum methylene-blue has a stronger inhibiting action than the other three dyes. Physostigmine is the most powerful specific inhibitor of cholinesterase so far discovered.

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

Further Study of Cholinesterase. Riechert, W., and Schnarrenberger, C. [*Ibid.*, **200**, 225–34 (1942).]

The cholinesterase activity of aqueous leech extract does not decrease upon long standing exposure to air even though putrefactionsets in. The determination of cholinesterase activity is discussed. The medullary ganglions of the human brain have a greater cholinesterase activity than the higher regions of the brain. Procaine and tutocaine inhibit the activity of cholinesterase and their effect is not modified by addition of p-aminobenzoic acid. Sulfanilamide, sulfapyridine and sulfathiazole in therapeutic concentrations do not decrease cholinesterase activity.

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

Determination of the Choline-esterase Activity. Sack, A., and Zeller, E. A. [*Science*, **97**, 449–50 (1943).]

The serum, a $NaHCO_3$ solution and the acetylcholine solution were placed in the outer chamber of a Conway jar. A 0·1 N $Ba(OH)_2$ solution of 0·5 c.c. was taken out 40 minutes after the Conway jar was covered with the glass lid and the unreacted $Ba(OH)_2$ was titrated with 0·01 N AcOH.

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

Cholinesterase in Normal and Pathological Cerebrospinal Fluid in Man. Birkhauser, H. [*Schweiz. Arch. Neurol. Psychiat.*, **46**, 185–90 (1941); *cf. C.A.*, **37**, 2021[7].]

Cholinesterase was estimated by measuring the CO_2 liberated from AcOH obtained during hydrolysis of acetylcholine. The mean value for 23 normal cases was 14 c.mm. of CO_2 per 0·5 c.c. of cerebrospinal fluid per 120 minutes (mean deviation = 1·1). Cholinesterase was increased in meningococcal and tuberculous meningitis (not in correlation to increased cell content) and slightly also in schizophrenia.

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

Cholinesterase. Reichert, Willi, and Wieland, Theodor. [*Arch. exptl. Path. Pharmakol.*, **197**, 629–35 (1941); *Chem. Zentr.*, **1**, 3107 (1942).]

Cholinesterase splits acetylthiamine. Aqueous extract of leeches splits benzoylthiamine, 4-methyl-5-acetoxyethyl-N-methylthiazolium iodide and 4-methyl-5-acetoxyethyl-N-benzylthiazolium chloride at a considerably slower rate than it splits acetylthiamine. This action is inhibited by high concentrations of physostigmine.

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

A New Reaction for the Study of Globulin in the Cerebrospinal Fluid. Grigorescu. [*Wien. med. Wochschr.*, **92**, 144–5 (1942); *Chem. Zentr.*, **1**, 2807 (1942).]

Globulin can be detected by pouring a small amount of alcohol over the same amount of cerebrospinal fluid. This reaction gives an accurate picture of the meningeal state.

RUTH BERGGREN (Chem. Abstr.).

A Simple Method for the Determination of all Protein Fractions and of the Total Protein Content in Normal and Pathological Cerebrospinal Fluid. Ujsághy, Paul. [*Biochem. Z.*, **307**, 264–9 (1941).]

To 1 c.c. fluid (filtered or centrifuged) add 3 c.c. $(NH_4)_2SO_4$ solution (2 parts saturated neutral salt + 1 part 0·4 N HCl); mix and leave for 15 minutes. Determine the percentage of extinction in the photometer using filter S_{50} and 10 mm. depth. Read the protein content from a calibration curve. To another 2 c.c. sample add drop by drop 2 c.c. of a neutral saturated $(NH_4)_2SO_4$

solution and again read in the photometer, as before correcting for blank, and from the extinction value determine the total globulin + fibrinogen. The euglobulin + fibrinogen is determined on a separate 2 c.c. sample to which only 1·32 c.c. of the precipitating reagent is added. Finally, determine the fibrinogen content in a 2 c.c. sample by adding 1·08 c.c. of the neutral precipitating reagent. S. MORGULIS (Chem. Abstr.).

Rheumatoid Arthritis as a Cause of Increased Cerebrospinal Fluid Protein. Ludwig, Alfred O., Short, Charles L., and Bauer, Walter. [*New Engl. J. Med.*, **228**, 306–10 (1943).]

An increase in the total protein of the cerebrospinal fluid, abnormal colloid Au curves or a combination of the two were observed in 16 of 42 patients having spondylitis with or without peripheral arthritis. Of 59 with involvement of the peripheral joints alone, 9 showed these abnormalities. The changes in total protein or globulin contents may be caused by the increased permeability of the spinal cord membrane resulting from its proximity to inflamed articular tissue. E. R. MAIN (Chem. Abstr.).

The Importance of the Ascorbic Acid Content of the Cerebrospinal Fluid from the Standpoint of Differential Diagnosis. Wirth, Josef. [*Deut. med. Wochschr.*, **68**, 213–14 (1942); *Chem. Zentr.*, **1**, 2551 (1942).]

The determination of the ascorbic acid content of the cerebrospinal fluid after deproteinzation with Na_2WO_4–H_2SO_4 and alkalinization is of diagnostic significance. In encephalitis there is abundant protein and a strong reaction for ascorbic acid compared to the protein-free feeble reaction in the normal person. ARTHUR GROLLMAN (Chem Abstr.).

Quantitative Studies of the Bilirubin in Body Fluids. II: A Comparison of the Direct Diazo Reaction by the Photoelectric Colorimeter, the Three Test Tube Method, and the Oxidation Test in Xanthochromic Spinal Fluid. Lepehne, G. [*J. Lab. Clin. Med.*, **28**, 229 (1942).]

The xanthochromic spinal fluid was examined by the methods described in the first paper. The bilirubin in this fluid gives the same qualitative reactions as the bilirubin in serums of hemolytic jaundice, of jaundice of the newborn and of the non-hemolytic familial jaundice. The direct diazo reaction was delayed or biphasic delayed, and the oxidation test negative or diminished delayed. The total protein content did not influence the type of the reaction.
H. W. ROBINSON (Chem. Abstr.).

Glutamine-like Substance in Blood and Spinal Fluid. Harris, Meyer M. [*Science*, **97**, 382–3 (1943).]

Blood and spinal fluid of man or rabbit liberate NH_3 on mild acid hydrolysis. The amount liberated is equivalent to 5–10 mgm. of glutamine (I) per 100 c.c. of plasma, serum or spinal fluid. Insulin hypoglycemia and also the administration of glucose reduce the level of (I) in the blood, the effect of the former being more marked. The administration of certain amino-acids such as dl-*a*-alanine increased the level of (I) in the blood. Glycine produced no effect in some animals and a variable increase in others. W. J. P. (Chem. Abstr.).

Determination of the Isoelectric Point of the Proteins of the Cerebrospinal Fluid and Serum. Kastein, G. W. [*Klin. Wochschr.*, **20**, 1103–5 (1941); *Chem. Zentr.*, **11**, 931 (1942).]

A simple determination of the isoelectric point of proteins by means of a collargol solution and a series of buffer solutions of different pH values (modification of the HCl-collargol reaction of Riebeling-Huffmann (*C.A.*, **32**, 5488[8])) is described. A typical flocculation zone is obtained with normal cerebrospinal fluids, and more or less typical changes in the flocculation zone with pathological cerebrospinal fluids. With abnormal cerebrospinal fluids there are not only quantitative protein changes, but also qualitative changes in the protein components. An attempt was made to explain the reaction mechanism. The reaction can also be carried out with diluted serum, and can be of importance for the diagnosis of internal diseases (liver diseases).
RUTH BERGGREN (Chem. Abstr.).

Substitutes for Spinal Fluids as Colloidal Gold Controls. Bossak, H. N., Rosenberg, A. A., and Harris, Ad. [*Venereal Disease Inform.*, **24**, 194–6 (1943).]

Two methods are presented for preparing globulin solutions, utilizing jack bean meal and blood serums, respectively, which can be used as positive controls with which to guide the adjustment of colloidal Au solutions to a standard reactivity.
RUTH BERGGREN (Chem. Abstr.).

Clinical Experiences with a Modification of the Takata Reaction in Blood and Cerebrospinal Fluid. Ucko, H. [*J. Lab. Clin. Med.*, **28**, 17–27 (1942).]

The modified procedure of Ucko (*C.A.*, **30**, 7609[3]), which possesses a greater certainty in indicating affections of the liver, is described. The investigations by a number of workers on approximately 2,500 cases are summarized and discussed. A positive reaction for the test was obtained in 90 per cent. of the patients suffering from liver diseases, while at least 86 per cent. of the negative reactions were obtained in patients suffering from other diseases. Non-hepatic diseases with positive reactions are tabulated. As the test indicates an alteration of the serum proteins, the occurrence of positive reactions in non-hepatic diseases suggests that these alterations found

most regularly in liver diseases can occur in certain other conditions (multiple myeloma, tuberculosis, diabetes, malaria, etc.). The test applied to the cerebrospinal fluid is more sensitive than the routine tests for protein. From the results it can be concluded that the reaction is not specific for syphilis. HOWARD W. ROBINSON (Chem. Abstr.).

Changes in the Cerebrospinal Fluid Following Spinal Anesthesia. Konwaler, B. E. [*Am. J. Clin. Path.*, **13**, 378–80 (1943).]

The spinal fluid showed no significant changes in 31 patients one, two and three weeks after spinal anesthesia. The following tests were made: sugar, total protein, chlorides, cell count, colloidal Au, Takata-Ara, globulin and Kahn. JOHN T. MEYERS (Chem. Abstr.).

Pharmacodynamic Action of Vitamins in Nerve Disorders Due to Avitaminoses. Possibility of Non-specific Corrective Effects. Chauchard, B., Mazoué, H., and Chauchard, Paul. [*Compt. rend. soc. biol.*, **136**, 182–4 (1942).]

A discussion based on several previous papers. L. E. GILSON (Chem. Abstr.).

Vitamin Deficiencies and Liver Cirrhosis in Alcoholism. Introduction and Part I (Polyneuropathy). Jolliffe, Norman. [*Quart. J. Studies Alc.*, **1**, 517–57 (1940); *cf. C.A.*, **36**, 1664[8].]

After a detailed review, with bibliography, of literature to July, 1940, on "alcohol" polyneuropathy and its therapy by thiamine, Jolliffe concludes that the disease is caused not by alcohol *per se*, nor merely by the poor food habits of the alcoholic, but by a relative vitamin B_1 deficiency primarily due to unbalance between thiamine and caloric intakes, and further fostered by gastric and hepatic disorders interfering with food tolerance, absorption and assimilation, and also possibly by increased urinary thiamine excretion.

II. Circulatory Disturbances. [*Ibid.*, 727–38 (1941).]

Analysis of the literature on cardiovascular disturbances of alcoholism indicates that they are dependent upon thiamine deficiency, but does not yield a definite pathogenetic mechanism.

III. Pellagra. Jolliffe, Norman, and Stein, Martin H. [*Ibid.*, 739–50.]

"Alcoholic" pellagra results from deficiency of vitamin B complex, predominantly nicotinic acid, according to the investigations reviewed.

IV. The Wernicke Syndrome. Jolliffe, Norman, Wortis, Herman, and Stein, Martin H. [*Ibid.*, **2**, 73–85.]

From a review of the literature on Wernicke's syndrome (clouding of consciousness, varying ophthalmoplegias and ataxia, usually associated with alcoholism), it is concluded that this syndrome is probably a combination of several nutritional deficiencies affecting the nervous system. Alcohol *per se* does not seem responsible. Thiamine-HCl deficiency seems the most prominent etiologic factor, and thiamine-HCl administration is successful in reversing the ophthalmoplegia and frequently helps in altering the disturbed state of consciousness.

V. Nicotinic Acid Encephalopathy. [*Ibid.*, 85–92.]

The clinical and pathological symptoms of alcohol pellagra are discussed.

