Part III.—Bibliography and Epitome.*

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

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

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

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

PSYCHIATRIC JOURNALS.

2 *Abh. Neur. Psychiat.*
Abh. Psychother.
2 *Acta Española Neur. y Psiquiat.*
Acta Neurol., Naples.
2, 3, 4 *Acta Psychiat. et Neurol., Copenhagen.*
3 *Acta Psychol., Hague.*
Acta Psychol., Keijo.
Alg. Neder. Tijdschr. Wijsbegeert. Psychol.
Aliéniste Français.
2 *Allg. Ztschr. f. Psychiat.*
Altersprobleme.
Am. Imago.
1, 2 *Am. J. ment. Def.*
1, 2, 3 *Am. J. Orthopsychiat.*
1, 2, 3, 4 *Am. J. Psychiat.*
2, 3 *Am. J. Psychol.*
Am. J. Psychotherap.
Am. Psychol.
An. Bras. Hig. Ment.
An. Istit. Psicol. Univ. B. Aires.
An. Psicotec., Rosario.
Anal. Inst. Neurol., Montevideo.
Analele Psihol. (Rumania).
Anales de psicol., Buenos A.
2, 3 *Année Psychol., Paris.*
2, 3 *Ann. Méd.-Psychol.*
2 *Ann. Osp. psichiatr., Perugia.*
Appl. Psychol. Monogr., Washington.
Arb. Psychiat. Inst., Sendai.

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

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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.*
Arch. Neurocir., Paraguay.
4 *Arch. Neurol., Paris.*
2 *Arch. de Neurol. de Bucarest.*
1 *Arch. de Neurol.*
2 *Arch. di Antropol. Crim.*
Arch. di Crim. Neuropsiquiat. y Disc. Con., Quito.
Arch. di Sci. Cereb. Psich., Salerno.
2, 4 *Arch. f. Psychiat.*
2, 3 *Arch. ges. Psychol.*
Arch. Internat. de Neurol.
Arch. Ital. Psicol.
Arch. Krim. Anthrop.
1, 2, 3, 4 *Arch. Neurol. Psychiat., Chicago.*
Arch. Neur. Psychiat., Mex.
2, 3 *Arch. Psicol., Neurol., Psichiat. e. Psicoter., Milan.*
2, 3 *Arch. Psychol., Genève.*
2, 3 *Arch. Psychol., N.Y.* (ceased publication 1945).
Arch. Relig. psychol.
Arch. Speech.
Arq. da Assist. a Psicop. de Pernambuco.
Arq. de Neuro-psiquiat., Brasil.
3 *Austr. J. Psychol. Phil., Sydney.*

Beih. Z. angew. Psychol.
Beih. Zbl. Psychother.
Bol. Inst. Psiquiat., Rosario.
2, 3, 4 *Brain.*
3 *Brit. J. Educ. Psychol.*
2, 4 *Brit. J. Inebriety* (now *Brit. J. Addiction*).
1, 2, 3, 4 *Brit. J. Med. Psychol.*
2, 3, 4 *Brit. J. Psychol.*
2, 3 *Brit. J. Psychol. Monogr. Suppl.*
Bull. Canad. Psychol. Ass.
2, 4 *Bull. de la Soc. de Psychiat. de Bucarest.*
2 *Bull. de la Soc. Roumaine Neur. Psychiat. Psychol. Endocrin.*
Bull. du Group. Franç. d'étud. de neuro-psychopath. infant.
2 *Bull. industr. Psychol., Melbourne.*
2 *Bull. Los Angeles Neur. Soc.*
2 *Bull. Menninger Clin.*
Bull. Milit. Clin. Psychol.
Bull. Soc. Psihol. med., Sibiu.

Canad. Journ. Occup. Ther.
Canad. J. Psychol., Toronto.
2, 3 *Cath. Univ. of Amer. Studies in Psychol. and Psychiat.*
2 *Cervello.*
2, 3 *Character and Per.* (now *J. Personality*).
2 *Child Develpm.*
2 *Child Develpm. Abstr.*
Child Develpm. Monogr.
Child Study.
Chin. J. Educ. Psychol., Chungking.
Chin. J. Psychol.
3 *Comp. Psychol. Monogr.*

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2 *Confinia Neurol.*
Contr. del Lab. di Psichol.
Contr. Lab. Psicol., Milan.
Contr. psychol. Theor.
Criança Portuguesa.
Criminalia, Mexico.