VI. Encephalopathies with Possible Nutritional Involvements. [*Ibid.*, 92–7.]

The authors believe that deficiencies of thiamine and nicotinic acid are not specific in causation of delirium tremens. However, they point out that delirium tremens, by raising metabolic requirements, may lead to production of nutritional disturbances of the nervous system, e.g. Wernicke's syndrome and peripheral neuropathy. Hence it is urged that all patients with delirium tremens be given thiamine and nicotinic acid as well as the entire vitamin B complex. In treatment of alcohol pellagra, it is recommended that riboflavin and other members of the B complex be given in addition to nicotinic acid in order to avert associated neuropathies. The role of thiamine in etiology and treatment of Korsakoff's psychosis is not yet clear.

MARION HORN PESKIN (Chem. Abstr.).

Thiamine Excretion Tests in Children with Paralytic Poliomyelitis. Ward, Robert, Sabin, Albert B., Najjar, Victor A., and Holt, L. Emmett (jun.). [*Proc. Soc. Exptl. Biol. Med.*, **52**, 5–7 (1943).]

The results of thiamine-excretion tests in seven children with paralytic poliomyelitis did not differ significantly from those found in normal children. L. E. GILSON (Chem. Abstr.).

Urinary Vitamin B_1 Content in Post-diphtheric Paresis. Reinhard, H., and Schwertzer, K. [*Arch. Kinderheilk.*, **118**, 192–5 (1939).]

Values were lower during the active paretic stage than during convalescence, but the latter was not hastened by administration of thiamine. B. C. P. A. (Chem. Abstr.).

Appetite, Vestibular Chronaxia and Action of Thiamine in the Beriberi Syndrome (in Pigeons). Mouriquand, G., and Coisnard, J. [*Compt. rend. soc. biol.*, **136**, 545–7 (1942).]

Pigeons on a diet deficient in the entire vitamin B complex showed a decrease in vestibular

chronaxie after 6 days, decrease in appetite in 8 days, anorexia in 12 days and paralytic spasms on the 17th day. When on a diet lacking in B_1 but containing the thermostable members of the B complex they developed the above symptoms on the 43rd, 55th, 60th and 80th day respectively. A single injection of thiamine effected a return to normal.

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

Balanced Partial Inanition and Vestibular Chronaxia. [*Ibid.*, 547–8.]

Pigeons on a balanced diet but with total food intake restricted to one-sixth of the normal lost weight and showed a decrease in vestibular chronaxia after 17 days.

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

Induced Thiamine (Vitamin B_1) Deficiency in Man. Relation of Depletion of Thiamine to Development of Biochemical Defect and of Polyneuropathy. Williams, Ray D., Mason, Harold L., Power, Marschelle H., and Wilder, Russell M. [*Arch. Intern. Med.*, **71**, 38–53 (1943); *cf. C.A.*, **36**, 4863[6]; **37**, 3481[7].]

Two human volunteers were restricted by diet to a thiamine (I) intake of 0·2 mgm./day (2,000 cal.) for 120 days. A test dose of 1·0 mgm. (I)-HCl was administered subcutaneously about every two weeks; this raises the average daily intake to 0·35 mgm. (I) (0·175 mgm. per 1,000 cal.). This "periodic partial cure" was attended by increase in appetite and activity 7–10 days after administration. Symptoms of (I) deficiency were manifested as early as the 30th day of restriction. The first objective evidence of abnormality in these subjects consisted of a decrease in their ordinary urinary excretion of (I). At about the 50th day the urinary excretion after a test dose of 1 mgm. (I) was reduced. After this time whenever dextrose was given, abnormally high values for pyruvic and lactic acids in the blood were observed. Also anorexia and weakness became more severe and paresthesia of the legs was observed. The earliest stages of (I) deficiency were demonstrated by determination of excretion after administration of a test dose of (I), more advanced stages by data on blood lactic and pyruvic acids, and still more advanced stages by progressively higher blood pyruvate curves after administration of dextrose.

J. B. BROWN (Chem. Abstr.).

Thiamine Inactivation by the Fresh-fish or Chastek-paralysis Factor. Sealock, Robert R., Livermore, Arthur H., and Evans, Charles A. [*J. Am. Chem. Soc.*, **65**, 935–40 (1943).]

The Chastek-paralysis or thiamine-destroying activity of fish tissues has been investigated by means of methods *in vitro*. the thiamine (I) loss being measured by a standard colorimetric chemical procedure. The fish pulp or extract (1–3 ml.) adjusted to pH 7·4 is treated with 0·2 M phosphate buffer (pH 7·4), the volume adjusted to 4 ml. with H_2O and 1 ml. of (I) solution (2·5 micromoles) added; after incubating for two hours at 37·5°, 5 ml. of 20 per cent. Cl_3CCO_2H is added, the solution allowed to stand for 30 minutes, centrifuged and analysed for (I). One unit of activity is that amount which, under the above conditions, will cause the disappearance of 1 micromole of (I). By this method it has been shown that the (I)-destroying principle is present in the majority of the visceral tissues of the carp, and that the spleen, liver and pancreas, gastrointestine and gills contain the highest concentration. A dry stable powder can be prepared from the active fish tissues by acetone treatment. The solubility of the factor in diluted salt solutions, the rapid destruction by heat and the precipitability by common protein precipitants indicate the fish principle to be of protein nature. The destruction of (I) is maximum at pH 9·1 and 60°, is proportional to the amount of principle and is characterized by 1st-order velocity constituencies. These facts, together with the evidence of the catalytic nature of the reaction, strongly suggest that the principle effecting the (I) loss is an enzyme.

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

Muscle and Nerve in Biotin-deficient Rats. Lazere, B., Thomson, J. D., and Hines, H. M. [*Proc. Soc. Exptl. Biol. Med.*, **53**, 81–2 (1943).]

At no stage of biotin deficiency was the capacity of a motor nerve to elicit tension in its muscle impaired. A decrease in the strength of skeletal muscle occurred only in the terminal stages. The rate of neuromuscular regeneration after crush injury of nerves was not significantly different from the normal.

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

Vitamin D and the Functioning of the Nervous System. Chauchard, Paul. [*Compt. rend. soc. Biol.*, **136**, 51–5 (1942); *cf. C.A.*, **36**, 2594[5], 3533[4].]

Oil solutions of vitamin D were injected intraperitoneally in guinea-pigs not in a state of avitaminosis. Chronaximetric analysis showed that small doses excite the central nervous system, while large doses have an inhibiting action because of their hypercalcemic effect.

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

Observations on Pellagra. Frontali, G. [*Schweiz. med. Wochschr.*, **72**, 208–17 (1942).]

Twelve children were given a pellagragenic diet, yielding 2,150 calories and having a protein content which was 13·4 per cent. of total calorie. After two months typical cutaneous and mucous membrane changes occurred. The skin capillaries were markedly dilated and tortuous. Within 48–72 hours after therapy with nicotinic acid these alterations disappeared. Gastric hypochlorhydria was observed in 8 children and a negative N balance with loss of weight in 8

cases. The blood porphyrin was increased up to 10·5γ per cent. By the method of Baserga and Fornaroli (*C.A.*, **36**, 5515[3]), determinations of nictotinic acid excretion in the urine gave values of 0·5 to 0·7 mgm. per day, the normal being 3·5 mgm.

MAURICE M. RATH (Chem. Abstr.).

Symptomatology of Experimental Pellagra. Efremov, V. V., and Maslenikova, E. M. [*Voprosy Pitaniya*, **10**, *No.* 2, 70–4 (1941); *Chem. Zentr.*, **1**, 1769 (1942); *cf. C.A.*, **36**, 2594[3].]

Substitution of starch for sucrose in Sherman's basic diet with the addition of B_1 results in the following lesions in rats: erythroedema of the extremities, necrotic lesions of the tongue and rhinitis.

ARTHUR GROLLMAN (Chem. Abstr.).

Stability of Nicotinic Acid and Its Urinary Excretion. Ghosh, N. C. [*Ann. Biochem. Exptl. Med.*, **1**, 235–8 (1941).]

Nicotinic acid (I) in diluted aqueous solution at pH 3 to 5 disappears rapidly at room temperature owing to bacterial destruction. At lower or higher pH values it is quite stable, pH 8·5 being optimum. NaCl does not prevent its destruction, but EtOH, toluene or steam-pressure sterilization confer complete stability. From 3 to 3·5 mgm. of (I) were excreted in the urine per 24 hours by each of eight healthy male adult Bengali, while two 5-year-old boys excreted daily from 1·4 to 2·7 mgm. Urine when preserved with toluene and kept in a refrigerator retained its (I) content for one month. If appreciable quantities of coal gas were present in the laboratory air, erroneously high (I) values were obtained, due to pyridine contamination.

BRUNO VASSEL (Chem. Abstr.).

Determinations of Nicotinic Acid in Blood and Urine. Roggen, J. C. [*Nederland. Tijdschr. Geneeskunde*, **85**, 4603–8 (1941); *Chem. Zentr.*, **1**, 1917 (1942).]

By adsorption on frankonite-KCl and by use of a very strong acid it was possible, in the color reaction of König, to obtain a completely clear solution and a very strong, yellow color which was sufficiently stable in daylight, by means of the following procedure: 2 c.c. of Br_2 is dissolved in 75 c.c. of water. While cautiously shaking under a hood, 20 c.c. of a 10 per cent. NaCN is added to this Br_2 solution until a trace of free Br_2 is still present as tested with KI paper. The solution is now colorless or very slightly green with a pH of 5. To this solution is added 28 c.c. of an acetate buffer obtained from 20 c.c. of 0·4 N AcOH (20 gm. of glacial AcOH per l.) plus 8 c.c. of a solution of 50 gm. of crystallized AcONa per l. After mixing, the solution is filtered to remove very small amounts of resins. The solution keeps indefinitely in the icebox in the dark. Detailed descriptions for determinations in blood and urine are given which show reproducible results. In an average of 117 determinations in the blood of various persons of different age, sex and living conditions, a nicotinic acid content of 6·25γ per c.c. is found with a standard deviation of 1·05γ. The accuracy of the determination is 5 to 10 per cent. The total nicotinic acid is contained in the red blood cells, none of it in the serum. In the urine the results vary considerably.

R. BEUTNER (Chem. Abstr.).

Test for Nicotinic Acid Amide in the Urine. Wenusch, Adolf. [*Oesterr. Chem.-Ztg.*, **45**, 87–8 (1942); *Chem. Zentr.*, **11**, 554 (1942).]

An extract of 1 c.c. was prepared from 2,000 c.c. urine. This extract should have contained all the nicotinic acid in the urine. The extract gave a very marked reaction with BrCN and aniline, but did not yield nicotinic acid picrolonate with picrolonic acid. This urine, therefore, contained no nicotinic acid, but did contain a substance which, like nicotinic acid, gave a color reaction with BrCN and aniline.

RUTH BERGGREN (Chem. Abstr.).

Blood Level and the Requirement of Nicotinic Acid in Newborn Infants. Verrotti, Irene. [*Pediatria* (*Riv.*), **50**, 20–34 (1942); *Chem. Zentr.*, **1**, 3223 (1942).]

In newborn infants the content of nicotinic acid in urine and blood is lower than during the period of suckling. At the age of two it reaches normal adult values. The daily requirement of a suckling fed exclusively on mother's milk, as ascertained from the daily secretion in urine, is 120 to 140γ/kgm. body-weight.

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

Niacin-niacinamide Differentiation in the Microbiological Assay Procedure. Atkin, Lawrence, Schultz, Alfred S., Williams, Wm. L., and Frey, Charles N. [*Am. Chem. Soc.*, **65**, 992 (1943).]

The microbiological niacin (I) assay method of Snell and Wright (*C.A.*, **35**, 4792[4]) does not differentiate between (I) and niacinamide (II). This may be done by the action of Br and KOH, which transforms (II) into β-aminipyridine; the proportion of (I) to (II) in a preparation can be determined by estimation of the vitamin activity before and after treatment with Br and KOH. (II) (1 mgm.) in 6 ml. H_2O, 1 ml. saturated Br-H_2O and 3 ml. 30 per cent. KOH are kept 20 minutes at room temperature and then heated on a steam bath for 20 minutes; after acidification with 10 N H_2SO_4 the Br is removed with 4 per cent. $NaHSO_3$.

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

Electroencephalographic Study of 275 Candidates for Military Service. Harty, J. E., Gibbs, E. L., and Gibbs, F. A. [*War Med., Chicago*, **2**, 923–30 (1942).]

The incidence of abnormal EEGs in the total group was 30 per cent. For various reasons it is believed that this percentage is higher than in the general population. A superior control

group (hospital staff) gave 15 per cent. abnormal tracings. The percentages of abnormal tracings in the candidate group were respectively 46 and 13 for men with and for those without a history of severe head injury or neuropsychiatric disorder. Epileptoid types of abnormality were five times more common for men with than for men without a positive neuropsychiatric history. The practical value of an EEG in military selection is that it focuses attention on certain persons and marks them for special neuropsychiatric scrutiny, particularly when a general examination indicates that a draftee is on the borderline between acceptable and rejectable.

M. E. MORSE (Psychol. Abstr.).

The Metabolism of Pyruvic Acid in Brain. Simola, P. E., and Alapeuso, H. [*Z. physiol. Chem.*, **278**, 57–91 (1943); *cf. C.A.*, **34**, 1394.][2]

Beef brain is minced and incubated in Ringer-phosphate solution or in 0·025 N $NaHCO_3$ in the presence of O or N and 0·01 N Na pyruvate for two hours at 37°. During this period 20–31 per cent. of the added pyruvate disappears in N, 22–36 per cent. in O. Of the amount lost, approximately 23 per cent. is converted to lactic acid under aerobic, 42 per cent. under anaerobic conditions. Both in O or N, 0–3 per cent. is converted to succinic, 13–25 per cent. to -ketoglutaric, 0–2 per cent. to fumaric acid; malic and oxalacetic acids are not formed. Citric acid is not formed in N, while 2–4 per cent. are formed in O. In the presence of both pyruvic and malic acids in O, a little more citric acid is formed than the sum of the amounts formed from either of the substrates alone. AcOH is produced in minimal amounts in N (in presence or absence of methylene blue) and in O; these amounts seem to be produced in brain even in absence of pyruvate. Brain contains small amounts of HCOOH, which are not increased by addition of pyruvate. About 16–18 per cent. of the disappearing pyruvic acid can be accounted for as alanine both in O and N. Brain contains approximately 60 mgm. per cent. of glutamic acid; this amount can decrease slightly on addition of pyruvate. Methods for the determination of the possible products of pyruvic acid metabolism are described.

B. J. JANDORF (Chem. Abstr.).

The Mineral Metabolism in Acute Psychoses. Lenz, H. [*Klin. Wochschr.*, **20**, 785–7 (1941); *Chem. Zentr.*, **2**, 1258 (1942).]

The K content of the cerebrospinal fluid was decreased and the Cl content increased, while the Na content showed no essential changes. The serum values were normal in all cases. Possible causes for these changes and their significance for the knowledge of psychoses are discussed.

RUTH BERGGREN (Chem. Abstr.).

Urinary Elimination of Phenolsulfonephthalein Injected into the Cerebrospinal Cavity in Schizophrenia and General Paresis. Androp, S., Ratcliffe, H. E., and Katzenelbogen, S. [*Am. J. Med. Sci.*, **206**, 86–9 (1943).]

By the use of the test devised by W. E. Dandy (*J. Am. Med. Assoc.*, **61**, 2216 (1913)) the total elimination of the dye was found to be distinctly below the normal level. The results suggest the need for well-established normal levels.

RACHEL BROWN (Chem. Abstr.).

The Isolation of Protective Enzymes in Schizophrenic Patients during Insulin Treatment. Buschhaus, O. [*Allgem. Z. Psychiat.*, **119**, 143–59 (1941).]

Highly active enzyme preparations were isolated from the urine of seven schizophrenic patients during insulin treatment. With the micro method of the Abderhalden reaction the Me_2CO-urine precipitate exhibited, in addition to the hydrolysis of organ substrates, an especially marked decomposition of insulin. While active proteinases which hydrolyzed brain substrate could be isolated from the urine, the enzyme which hydrolyzed insulin could not be satisfactorily prepared in a highly active form. Besides the enzymes which hydrolyzed cerebral cortex, enzymes which produced a particularly marked hydrolysis of testis, anterior pituitary and thyroid could be isolated. Characteristic albumin crystals in the form of short rods could be obtained which corresponded morphologically to the crystals described by Mall (*cf. C.A.*, **35**, 7426[1] and following abstract). The enzyme reactions observed in schizophrenic patients are distinguished, particularly by the hydrolysis of brain substrate, to a considerable degree from the enzyme reactions observed in other diseases and in normal persons. Comparison of the patients studied with and without insulin showed that under insulin there was no essential intensification or diminution of the protective enzyme reactions corresponding to the schizophrenic basic process, especially with regard to the hydrolysis of cerebral cortex and testis.

RUTH BERGGREN (Chem. Abstr.).

The Lipides of the Human Spinal Cord. Schuwirth, K. [*Z. physiol. Chem.*, **278**, 1–6 (1943); *cf. C.A.*, **36**, 1809[6].]

The human spinal cord contains approximateiy 75 per cent. H_2O. The lipide content, in terms of gm. per 100 gm. dry weight, is: Fat and cholesterol 15–20, Et_2O-soluble glycerophosphatides 19–29, sphingomyelins 2·6–2·8, cerebrosides 5·1–6·2, gangliosides 0·0–0·3. Spinal cord, in contrast to brain, contains only small amounts of highly unsaturated fat acids. From the cerebrosides, cerebronic, lignoceric, nervonic and hydroxynervonic acids, sphingosine and galactose can be isolated, from the sphingomyelins, lignoceric and stearic acids.

B. J. JANDORF (Chem. Abstr.).

Acid-soluble P Compounds of Cerebral Tissue. Stone, W. E. [*J. Biol. Chem.*, **149**, 29–41 (1943); *cf. C.A.*, **34**, 6683[3].]

Approximately 1 : 10 extracts of dog cerebral tissue frozen *in situ* were prepared with 5 per cent. CCl_3COOH. Neutralization with $Ca(OH)_2$ and treatment with 10 per cent. EtOH gave a precipitate of inorganic P (I) and a large proportion of the adenosine triphosphate (II). After the further removal of (I) and (II) by precipitation with excess $Ca(OH)_2$, residual organic P (III), phosphocreatine (IV) and pentose (V) were precipitated by the addition of 80 per cent. of EtOH to the neutralized solution. (III) consists largely of hexose 6-monophosphate. The uranyl precipitate of (III) extracted with $Ba(OH)_2$ consists largely of aminoethyl phosphate. No phosphoglyceric acid could be detected in cerebral tissue. Triose phosphate and phosphopyruvate were not detected in the fraction precipitated with 80 per cent. EtOH. In the fraction precipitated by $Ca(OH)_2$ the ribose monophosphate P equals half the acid-hydrolyzable P. The principal changes occurring during 30 minutes of post-mortem autolysis of cerebral tissue are the hydrolysis of (IV) and the partial decomposition of (II). The methods used indicate the presence of adenosine diphosphate, adenylic acid, a nucleoside or free pentose and inorganic phosphate among the decomposition products of (II). RACHEL BROWN (Chem. Abstr.).

Metabolic Basis for Stabilization of Resting (Nerve) Potentials by Calcium. Shanes, A. M. [*J. Cellular Comp. Physiol.*, **19**, 249–52 (1942).]

Presence of 0·013 M Ca maintains resting potential in frog sciatic nerve in spite of anoxia or iodoacetate. Addition of Ca to a nerve already poisoned by iodoacetate has no effect until pyruvate is added, when p.d. is restored (*cf. C.A.*, **36**, 2628[4]). B.C.P.A. (Chem. Abstr.).

Effect of Striated Muscle Paralysis Induced with Erythroidine on the Electroencephalogram. Girden, E. [*Proc. Soc. Exptl. Biol. Med.*, **53**, 163–4 (1943).]

So long as proper artificial respiration is given, normal cortical activity, as indicated by the electroencephalogram, persists undisturbed in dogs and monkeys during complete paralysis induced with erythroidine. L. E. GILSON (Chem. Abstr.).

Serine as a N-containing Constituent of the Glycero-phosphatides of the Human Brain. Schuwirth, K. [*Z. Physiol. Chem.*, **277**, 87–96 (1942); *cf. C.A.*, **37**, 922[9].]

Human brain was treated with Me_2CO, extracted with Et_2O and the solution precipitated with Me_2CO. Hydrolysis with 5 per cent. 2N NaOH in EtOH for 6 hours and with 10 per cent. HCl in H_2O for 3 hours gave identical values in the hydrolyzate for choline, amino and colamine N. Since the colamine N accounts only for about 50 per cent. of the total amino N, the presence of an undetermined amino acid was postulated. The glycerophosphatide was hydrolyzed with $Ba(OH)_2$, filtered, freed from Ba with H_2SO_4 and concentrated *in vacuo*. Most of the choline was removed with EtOH. Serine was isolated in the form of its compound with β-naphthalenesulfonic acid, m. 214–18°. From the hydrolyzate a small quantity of serine was obtained directly after extraction with BuOH and PrOH in succession, and keeping the mother liquid in the cold. A. E. MEYER (Chem. Abstr.).

The Glycogen Contents of Various Parts of the Central Nervous System of Dogs and Cats at Different Ages. Chesler, A., and Himwich, H. E. [*Arch. Biochem.*, **2**, 175–81 (1943).]

Glycogen increases progressively with age in the cortex and the caudate nucleus but decreases in the colliculi, cerebellum, medulla oblongata and cord in both dogs and cats. It increases in the thalamus in the dog, but decreases in the cat. VERNON L. FRAMPTON (Chem. Abstr.).

Respiration of the Brain in vivo. (1) *Lactic Acid Formation.* Johgbloed, J. [*Arch. neerland. physiol.*, **25**, 548–52 (1941); *Chem. Zentr.*, **2**, 681–2 (1942).]

The lactic acid (I) content was determined in the brain and liver of rats which had been kept under a pressure of 265 mm. Hg. for 0–120 minutes with constant removal of the CO_2 formed. During the first 15 minutes the (I) content in the brain increased markedly and then remained at this high level, while in the liver the behaviour was almost the opposite. It is assumed that in O deficiency the organs of most vital importance increase their (I) formation from sugars in order to gain energy, while the (I) formation decreases transitorily in the others.

RUTH BERGGREN (Chem. Abstr.).

Localization of the Two Isodynamic Phosphatases in the Central Nervous System. Carandante, G. [*Arch. sci. biol.* (*Italy*), **28**, 13–21 (1942); *Chem. Zentr.*, **2**, 788 (1942).]

In beef brain, free of blood, the amount of acid phosphatase extractable by physiological NaCl solution from equal weights of the different parts decreased in the order, medulla, cortex, cerebellum, white matter, while the alkali phosphatase decreased in the order, medulla, cerebellum, cortex, white matter. The ratio of acid phosphatase to alkali phosphatase was 0·78 for medulla and 2·2 for white matter. L. E. GILSON (Chem. Abstr.).

The Nature of the Nerve Influence on Retinomotor Phenomena. (The Action of Eserine, Acetylcholine, Adrenaline, Atropine and Nicotine on the Light and Dark Migration of the Rods and Cones.) Studnitz, C. v., and Kosarov, G. [*Z. vergleich. Physiol.*, **29**, 418–32 (1942).]

The position of the rods and cones was determined in the retinae of frogs treated with physostigmine, acetylcholine, atropine, nicotine or adrenaline (injection into the dorsal lymphatic

sac); the frogs had been previously dark-adapted and exposed to light shortly after the injection or they had been light-adapted and then placed in the dark. The values were compared with those of control animals similarly treated except for injections only of 0·65 per cent. NaCl solution of the same pH as the above solutions. Acetylcholine was the only substance studied which exerted an antagonistic action on the rods and cones in which, in the sense of the light stimulus, it caused contraction of the cones at both concentrations used (10^{-4} and 10^{-8}) upon light and dark exposure, but produced only expansion of the rods. Effects of light on the migration of the visual elements could therefore be due to an excretion of acetylcholine resulting from illumination of their nerve-endings. The discussion of the possibilities of a promoting action of the same nerves also upon dark exposure leads to the assumption that this must be due to a second substance excreted under these conditions of adaptation by the same nerve-endings, likewise antagonistic to the inner members of the visual cells, but in opposite directions like acetylcholine. The dissimilar effect of atropine and nicotine which caused expansion of the rods and cones upon light and dark exposure on the part of the second "promoting hormone" is pointed out; the neurohormone active upon light exposure inhibits the activity of atropine, and promotes that of nicotine on the inner members of the visual cells, while the one which favors the migration on dark exposure conversely promotes the influence of atropine and inhibits that of nicotine. Possibly the activity of eserine on the inner members of the visual cells is similarly influenced by the two neurohormones. A contracting action of physostigmine, at least on the cones, is evident. Under the supposition of chemical transmission of stimulus another pair of active substances must be assumed for the inhibition of the retinomotor phenomena, in which adrenaline at best could play only a partial role. Its behaviour differed according to concentration and adaptation, but was always in the same sense on the rods and cones; it always caused contraction on light exposure (concentrations of 10^{-4} and 10^{-8}), while on dark exposure it always produced distinct expansion at a low concentration (10^{-7}) and slight contraction at a higher concentration (10^{-4}). RUTH BERGGREN (Chem. Abstr.).

Probable Mechanism by which Somatic Changes in Certain Emotional States are Mediated. Milhorat, A. T., Small, S. M., Doty, E. J., and Bartels, W. E. [*Proc. Soc. Exptl. Biol. Med.*, **53**, 23–5 (1943).]

Preliminary experiments show that the blood of mentally ill patients showing fear or anxiety contains a substance which changes the rhythm of contractions of isolated rabbit intestine. L. E. GILSON (Chem. Abstr.).

The Isolation of Protective Enzymes in Schizophrenic Patients. Wagner, H. [*Allgem. Z. Psychiat.*, **119**, 124–42 (1941).]

Enzymes were isolated by the procedure of Mall (*C.A.*, **35**, 7426[1]) from the urines of 5 schizophrenic patients. All 5 cases yielded enzymes which hydrolyzed markedly the cerebral cortex and testis. Occasionally, hydrolysis of the anterior pituitary could be observed. In two patients there was isolated simultaneously from the serum a crystallized fraction which exhibited enzymic activity, and showed the same specific activity as the enzymes obtained from the urine of these patients. RUTH BERGGREN (Chem. Abstr.).

The Problem of the Protective Proteinases in Schizophrenic Psychoses. Mall, G. [*Allgem. Z. Psychiat.*, **119**, 110–23 (1941); *cf. C.A.*, **35**, 7426[1]; **37**, 2029[9].]

RUTH BERGGREN (Chem. Abstr.).

Isolation and Crystallization of Specific Protective Proteinases from the Urine of Patients with Basedow's Disease. Beimborn, Willi. [*Allgem. Z. Psychiat.*, **119**, 87–109 (1941).]

Protective proteinases (I) were isolated from the urine of three patients with Basedow's disease and a neurotic patient with vegetative stigmata. (I) could be isolated in the crystal form from the urine of the patients with Basedow's disease; (I) were highly active and predominantly specific to thyroid substrate. In addition to a marked hydrolysis of thyroid substrate they produced a somewhat smaller breakdown of substrates of reproductive glands. Substrates of adrenal glands and pituitary were hydrolyzed least. In one case a highly active protective proteinase, monospecific to the thyroid gland, could be isolated. The urine of the neurotic patient with vegetative stigmata yielded enzymes which hydrolyzed the substrates of testes and ovaries, but no proteinases which hydrolyzed thyroid, pituitary or adrenal glands could be isolated. RUTH BERGGREN (Chem. Abstr.).

The Isolation of Crystallized Proteinases from the Urine of Paralytic Patients. Mall, G., and Winkler, W. [*Allgem. Z. Psychiat.*, **119**, 77–86 (1941); *cf. C.A.*, **37**, 2029[9].]

A total of 421 combined urines of 7 paralytic patients were used. Upon precipitation of the neutralized urine (1 : 1) with MeOH an enzyme-containing precipitate was obtained which, after being dried and pulverized, was used as the starting material for the isolation of the enzymes. A concentrated enzyme solution can be prepared by extraction of each 5 gm. dried enzyme powder with 200 c.c. distilled water in the incubator with sterile precautions. This solution spoils very rapidly upon the slightest bacterial contamination, and simultaneously the specificity of the reactions is lost through non-specific bacterial proteases. Crystal proteins deposit from the concentrated stock solution on cooling; these proteins, if used at once, show a

high degree of enzymic activity, but in the course of a few days rapidly pass over into a reversible inactive state. These crystal proteins can be reactivated by serum and to a still greater extent by very diluted trypsin solutions. The crystals of these proteins are polyhedral; they are difficultly soluble in 0·1 N HCl or NaOH and in distilled water. Thus far reprecipitation of these crystals has not been successful. Under the action of diluting acids only a part of the crystal material dissolves. The insoluble portion dissolves in diluting NaOH. The fraction soluble in diluting HCl can be recrystallized from diluting HCl in the form of acute-angled rhombs. Upon recrystallization the fraction soluble in NaOH, however, exhibits more the form of crystalloid cocci, as described by Mall and Bersin (*C.A.*, **35**, 7426[1]). It is assumed that the polyhedral crystals adsorb the specific proteinases upon crystallization. Clearly, here it is not a case of crystallized pure proteinases, since upon fractionated salting-out with $(NH_4)_2SO_4$ the enzyme activity is bound to other crystals. The enzymes from the concentrated enzyme stock solution obtained by extraction of the dried enzyme powder can be further purified by fractionated salting-out with $(NH_4)_2SO_4$. Upon half-saturation with $(NH_4)_2SO_4$ the enzymes remain in solution while the carrier proteins are precipitated. After removal of the $(NH_4)_2SO_4$ from the filtrate by dialysis the dried residue contains HCl-soluble and NaOH-soluble fractions, both in the reversibly inactive form. They are activated consistently and specifically by trypsin in very low concentrations. RUTH BERGGREN (Chem. Abstr.).

Levinson Test for Tuberculous Meningitis. Burman, D., and Weintraub, J. [*J. Lab. Clin. Med.*, **28**, 213 (1942).]

Results indicate that this test is 94–97 per cent. accurate in diagnosing tuberculous meningitis. Therefore it is a laboratory procedure that should be used more often in the diagnosis of meningitis when the spinal fluid is clear and where no serum has been administered, since pus, red blood cells and serum render the fluid alkaline, giving false positive results.

H. W. ROBINSON (Chem. Abstr.).

Histamine in Nervous System. Kwiatkowski, H. [*J. Physiol.*, **102**, 32 (1943).]

The midbrain, cerebellum, brachial plexus, sciatic nerve and nerves containing mainly sensory fibers from the skin contain 0·6–13γ of histamine (I) per gramme of tissue in seven animal species, including man. Smaller amounts are found in cerebral cortex, little or none in the spinal cord, medulla or nerves containing mostly motor fibers (except the posterior tibial) and those connected with special sense organs. The posterior and sensory roots of the trigeminal contain no, the lingual division small, and the semilunar ganglion and the ophthalmic and maxillary divisions higher amounts of (I). Degeneration of sciatic nerve (cut 3–105 days before removal) causes a progressive increase in the concentration of (I). Extracts of blood, collected before and during nerve stimulation, show little, those of blood collected 1–4 minutes after stimulation much higher concentrations of (I). B. J. JANDORF (Chem. Abstr.).

The Metabolism of Brain Tissue in vitro with and without Glucose: The Formation of Acetylcholine and the Effect of Hydrogen Cyanide. Sanz, M. C. [*Arch. ges. Physiol.* (*Pflügers*), **246**, 597 (1943).]

Acetylcholine (I) formation occurs in a suspension of rat-brain in Locke's solution containing 0·01 M glucose. The O_2 content decreases markedly. In the absence of glucose the formation of (I) is delayed several hours. Respiration and glycolysis are increased by the addition of 0·0001 N HCN in the presence of glucose and inhibited in its absence.

A. GROLLMAN (Chem. Abstr.).

Effect of Bulbocapnine on Defensive Conditioned Reflexes. Denyabin, V. S. [*J. Physiol.* (*U.S.S.R.*), **29**, 401 (1940).]

Artificial alimentary reflexes were first depressed, then the natural ones. Increase of dose depressed the acid reflexes and finally the motor reflexes. At doses of 5–28 mgm./kgm. a marked decrease of parotid salivation occurred when 0·148 per cent. NaCl was given. Subcutaneous doses of 0·07–0·1 gm. caused sharp dilatation of pupils in dogs with severed cervical nerves; this suggests paralysis of the parasympathetic innervation of the eye.

T. LAANES (Chem. Abstr.).

Electrometric Methods of Determination of Phosphatides of the Brain Tissue. Epshtein, Ya. A. [*Biokhimiya*, **7**, 69–78 (*German summary*, 78) (1942).]

In continuation of previous work on phosphatides of the brain (*C.A.*, **35**, 1433[6]) Epshtein investigated various methods for the determination of natural phosphatides. Phosphatides can be determined by conductometric titration of fat acids liberated by saponification of the alcoholic-ether extracts of the tissue with NaOEt, or by determination of glycerophosphoric acid formed during this saponification by neutralization with BaO and electrometric titration of the Ba salts with HCl. Because of the differences in behaviour to acids and alkalis between lecithins and cephalins, it is possible to effect direct electrometric titrations for these two classes of phosphatides. Titration with 0·1 N NaOH of the alcoholic ether extract (conductometric or electrometric) gives total phosphatides, the results being comparable to those obtained by hydrolytic decomposition. On back titration with 0·1 N HCl the amount is usually somewhat greater and

corresponds to the amount found by direct acid titration. Samples of neutral extracts were titrated by the " formol " procedure with NaOH and back-titrated with HCl. The titration curve with NaOH runs at lower pH values than that without formol treatment; this first part of the curve corresponds to titration of the cephalin NH_2 group. After this part of the curve is passed, the curve rises sharply and titration of the methylated amino group of lecithin occurs (in the more basic region of the curve). Direct titration with acid, in the formol method, gives a curve indicative of the acidic groups of the phosphatides, while back-titration with alkali gives not only the phosphatides titrated as acids but also the basic groups, with a shift of the titration curve to the acid side (compared with non-formal titration). Thus, the total phosphatides can be titrated by acid formol titration or by alkali formol titration, as well as by direct alkali titration and the hydrolytic methods previously listed. Titration by HCl without formol gives cephalin, while lecithin can be determined by difference. Both phosphatides appear to exist in the alcoholic-ether solution at the isoelectric point in the form of " amphions."

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

The Influence of the Nervous System Upon the Formation of Experimental Tumours. Notik, L. V. [*Bull. biol. med. exptl. U.R.S.S.*, **9**, 507–9 (1940); *Chem. Zentr.*, **1**, 3003 (1942).]

The pre-caudal portion of the back of mice was painted with tar for six months or with 3, 4-benzopyrene for 3·5 months. Shortly before the end of such treatment or shortly thereafter, when many animals already had papillomas, the right sciatic nerve was cut and the central end treated with formol or croton oil. After 2–3 months more all animals were killed. By this time a large part of the papillomas, in contrast to the correspondingly painted controls, had regressed; and the formation of cancer was decreased.

MAURICE M. RATH (Chem. Abstr.).

Purification of Equine Encephalomyelitis Virus by Ultra-centrifugation and Maintenance of its Activity with Cysteine. Bang, F. B., and Herriott, Roger M. [*Proc. Soc. Exptl. Biol. Med.*, **52**, 177–80 (1943).]

Cysteine in 0·1 M concentration retards spontaneous inactivation of the ultracentrifuge-purified virus. L. E. GILSON (Chem. Abstr.).

The Action of Formaldehyde on Nerve Tissue. Vidal, F., and Vonesch, E. E. [*Rev. asoc. med. Argentina*, **55**, 761–5 (1941); *Anales asoc. quim. argentina*, **30**, 30B (1941).]

Organic, inorganic and total P contents, solubilized in brains of human beings, cats and cattle, fixed in HCHO, were determined by the Tidsdall method (*cf. C.A.*, **16**, 1441) by use of photometry. HCHO has a premature, rapid, constant and prolonged disintegrating action on phospholipides of nerve tissue. Eight per cent. of the solid substance was extracted. About a quarter of the P contained in the brain was recovered. E. M. S. (Chem. Abstr.).

Hypoglycemia following Alcoholic Intoxication. Tucker, H. StGeo. (*jun.*), *and Porter, Wm. B.* [*Am. J. Med. Sci.*, **204**, 559–66 (1942).]

All of four persons suffering from hypoglycemic coma after alcohol intoxication recovered when glucose solution was given intravenously. One patient was thought to have hypopituitarism. The other patients showed no evidence of endocrinologic disorder. After recovery there was only questionable evidence of impaired liver function in one patient.

RACHEL BROWN (Chem. Abstr.).

Neurotrasentin. Cavalli, F. [*Arch. ital. sci. farmacol.*, **10**, 107–20 (1941); *Chem. Zentr.*, **1**, 379–80 (1942); *cf. C.A.*, **34**, 1392^5.]

An association of trasentin (Ciba), which is $(C_6H_5)_2.CHCO_2CH_2CH_2N(C_2H_5)_2.HCl$, with the same amount of phenylethylbarbituric acid is designated neurostrasentin (Ciba). Because of the differences in solubility of these two substances the solutions of the individual components were administered simultaneously by subcutaneous injection. The toxicity of the combination in guinea-pigs corresponds to the arithmetical mean of the values of the components. A cumulative effect was not observed. In strychnine poisoning it not only reduces the number of tetanic convulsions, but often saves the life of the animal even after fatal doses of strychnine. It exerts a distinct antagonistic action in metrazole poisoning; it prevents the appearance of or abolishes the convulsions if non-fatal doses of metrazole are used. It does not impair the tonus of the isolated small intestine; after stimulation with $BaCl_2$ or acetylcholine it rapidly diminishes the contraction; it acts, therefore, on the parasympathetic nerve-endings. It inhibits the contractions of the isolated non-gravid uterus, but this action can be readily reversed by washing. The action also appears rapidly and distinctly after stimulation of the organ with endopituitrin. The action of the individual components on the isolated organs can be easily increased.

RUTH BERGGREN (Chem. Abstr.).

The Pathological Changes in the Brain in Fatal Hypoglycemia. Lawrence, R. D., Meyer, A., and Nevin, S. [*Quart. J. Med.*, **11**, 181–201 (1942).]

In six fatal cases of hypoglycemia the lesions were similar except in intensity. There occurred widespread degeneration and necrosis of nerve cells with corresponding micro- and macroglial proliferation. Homogenizing and nerve-cell changes were the predominating types

of degeneration. The cerebral cortex, the caudate nucleus and putamen were most affected. The main cause of the degeneration seemed to be failure of vital oxidative processes from the lack of glucose as a substrate, probably re-enforced by vasomotor disturbances.

JOHN T. MYERS (Chem. Abstr.).

Creatinine and Muscle Metabolism. Comparative Excretion of Creatinine in the Urine by the Insane in Periods of Quiet and Excitement. Gautier, J. A. [*Compt. rend. soc. biol.*, **135**, 853–5 (1941); *Chem. Zentr.*, **1**, 893–4 (1942).]

In a group of insane patients creatinine excretion was greatly increased (sometimes as high as 400 per cent.) during periods of excitement. The excretion is more closely related to the muscular activity than to the mental condition. L. E. GILSON (Chem. Abstr.).

Action of Diphenyloxazolidinedione on Brain Respiration at varied Temperature Levels. Fuhrman, Frederick A., and Field, John, (2nd). [*J. Pharmacol.*, **77**, 229–37 (1943); *cf. C.A.*, **38**, 5257⁴.]

The m.l.d. of 5,5-diphenyl-2, 4-oxazolidinedione (I) for rats is about 40 mgm./kgm. given intravenously. The compound irreversibly inhibits brain respiration *in vitro*, but there is a small fraction of cerebral cortex respiration which is not abolished, even by high concentrations of (I) or 5,5-dipropyl-2, 4-oxazolidinedione (II).

At 37·5° only 10 per cent. of the respiration was stable toward (I), while at 15° 36 per cent. was unaffected. Like (II) and like some narcotics, (I) decreased the O consumption of cerebral cortex slices much more markedly in the presence of glucose than in the presence of succinate.

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

Neutralization Tests with Fractions of Poliomyelitis Antiserum (Horse). Toomey, John A., McKhann, Charles F., and Fahey, Kathleen. [*J. Immunol.*, **46**, 1–7 (1943).]

Antipoliomyelitic horse serum was partially fractionated by salting-out and iso-electrical precipitation methods. Neutralization antibodies were concerned in that portion of the globulin fraction on the borderline between pseudoglobulin and euglobulin.

CHARLES A. ZITTLE (Chem. Abstr.).

Influence of X-Ray Therapy on the Function of the Hemato-encephalic Barrier in Diseases of the Central Nervous System. Surat, V. S. [*Ann. Roentgenol. Radiol. (U.S.S.R.)*, **24**, 213–19 (*in French and German*, 219), (1940).]

Therapeutic doses of X-rays given to patients suffering from multiple sclerosis and other pathological states of the central nervous system cause regular increases of permeability of the hemato-encephalic barrier, both in cerebral hemispheres and in the spinal cord. Study of the regulating function of the barrier with respect to sugar, chlorides, Ca, and K concentrations in the spinal fluid shows absence of any change in the content of these substances when the protective function is diminished as result of irradiation. It follows that the regulating mechanism is not exclusively represented by the barrier function. C. S. SHAPIRO (Chem. Abstr.).

The Sugar of the Cerebroside from the Spleen in Gaucher's Disease. Lieb, H., and Gunther, V. [*Z. physiol. Chem.*, **271**, 211–13 (1941).]

The sugar from the cerebroside isolated in Gaucher's disease in a 3-year-old-girl gave a negative fermentation test with pure yeast; it is considered to be d-galactose, which is found also in kerasin in brain substance. Others have isolated d-glucose from the cerebroside of the spleen; hence it is concluded that both cerebroglucoside and cerebrogalactoside may occur in the spleen.

EUGENE MAIER (Chem. Abstr.).

Cerebrosides. XVII: Occurrence of a Hexacosanoic Acid Among the Fat Acids of Brain Cerebrosides. Klenk, E., and Schumann, E. [*Z. physiol. Chem.*, **272**, 177–88 (1942); *cf. C.A.*, **38**, 3332⁴.]

A fraction of unsaturated acids was obtained with 10 per cent. H_2SO_4 in MeOH from a mixture of cerebrosides very poor in P. Small impurities of phosphatides were probably sphyngomyelin and ether-insoluble glycerophosphatides. After precipitation and separation of the fraction of unsaturated hydroxy-acids as Mg salts the Me ester of the remaining nervonic acid fraction was distilled in vacuo. A hexacosanoic acid was isolated from a Me ester fraction distilling at about 173°. The free acid crystallized from acetone in bright scales, m. 45–45·5°.

GERALD REED (Chem. Abstr.).

Thermal Paralysis and Metabolism of Nervous Tissue. Brachet, J., and Bremer, F. [*Arch. intern. physiol.*, **51**, 195–8 (1941).]

Oxygen consumption of minced brain from the frog, *Rana temporaria*, in the presence of Ringer glucose reaches a maximum at 31° and falls off rapidly at higher temperature; for *R. esculenta* the maximum is at 38°. These values correspond very closely to the temperatures which cause central thermal paralysis. ZELMA BAKER MILLER (Chem. Abstr.).

Effect of Chloropicrin and Bromopicrin on Nerve Fibers and Sympathetic Ganglion. Bacq, Z. M., and Coppée, G. [*Arch. intern. physiol.*, **51**, 35–50 (1941).]

Following chloropicrin (saturated solution) there is a repetitive response (6–40 impulses) to

an isolated stimulus in the nerve cell and fiber. After excitation, subjection of the sympathetic ganglion of the cat to chloropicrin causes tonic activity (10–100 impulses/minute). Bromopicrin excites the ganglionic cells directly, and appears to paralyze conduction in the fiber without previous increase in the excitability. This period of potentiation by chloro- and bromopicrin is followed by a block in conduction and transmission of impulse. Results with chloro- and bromopicrin are compared with allyl isothiocyanate, monobromoacetic acid and β, β^1-dichloroethylsulfone. The authors conclude that the effects observed might be caused by sensitization to K ions. ZELMA BAKER MILLER (Chem. Abstr.).

Lipides of Muscle and Brain in Rats Deprived of Tocopherol. Heinrich, Milton R., and Mattill, H. A. [*Proc. Soc. Exptl. Biol. Med.*, **52**, 344–6 (1943).]

In rats on a vitamin E-deficient diet the muscle cholesterol was significantly increased and total muscle lipides were slightly increased. Brain cholesterol was markedly increased, especially free cholesterol. L. E. GILSON (Chem. Abstr.).

Blood Glutathione in Relation to Stimulation of the Vagus and Sympathetic: III. Vlasovskii, I. P. [*Med. Exptl.*, 2027.]

Glutathione (I) of the blood was studied as the test substance to explain the participation of the vegetative nervous system in the oxidation processes. (I) was determined in the blood of the horse donor before and after stimulation of the vagus and sympathetic, as well as in the horse recipient before and after transfusion of blood from horses in which the sympathetic had been stimulated. The studies showed the increase of the reduced forms and diminution of the oxidized form of (I) in the blood of the donor, in relation to stimulation of the vagus; on stimulation of the sympathetic the reverse was observed. The transfusion of the blood of the previously vagus-stimulated donor also caused an increase of the reduced form; transfusion of blood from a donor with previously stimulated sympathetic increased the oxidized form of (I) in the recipient. HELEN LEE GRUEHL (Chem. Abstr.).

Brain Cephalin, A Mixture of Phosphatides. Separation from it of Phosphatidyl Serine, Phosphatidyl Ethanolamine, and a Fraction Containing an Inositol Phosphatide. Folch, Jordi. [*J. Biol. Chem.*, **146**, 35–44 (1942).]

The cephalin fraction of brain phosphatides is a mixture of phosphatidyl serine (I) (*C.A.*, **35**, 4787[9]), phosphatidyl ethanolamine (II), and one or more phosphatides, some containing inositol (III) as a constituent (*C.A.*, **36**, 2605[6]). The fraction containing (III) is less soluble in alcohol than either (I) or (II). (II), unlike cephalin, to which its composition was formerly assigned, is soluble in alcohol. With the exception of (II) the phosphatides in the cephalin fraction of brain lipides are strongly acidic and are isolated as K and Na salts.

PHILIP L. HARRIS (Chem. Abstr.).

Effect of Hypophysectomy on the Concentration of Ascorbic Acid in the Adrenals of the Rat. Tyslowitz, R. [*Endocrinology*, **32**, 103–8 (1943).]

Adrenal weight in hypophysectomized male rats 21 to 40 days old decreased gradually, beginning within two days after operation. Ascorbic acid concentration in the adrenals increased briefly before beginning its gradual decline on about the third day. This decline was not specific, for it was shared by the ascorbic acid concentration of testis, liver, kidney and blood serum. Values for female rats were similar. They were increased by treatment with pituitary extracts and remained higher where hypophysectomy was incomplete. Starvation of normal rats for six days reduced liver and kidney ascorbic acid more than that of adrenals, testis or blood serum. Thyroidectomy did not alter findings in hypophysectomized animals. It is apparent that adrenal ascorbic acid levels are not reliable indexes of cortical activity.

KATHRYN KNOWLTON (Chem. Abstr.).

The Significance of Carbon Monoxide Injury in Brain-stem Pathology. Sturm, Alexander. [*Wien. med. Wochschr.*, **91**, 709–13 (1941).] C. L. B. (Chem. Abstr.).

2. Pharmacology and Treatment.

Sodium Succinate as an Antidote for Barbiturate Poisoning and in the Control of the Duration of Barbiturate Anesthesia. Soskin, Samuel, and Taubenhaus, Matthew. [*J. Pharmacol.*, **78**, 49–55 (1943).]

Na succinate is a safe and effective antidote against toxic doses of Na pentobarbital in rats. Its action appears to be the maintenance of the metabolism of the brain, through oxidation of the succinic acid, during the period in which the oxidation of glucose, lactate and pyruvate in the brain is inhibited by the barbiturate (*cf. C.A.*, **27**, 781[5]). For best results it should be given intravenously after the barbiturate; if given prophylactically before the barbiturate it can be injected intramuscularly or intravenously. Na succinate also shortens the duration of both Na pentobarbital and Na amytal anesthesia in rats. A case of barbiturate poisoning in a woman is described, in which the use of Na succinate appeared to be of great benefit.

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

Reduction of Fluid Loss from Damaged (Burned) Tissues by a Barbiturate. Beecher, Henry K., and McCarrell, Jane D. [*J. Pharmacol.*, **78**, 39–48 (1943).]

In experimental animals burned with hot water the administration of Na pentobarbital greatly decreased loss of fluid and protein from the burned area. Under the same conditions morphine had no curtailing effect on fluid loss. L. E. GILSON (Chem. Abstr.).

The Determination of Sodium Pentothal in Blood. Hellman, L. M., Shettles, L. B., and Stran, Herbert. [*J. Biol. Chem.*, **148**, 293–7 (1943).]

A simple method for the determination of Na pentothal in blood is described. This particular barbiturate has a maximum ultra-violet absorption at 2880 A. A recovery of 90 per cent. is obtained when known amounts of the drug are added to bank blood.

H. J. PREBLUDA (Chem. Abstr.).

Removal of Red Cells from the Active Circulation by Sodium Pentobarbital. Hahn, P. F., Bale, W. F., and Bonner, J. F. (jun.). [*Am. J. Physiol.*, **138**, 415–20 (1943); *cf. C.A.*, **37**, 686⁶.]

When the circulating red blood cells of the dog are tagged with other dog cells containing the radioactive isotope of Fe, and nembutal anesthesia is induced, removal of the engorged spleen shows that up to 30 per cent. of the circulating red cells may be present in this organ as shown by the radioactivity of the contained cells. When red cells have been sequestered from the circulation by the influence of nembutal, the actively circulating cell mass can be determined by the tagged-donor-cell technique. Administration of adrenaline by vein results in an increase in the actively circulating cells as shown by dilution of the tagged cells. When the latter procedure is applied to splenectomized animals there is still a marked response to adrenaline, an increment of red cells being added to the circulation. E. D. WALTER (Chem. Abstr.).

The Pharmacology of Sodium Cyclopentenylallyl Barbiturate (Cyclopal). Dille, James M., and Kipple, Helen M. [*Anesthesiology*, **4**, 135–44 (1943).]

Na cyclopentenylallyl barbiturate, known as cyclopal-Na, belongs to the group of intermediate acting barbiturates. After intravenous injection of 80 mgm. per kgm. in rabbits the average duration of sleep, as measured by the duration of the absence of the righting reflex, was 114 minutes. A therapeutic ratio of 5·53 for male rats, 3·97 for female rats and 3·45 for male albino rabbits was found. A slightly lowered response in rabbits was noted after the second and following days when anesthetic doses of cyclopal-Na (80 mgm./kgm.) were administered daily over a period of time. Cyclopal is eliminated rapidly by some process of detoxication. Excretion plays practically no part in the elimination of this drug, since bilateral nephrectomy does not change the response to anesthetic doses. Accumulation occurred in rabbits only when anesthetic doses of 60 mgm. per kgm. were repeated at intervals of two hours; accumulation did not occur when doses of 30 mgm. per kgm. were administered at 2-hour intervals for 12 hours.

RUTH BERGGREN (Chem. Abstr.).

The Effects of Nembutal (Sodium Pentobarbital) and Scopolamine on Human Subjects. Hawk, M. H., and Wangeman, C. P. [*Anesthesiology*, **4**, 238–46 (1943).]

The experiments demonstrate that nembutal (I) has definite stimulative and depressant qualities. The addition of scopolamine (II) lessens the depressing effects of (I). This is particularly true with respect to minute volume exchange of air to and from the lungs. There is less depression of the respiratory functions with (I) than with morphine. The combination of (I) and (II) causes less respiratory depression than that caused by morphine and (II). The addition of (II) to (I) provides a less profound, longer acting and more pleasant sedation than (I) alone, in spite of the apparent greater restlessness. It is believed that the combination of (I) and (II) is satisfactory for preoperative sedation and mucus inhibition, but that the combination cannot be depended upon to relieve pain. RUTH BERGGREN (Chem. Abstr.).

The Comparative Rate of Gastrointestinal Absorption of Barbital, Sodium Barbital and Elixir of Barbital N. F. VII. Seeberg, Victor P., and Dille, James M. [*J. Am. Pharm. Assoc.*, **32**, 133–7 (1943).]

Tablets of Na barbital administered after crushing are absorbed more rapidly from the gastrointestinal tract of 24-hour starved cats than crushed tablets of barbital or barbital administered in the form of elixir of barbital N. F. VII. Crushed tablets of barbital are absorbed at about the same rate as the elixir. After oral administration the fact that only small amounts of the drug reach the colon indicates that absorption takes place mainly in the small intestine. Absorption of isotonic solutions from the ligated intestine is about the same for barbital and Na barbital provided that both are in solution. Absorption of barbital after administration of elixir of barbital N. F. VII is much slower than was expected. While depression is greater than the blood level of barbital would indicate, this can be explained by the presence of alcohol in the elixir. The delayed absorption of the barbital in the elixir probably occurs because the glycerol present delays the passage of the elixir into the intestine from the stomach.

A. PAPINEAU-COUTURE (Chem. Abstr.).

Relationship between Chemical Structure and Inhibitory Action of Barbituric Acid Derivatives on Rat-brain Respiration in vitro. Fuhrman, Frederick A., and Field, John (2nd). [*J. Pharmacol.*, **77**, 392–400 (1943).]

In homologous series of 5-alkyl-5-ethylbarbiturates and 5-alkyl-5-allylbarbiturates, with increasing length of the alkyl side chain there is a decrease in the molar concentration required to produce a 50 per cent. decrease in the O consumption of rat cerebral cortex slices *in vitro*.

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

Alcohol and Cerebral Vasodilatation. Loman, Julius, and Myerson, Abraham. [*New Engl. J. Med.*, **227**, 439–41 (1942).]

A 25 per cent. solution of EtOH in physiological saline was given intravenously to human subjects in doses sufficient to produce definite signs of intoxication. In 2 of the 10 subjects there was a decrease in O uptake by the brain (lowered arteriojugular difference). The uptake of glucose by the brain was not significantly altered, nor was there any significant change in cerebrospinal fluid pressure. The results indicate that EtOH is not an efficacious vasodilator.

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

Antagonistic Actions of Narcotics and Analeptics on the Central Nervous System. II: Action of d- and l-Ephedrine and their Synergism with Metrazole and Strychnine on the Narcotized Cat Spinal Cord. Koll, W., and Ergang, M. [*Arch. exptl. Path. Pharmakol.*, **199**, 577–605 (1942); *cf Koll, ibid.*, **184**, 365 (1937).]

In decerebrate cats narcotized with avertin, ethylurethan or pernocton, the spinal cord was severed back of the last rib and the awakening action of ephedrine, metrazole and strychnine was studied by the effect on various reflexes. These last three drugs act synergistically with each other.

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

Antagonism between Chloralose and Metrazole. Dybling, O., and Dybing, F. [*Arch. exptl. Path. Pharmakol.*, **199**, 435–7 (1942).]

Metrazole awakens rats lightly anesthetized with chloralose.

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

Effects of Pentamethylenetetrazole (Metrazole) on the Stomach. Mautner, Hans, and Yetwin, I. Jacques. [*J. Am. Pharm. Assoc.*, **32**, 17–20 (1943).]

After injection of metrazole in rats there is an increase in fluid content of the stomach. This is due to cessation of gastric motility, possibly also to slight hypersecretion. The effect on gastric motility cannot be attributed to an increased output of adrenaline, but is probably due to a central effect on the antonomic nervous system. These results corroborate the findings of several investigators in that a stimulation of the hypothalamic region simultaneously regulates both sympathetic and parasympathetic divisions of the autonomic nervous system.

A. PAPINEAU-COUTURE (Chem. Abstr.).

Liberation of Potassium from the Dog Brain by the Action of Convulsant Drugs. Cirardo, V. H., Torino, A., and Fendrik, B. [*Rev. inst. bacteriol. "Carlos G. Malbran" (Buenos Aires)*, **11**, 179–84 (1942).]

See *C.A.*, **37**, 1775.

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

Lung Edema from Metrazole. Riechert, Willi. [*Arch. exptl. Path. Pharmakol.*, **197**, 620–8 (1941); *Chem. Zentr.*, **1**, 3230 (1942).]

The smallest intravenous dose of metrazole producing convulsions in rats was 40 mgm./kgm. This dose did not cause edema of the lungs, but 60 mgm./kgm. produced lung edema lasting 7–8 hours. Repeated intraperitoneal injections of 20 mgm./kgm. produced convulsions and lung edema. Small doses of metrazole (10–30 mgm./kgm.) had neither a favorable nor an unfavorable effect on lung edema provoked by phosgene.

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

Liberation of Potassium in Dog Brain by the Action of Convulsant Drugs. Cicardo, V. H., Torino, A., and Fendrik, B. [*Rev. soc. argentina biol.*, **18**, 308–14 (1942); *cf. C.A.*, **36**, 5231[8].]

In dogs the intravenous injection of convulsive doses of either metrazole or azoman (3-ethyl-4-cyclohexyl-1,2,4-triazole) caused a liberation of K by the brain into the blood stream. Curare-like substances decreased this liberation through their antagonistic action on the nerve centers.

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

Insulin Reaction and the Cerebral Damage that may Occur in Diabetes. Murphy, Francis D., and Purtell, James. [*Am. J. Digestive Diseases*, **10**, 103–7 (1943).]

A case of diabetes is reported in which hypoglycemic shock resulted in cerebral damage and in the following year, death. The symptomatology and pathology of hypoglycemia and the mechanism of the action of insulin and of hypoglycemia on the central nervous system are discussed.

MARJORIE ANCHEL (Chem. Abstr.).

Glucose Tolerance and Insulin Tolerance in Mongolism. Bixby, Emily May, and Benda, Clemens E. [*Am. J. Mental Deficiency*, **47**, 158–66 (1942); *cf. C.A.*, **36**, 826[8].]

Further evidence for abnormal sugar metabolism in mongolism was obtained with the Exton-Rose divided-dose glucose-tolerance test; in most instances the blood glucose (I) concentration

continued to rise after the second half-dose instead of falling normally. In the insulin (II)-tolerance test the fasting levels of (I) and the fall of about 50 per cent. during the first 20 or 30 minutes after (II) administration were normal in mongoloids, but (I) rose again at a subnormal rate, being 13 to 29 mgm. below the fasting level two hours after (II) was given. The response of (I) to adrenaline, given two hours after (II), was also subnormal in mongoloids.

W. M. SPERRY (Chem. Abstr.).

The Use of Prostigmine in the Treatment of Poliomyelitis. Kabat, H., and Knapp, M. E. [*J. Am. Med. Assoc.*, **122**, 989–95 (1943).]

Following subcutaneous administration of prostigmine the skeletal muscle hypertonus and proprioceptive reflex hyperirritability, as well as the inco-ordination in poliomyelitis patients, are decreased. This action of prostigmine is not counteracted by atropine, and seems to depend on a change in spinal cord synaptic function. S. MORGULIS (Chem. Abstr.).

Ether and Metabolism in the Cerebral Cortex. Craig, F. N. [*Science*, **98**, 68–9 (1943).]

The effect of ether on the O uptake and lactic acid output by slices of cerebral cortex of the cat in Ringer-phosphate-glucose medium is given in a table.

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

Influence of Phenylalkylamines on Oxygen Uptake of Brain Tissue. Froentjes, W. [*Enzymologia*, **10**, 216–19 (1942) (*in German*).]

No important differences were found between d-, l- and dl-methylphenethylamines (benzedrine) in their ability to decrease glucose oxidation by brain tissue *in vitro* and to antagonize the depressing action of tyramine on this oxidation. The action of α-phenylpropylamine was similar to, but stronger than, that of benzedrine; the d-isomer was about 20 per cent. more active than the l-compound. On intestine, d- and l-ephedrines had equally strong actions. In the treatment of narcolepsy in children d- and dl-benzedrines were about three times as potent as l-ephedrine. L. E. GILSON (Chem. Abstr.).

The Isoelectric Point of Brain Cells in Intoxication by Hypnotics: II. Aizawa, T. [*Japan. J. Med. Sci., VII. Social Med. Hyg.*, **3**, 192–3 (1940); *Chem. Zentr.*, **2**, 923 (1942); *cf. C.A.*, **35**, 5187^8.]

In the small and large pyramidal cells from the cerebrum of rabbits after administration of phenobarbital the pH was 2·6–5·8, the isoelectric point 4·2; after dial, 2·6–5·4, and 4·0; after sulfonal 2·2–4·8, and 3·6 respectively. ALFRED BURGER (Chem. Abstr.).

Eserine, Acetylcholine, Atropine and Nervous Integration. Gesell, R., and Hansen, E. T. [*Am. J. Physiol.*, **139**, 371–85 (1943).] E. D. WALTER (Chem. Abstr.).

Diffusion of Sulfonamides from the Blood into the Cerebrospinal Fluid. Bechgaard, Poul, Lokse, Edel, and Vermehren, Emil. [*Nord. Med.*, **12**, 3247–9 (1941); *Chem. Zentr.*, **1**, 638 (1942).]

Sulfonamides were given by mouth in successive doses of 2, 2 and 1 gm. at 4-hourly intervals. The concentration of each drug in per cent. of that found in the blood 10–20 hours after the first dosage was: sulfapyridine, 69 per cent.; sulfathiazole, 19 per cent.; sulfamethylthiazole, 11 per cent. These results might be altered in cases with pathological changes in the meninges.

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

Effect on the Electrical Activity of the Cortex of Certain Depressant and Stimulant Drugs—Barbiturates, Morphine, Caffeine, Benzedrine and Adrenaline. Gibbs, Frederic A., and Maltby, George L. [*J. Pharmacol.*, **78**, 1–10 (1943).]

Frequency analyses of the encephalograms showed that in normal human subjects phenobarbital, pentothal and morphine caused a shift in frequency to the slow side comparable to that occurring in sleep. Caffeine, benzedrine and adrenaline caused a shift in frequency to the fast side comparable to that occurring with attention. Of the drugs studied, the one (pentothal) which produced the greatest clinical evidence of depression caused the greatest shift to the slow side, and adrenaline, which produced the greatest stimulation, caused the greatest shift in the other direction. The direction of the change in frequency was constant for a given class of drugs, but the direction of the change in voltage level varied with dosage and differed for drugs of the same class. L. E. GILSON (Chem. Abstr.).

The Antineuritic Activity of Vitamin B_1 Homologs and Analogs: II. Schultz, Fritz. [*Z. physiol. Chem.*, **272**, 29–61 (1941); *cf. C.A.*, **35**, 1839^8.]

The previous work showed that (1) substances with the same minimum curative dose may not require the same time for complete cure when that dose is used; (2) different homologs show a different penetrating strength; (3) in large doses certain substances fundamentally different in structure from vitamin B_1 effect cures the poor reproducibility of which casts doubt on the vitamin nature of the substance. On the basis of Funk's idea that the cure of acute beriberi can come about either through supplying the specific vitamin or through measures which allow sudden mobilization of reserve vitamin from organs and tissues, a distinction can be drawn between true vitamin activity and a simulated vitamin activity. A mobilization of residual

vitamin, which must be taken as non-specific cure, cannot be repeated. Accordingly, to have true vitamin activity a substance must be able to cure repeatedly beriberi spasm occurring several times in the same animal (repeated cure). It must be able also to keep the animal alive, after cure, for a long time, when continually added to the diet (lasting cure), or must be able to prevent appearance of symptoms (prophylaxis). Aneurine, 2^1-ethylaneurine, 2^1-propylaneurine and ethylaneurine were administered in a single dose, subcutaneously, after the onset of the spasm in pigeons on a diet deficient in vitamin B_1. If the spasm was cured, a second dose was given after a second spasm had developed, to test "repeated cure." If this was cured, the "lasting cure" was tested for by giving daily doses. Tables show the curative dose after each spasm, the time necessary for cure, and the survival time, for each of the four substances. All three homologs of vitamin B_1 tested were found to have true vitamin activity according to the criteria of repeated cure and lasting cure. The activity of the substances tested is proportional to the survival time, and is independent of the rapidity of effect after administration of the curative dose. Two compounds previously shown to have a pseudo-antineuritic action failed entirely to achieve a second cure, or a lasting cure. The three active aneurin homologs are believed to act directly, and not by conversion in the organism to the natural vitamin. This conclusion is based on the facts that the activity of one of the homologs is identical with that of the natural vitamin, that doses of the less active substances higher than the curative dose do not result in greater activity, and that the ratio of the survival time to that on vitamin B_1 remains the same even if the dose is doubled or tripled. The results confirm the previous finding that vitamin B_1 activity is not specific, but is common to a number of homologous compounds, which may possess it in varying degrees. MARJORIE ANCHEL (Chem. Abstr.).

Inactivation of Cholinesterase by Morphine, Dilaudid, Codeine and Desomorphine. Wright, C. I., and Sabine, J. C. [*J. Pharmacol.*, **78**, 375 (1943).]

The above four drugs have more or less inhibiting action on cholinesterase from human, dog or rabbit serum, and human or rabbit brain. The inhibition is only partly competitive.

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

Mode of Action of Sympathomimetic Drugs. XI: Influence of Tonephin on Sympathetic Stimulation. Malorny, G. [*Arch. exptl. Path. Pharmakol.*, **200**, 176 (1942).]

Tonephin sensitizes the decerebrate cat to adrenaline and increases the irritability of the peripheral sympathetic nerves. Tachyphylaxis is readily produced.

XII: Influence of Thyroxine and Diiodotyrosine on Specific Sympathetic Receptors. [*Ibid.*, 187.]

In decerebrate cats, thyroxine stimulates the sympathetic nerves and sensitizes the animal to adrenaline. The effect reaches a maximum about five hours after the thyroxine injection. Tyrosine and diiodotyrosine have similar but weaker actions. L. E. GILSON (Chem. Abstr.).

dl-Glutamic Acid Hydrolysis in Treatment of Petit Mal and Psychomotor Seizures. Price, J. C., Waelsch, H., and Putnam, T. J. [*J.A.M.A.*, **122**, 1153 (1943).]

The use of dl-glutamic acid was suggested on the following considerations: Since the unnatural isomer is excreted in the urine when a racemic amino-acid is administered 1 molecule of d-glutamic acid-HCl should furnish 1 molecule of HCl in addition to 2 COOH groups, and the l-glutamic acid would also furnish 1 equivalent of HCl. Furthermore, l-glutamic acid is thought to be the only amino-acid metabolized by brain tissue. Enough dl-glutamic acid-HCl was given daily to acidify the urine to about pH 5·0 (4 gm. three times daily). With this medication seizures decreased in frequency and mental and physical alertness increased. *Grand mal* seizures were not affected. S. MORGULIS (Chem. Abstr.).

A Comparison of Atropine and Curare as Antagonists of Acetylcholine. Luco, J. V., and Altamarino, M. [*Am. J. Physiol.*, **139**, 520 (1943).]

Large doses of atropine inhibit the muscular response to acetylcholine in cats. Larges doses of curare block the glandular response to acetylcholine. The doses of atropine capable of inhibiting the responses to acetylcholine are directly proportional to the acetylcholine thresholds of the effectors used. With curare this relationship is reversed. An explanation is given for the differences between the nicotinic and muscarinic activities of acetylcholine.

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

The Course of Narcosis at Different Times During the Twenty-four-hour Period. Edlund, Y., and Holmgren, H. [*Z. ges. exptl. Med.*, **107**, 26–52 (1940).]

Studies on the speed of narcosis in mice induced by avertin and evipan, while observing the liver rhythm in the course of 24 hours, showed an increased detoxifying action of the liver when it was rich in glycogen at about 6 a.m. The induction time was increased, and several animals did not undergo narcosis with the dose employed. Animals which were narcotized in the glycogen-poor phase of the liver, about 11 a.m., slept much sooner and without exception. This group exhibited a relatively great narcosis mortality of 21 per cent.

R. STAEMPFLI, MAURICE M. RATH (Chem. Abstr.).

Treatment of Distemper in Dogs with Wheat-germ Oil (Vitamin E-neuromuscular Factor). Vogt-Moller, P. [*Tierärztl. Rundschau*, **48**, *No.* 31/32, 274–5 (1942).]

Previous treatment of cows and sows for sterility with wheat-germ oil demonstrated the presence of a factor which cures neuromuscular symptoms. In distemper of dogs the nervous system was generally involved in 30–50 per cent. of the cases observed in Denmark in 1940 and 1941. Of 90 animals, one-third were untreated, one-third received daily subcutaneous injections of 10 mgm. tocopherol, and one-third were given 5 c.c. of wheat-germ oil fortified by 10 mgm. of tocopherol. The number of deaths in the respective groups were 14, 16, 12, total number of nervous complications 21, 23, 5. Of all animals with nervous complications 11, 12, 2 survived.

ERICH KAUFMANN (Chem. Abstr.).

The Antagonistic Action of Sodium Amytal and Benzedrine Sulfate (Amphetamine) in Serial Epileptic Episodes. Prudholme, Charles. [*Med. Bull. Veterans' Administration*, **19**, 186–90 (1942).]

The profound and long-continued narcosis consequent upon Na amytal used to control serial convulsive episodes of idiopathic and symptomatic epilepsy has been shortened by the antagonistic action of benzedrine sulfate. The associated dangers of respiratory infection and management of difficult overt behaviour seemingly have been minimized.

RACHEL BROWN (Chem. Abstr.).

Pharmacodynamic Test of Aneurine—the Action on Nervous Conductivity and Transmission (Neuromuscular and Ganglionic Transmission). Chauchard, Paul. [*Compt. rend. soc. biol.*, **135**, 869–72 (1941); *Chem. Zentr.*, **1**, 634 (1942); *cf. C.A.*, **36**, 2594[5].]

The pharmacodynamic action of the preparation on conduction in nerve, on neuromuscular transmission, and on ganglionic transmission in frogs was described. The significance of this action was stressed, since this is not an ordinary poison but a compound necessary for the function of the nerves.

HELEN LEE GRUEHL (Chem. Abstr.).

Effects of Strychnine on the Isolated Nerve. Coppée, G., and Coppée-Bolly, M. H. [*Arch. intern. physiol.*, **51**, 97–130 (1941).]

The demarcation potential is not modified. The speed of propagation of the impulse can be reduced to as little as 1/10 of its initial value with concentrations of 1/500,000. At the same concentration the amplitude of the electrical response of the nerve fiber is diminished. The duration of the action potential is lengthened. The negative after-potential is reduced in amplitude and in duration, and a positive after-potential appears. The relative and abstract refractory periods are lengthened. The refractory phase of conduction is longer than the abstract refractory phase of excitation. The rheobase is reduced with low concentrations of strychnine (10^{-6} and 10^{-7}) and increased by higher concentrations. The chronaxie of nerves of small diameter is not affected, but in nerves of large diameter it is decreased but returns to normal in several hours. The period of rhythmic response of a decalcified nerve is not affected by strychnine. The block in conduction evoked by strychnine is attributed to reduction in action potential and in excitability.

ZELMA BAKER MILLER (Chem. Abstr.).

Bone Marrow and Peripheral Nervous System in Chronic Manganese Poisoning. (Pathological Anatomy of Manganism.) Voss, H. [*Arch. Gewerbepath. Gewerbehyg.*, **10**, 550–68 (1941); *Chem. Zentr.*, **1**, 1906–7 (1942).]

In two cases of chronic Mn poisoning changes in the bone marrow and in the peripheral nervous system were found. In one case the atypical course of the poisoning was manifested clinically as amyotrophic lateral scleorsis with bulbar symptoms. Anatomical findings existed corresponding to the malfunctioning observed. In another case there were certain pyramidal tract symptoms. Anatomical study showed mainly extensive degeneration of the right lateral pyramidal tract and of both sciatic nerves, with pronounced vessel changes in the affected areas.

MAURICE M. RATH (Chem. Abstr.).

Concentration of Procaine in the Cerebrospinal Fluid of the Human Being after Subarachnoid Injection. Koster, H. [*Arch. Surg.*, **46**, 301–6 (1943).]

At the moment of injection the maximum concentration of procaine is that of the solution, 43 mgm. per c.c. In 10 minutes it falls to 2 mgm. per c.c. and then falls slowly until anesthesia wears off. At the moment of injection the concentration three interspaces above the site of injection is 0, but after 5 minutes it becomes 4 mgm. per c.c.; it falls rapidly for 4–5 minutes and then slowly disappears. With the patient in the Fowler position the concentration in the cisterna magna never went over 0·18 mgm. per c.c., and was frequently less than 0·02 mgm.

JOHN T. MEYERS (Chem. Abstr.).

Experimental Application of Sulfonamide Drugs to the Cerebral Cortex. Ingraham, Franc D., and Alexander, Eben (jun.). [*New Engl. J. Med.*, **227**, 374–8 (1942).]

When powdered sulfanilamide, sulfathiazole or sulfadiazine was applied directly to the cerebral cortex of cats under sterile and non-sterile conditions, there was little inflammatory reaction except in one treated under non-sterile conditions. Sulfadiazine applied to the cerebral cortex of monkeys caused no perceptible inflammatory reaction except in one in which the bone

flap was left out. It was concluded that sulfadiazine powder can be safely used in the presence of gross contamination when the brain is not severely damaged. Further work is needed to determine whether it can be used in more complex injuries.

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

Bismuth in Heine-Medin's Disease. The Salts of Heavy Metals in Diseases Caused by Neurotropic Viruses. Calabrese, Alberto. [*Semana méd.* (*Buenos Aires*), **1**, 531–42 (1943).]

The treatment must be initiated in the first stage of the disease to prevent permanent neural damage. Water-soluble Bi is given intramuscularly, or in very severe cases—with due precautions—intramuscularly at the rate of 3 to 4 mgm. Bi per kgm. weight. The dose is repeated after 12 hours. Simultaneously 1 to 2 mgm. fat-soluble Bi per kgm. is given intramuscularly. This treatment is continued during the acute stage, while later during the subacute stage only the solution in oil is used. The appearance of stomatitis and reduced urine volume must be watched for. The 58 cases reported showed generally good results.

A. E. M. (Chem. Abstr.).

Pharmacodynamic Action of Thiamine on Vestibular Chronaxia in Normal Pigeons. Mouriquand, G., and Coisnard, J. [*Compt. rend. soc. biol.*, **136**, 595–7 (1942.)]

A single large dose of thiamine depressed vestibular chronaxia for 20 minutes, then raised it above normal for 13 hours. This was followed by a slow decrease to below normal, where it remained for four days, then a gradual return to normal. L. E. GILSON (Chem. Abstr.).

Effect of Repeated Injections of Thiamine. [*Ibid.*, 597–8.]

Repeated daily injections first depressed vestibular chronaxia then raised it by steps to a high plateau, where it remained 3½ days after the injections were discontinued. A slow descent with a dip below normal followed. L. E. GILSON (Chem. Abstr.).

Pharmacological Action of Choline Glycerophosphoric Ester Prepared by Enzyme Action and Synthetically. Jeney, A. v., Mihalik, I., and Uri, W. J. [*Arch. exptl. Path. Pharmakol.*, **199**, 99–112 (1942); *Chem. Zentr.*, **1**, 3229 (1942).]

For synthesis of choline glycerophosphoric ester (I) choline chloride was converted to choline sulfate by AG_2SO_4, then to free choline by $Ba(OH)_2$. The choline solution was refluxed 30 hours with an equivalent amount of glycerophosphoric acid. The purified (I) m. 104–5°. (I) was prepared from lecithin with the aid of lecithinase " B " by the method of Contardi and Ercoli (*C.A.*, **29**, 8018). Both specimens of (I) had the same effect as choline chloride on blood pressure and intestine of cats and on frog heart. (I) is probably hydrolyzed in the body by choline phosphatase. L. E. GILSON (Chem. Abstr.).

Effect of Spinal Injection of Cocaine on Blood Pressure in Dogs. Jourdan, F., and Guillet, R. [*Compt. rend. soc. biol.*, **136**, 589–91 (1942).]

Injection of 3–10 c.c. of 1 per cent. cocaine solution into the subarachnoid space causes paralysis of the posterior roots and a small decrease in blood pressure. This decrease becomes greater as more of the body is anesthetized. L. E. GILSON (Chem. Abstr.).

Inhibiting Action of Tabernanthe iboga on Serum Cholinesterase. Vincent, D., and Sero, I. [*Compt. rend. soc. biol.*, **136**, 612–14 (1942).]

A very diluted extract of the roots of *Tabernanthe iboga* (family Apocynaceae), containing ibogaine, inhibits the action of cholinesterase of human or horse serum. Ibogaine has an anticholinesterase activity of the same order as eserine. Crude impure ibogaine is more potent than the crystallized alkaloid. L. E. GILSON (Chem. Abstr.).

The Central Action of the Sulfonamides. Marx, Hellmut. [*Klin. Wochschr.*, **21**, 30–1 (1942); *Chem. Zentr.*, **1**, 3231 (1942); *cf. C.A.*, **36**, 7129.]

The action of sulfonamides on the accompanying symptoms of infectious diseases, as reduction of the fever and the leucocytosis and the effect on other centrally controlled vegetative regulations, is considered. RUTH BERGGREN (Chem. Abstr.).

The Role of Glutathione and Vitamin C in Detoxication. Kovacs, Zoltan. [*Klin. Wochschr.*, **21**, 688–92 (1942).]

The use of vitamin C and glutathione in various toxic states is described. This treatment was, for the most part, successful. The rigor which may appear after intravenous injection of vitamin C + glutathione and the subsequent rise in temperature by about 2–3° is an unpleasant side reaction. It is probably due to the presence of the organically bound S in the sulfhydryl group (SH) of the cysteine in the glutathione molecule. If, however, the glutathione + vitamin C is administered intramuscularly, subcutaneously or perorally, this side reaction is absent although the curative effect is retained. The rigor which appears after intravenous injection is always evident in septic cases but rarely in toxic and allergic patients.

RUTH BERGGREN (Chem. Abstr.).

Effect of Chloroform and Ether on the Sensitivity of Muscle to Acetylcholine. Torda, Clara. [*J. Pharmacol.*, **77**, 350–6 (1943).]

In low concentrations ($CHCl_3$ 0·0025–0·03 per cent; Et_2O 0·5–1·5 per cent.) the drugs increase the response of frog rectus abdominis muscle to acetylcholine (I), somewhat higher concentrations decrease the response, and still higher concentrations ($CHCl_3$ 0·16 per cent. by volume or higher; Et_2O above 3·7 per cent.) cause contracture. Physostigmine increases the response of deeply chloroformed muscles to (I). $CHCl_3$ and Et_2O increase the response of fully eserinized muscle to (I), but even in high concentrations they do not counteract the effect of atropine in inhibiting the action of (I). Atropine does not modify the contracture provoked by high concentrations of $CHCl_3$ and Et_2O. This contracture is probably the result of processes which do not involve (I). Presumably $CHCl_3$ and Et_2O increase the excitability of the parasympathetic nervous system both by inhibiting the destruction of (I) by cholinesterase and by increasing the sensitivity of the effector organs to (I). L. E. GILSON (Chem. Abstr.).

Action of Benzene on Certain Central Nervous Regulating Mechanisms. Guerra, Francisco (Perez-Carral). [*J. Pharmacol.*, **77**, 336–42 (1943).]

Inhalation of C_6H_6 vapor produces sympathomimetic reactions in animals. In dogs and rabbits it exercises a specific central action on a zone of integration of panting and shivering. This zone is probably in the inferior portion of the pons and the middle portion of the medulla oblongata, possibly in the reticular formation. L. E. GILSON (Chem. Abstr.).

Stimulant Power of Secondary and Tertiary Phenylisopropylamines. Novelli, Armando, and Tainter, M. L. [*J. Pharmacol.*, **77**, 324–31 (1943).]

Homologs of benzedrine with one or two alkyl groups substituted on the N were studied for their effects on the central nervous system, circulation and respiration. Dimethyl-, ethyl-, diethyl-, butyl- and amyl-dl-benzedrine in moderate doses have no important action. In rats d-methylbenzedrine is slightly more active as a cerebral excitant than d-benzedrine. Respiration in animals and man is stimulated in amplitude and frequency by methylbenzedrine. d-Methylbenzedrine (pervitin) is much more active than the l-isomer. In another compound the amino group of benzedrine was replaced by piperidyl. The action of this compound was weak. L. E. GILSON (Chem. Abstr.).

Action of Adrenaline on the Atropine-acetylcholine Reversal Phenomenon. Stehle, R. L., and Melville, K. I. [*J. Pharmacol.*, **77**, 332–5 (1943).]

During slow intravenous injection of adrenaline or arterenol in the atropinized spinal cat, the pressor response to a large dose of acetylcholine is abolished and a transient depressor response is produced. During intravenous infusion of posterior pituitary extract under similar conditions the pressor response to acetylcholine is not abolished, but may be preceded by a transient depressor response when the blood pressure is high. L. E. GILSON (Chem. Abstr.).

Influence of Certain Drugs on the Crustacean Nerve-muscle System. Ellis, C. H., Thienes, C. H., and Wiersma, C. A. G. [*Biol. Bull.*, **83**, 334–52 (1942).]

The effects of a wide selection of drugs of known pharmacological action (sympathetic drugs, parasympathetic drugs, curare-like drugs, insecticides, local anesthetics and muscle drugs) were studied on the peripheral nerve-muscle preparations of the cheliped of the crayfish, *Cambarus clarkii*. The local anesthetics were the only drugs which, as a group, showed the customary vertebrate effects on crustacean preparations. In general the effects of the drugs studied were limited to changes in the excitability of the nerve fibre; either the refractory period of the nerve was markedly lengthened, or the nerve fibers became so hypersensitive that excitatory stimuli set up multiple discharges in them. The drugs excited little effect on the mechanisms involved in peripheral inhibition, especially on those responsible for supplementary inhibition. An investigation into certain "reversal" effects in which stimulation of the inhibitory axon showed an excitation, and in which stimulation of the excitatory axon showed an inhibitory effect, indicated that the former may be ascribed to stimulation of the adjacent hypersensitive motor fiber upon stimulation of the inhibitor, and the latter to a Wedensky-block. The central effects appear to be quite different from the effects on the peripheral systems.

LAWRENCE P. MILLER (Chem. Abstr.).

Action of Prostigmine on the Chronaxie Curve after Fatigue. Bourguignon, Georges, and Morichau-Beauchant, Jean. [*Bull. acad. med.*, **124**, 615–21 (1941).]

C. L. B. (Chem. Abstr.).

The Effect of Neurovegetative Poisons on Resistance to Infection. Frei, W. [*Schweiz. med. Wochschr.*, **71**, 377–9 (1941); *Chem. Zentr.*, **1**, 2293 (1942).]

Ephetonine increased resistance in mice against erysipelas infection. Acetylcholine increased resistance in the guinea-pig against infection with anthrax. Pilocarpine appeared to have a similar action. MAURICE M. RATH (Chem. Abstr.).