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

3 *Educ. psychol. Measmt., Washington.*
Egypt. J. Psychol., Cairo.
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. Jap.*
2 *Fortsch. Neur. Psychiat.*

3 *Genet. Psychol. Monogr.*
Geriat., Minneapolis.
Giorn. di Psich. e di Neuropat.

Hum. Factor.
Hum. Relat., Cambridge, Mass.
2, 3, 4 *Hyg. Ment.*

Illinois Psychiat. J.
2 *Index Neurol. y Psiquiat., Buenos Aires.*
3 *Indian J. Psychol., Calcutta.*
Indiv. Psychol. Bull., Chicago
3 *Industr. Psychol.*
3 *Industr. Psychotech.*
1, 2, 3, 4 *Int. J. Psychoanal., London.*
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., Washington.*
J. Am. Soc. Psychic. Res.
3 *J. App. Psychol., Washington.*
2, 4 *J. Belge Neur. Psychiat.*
J. Child. Psychiat.
J. Clin. Psychol., Burlington.
2 *J. Clin. Psychopath., Montecello, N.Y.*
2 *J. Comp. Neur.*
1, 2, 3 *J. Comp. Psychol., Washington.*
J. Consult. Psychol., Washington.
J. Crim. Law and Criminol., Chicago.
2 *J. Crim. Psychopathol.* [now *J. Clin. Psychopath.*].
2 *J. de Psychiat. Infant* [now *Zeit. f. Kinderpsychiatrie*].
3 *J. Educ. Psychol., Baltimore.*
J. Except. Child.
3, 4 *J. Exp. Psychol., Washington.*
2 *J. f. Psychol. u. Neurol.*
3 *J. Gen. Psychol., Provincetown, Mass.*
2, 3 *J. Genet. Psychol., Provincetown, Mass.*
2 *J. Geront., St. Louis.*
J. Juvenile Res.

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1, 2, 3, 4 *J. Ment. Sci., London.*
1, 2, 3 *J. Nerv. Ment. Dis., New York.*
1, 2, 3, 4 *J. Neurol. Neurosurg. Psychiat., London.*
J. Neuropath. and Psychiat., Leningrad.
1, 2 *J. Neuropath. Ex. Path.*
2, 4 *J. Neurophysiol.*
J. Neuropsychiat. du Pacifique.
2 *J. Neurosurg.*
3 *J. Parapsychol., Durham, D.C.*
2 *J. Personality, Durham, D.C.*
J. of Psychic. Res.
J. Psihoteh.
2 *J. Psycho-Asthen.* [now *Amer. J. Ment. Deficiency*].
1, 2, 3 *J. Psychol.*
J. Psychol., Moscou.
2, 3 *J. Psychol. Neurol., Leipzig.*
2 *J. Psychol. Norm. Path., Paris.*
J. Soc. for Psychic. Res.
3 *J. Soc. Psychol., Provincetown, Mass.*
2 *J. Speech Dis., Danville, Ill.*

Kriminal.
3 *Kwart. Psychol.*

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

Ned. Tijdschr. Psychol.
2 *Neopsichiat.*
2 *Nervenarzt.*
Nerv Child, New York.
3 *Neue psychol. Stud.*
2 *Neurbiol., Pernambuco.*
Neur. a Psychiat., Česká.
Nevrasse.
2 *Nevropath. i. Psikhiat.*
2 *Note e Riv. di Psichiat.*
Now. Psychjar.
Nuova Riv. di Clin. ed Assist. Psichiat.

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

3 *Person. J.*
Pisani.
Polsk. Arch. Psychol.
Prace Psychol.
2 *Proc. Amer. Assoc. Stud. Ment. Def.* [now *Amer. J. Ment. Deficiency*].
2 *Proc. A. Res. Nerv. and Ment. Dis.*
3 *Proc. Soc. Psych. Res., London.*
Prog. Neurol., Psychiat.

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3 *Psichotec.*
Psicoanalisi, Rome.
Psicoter., Cordoba.
Psyche, Cambs., Mass.
Psychiat. Monogr.
2 *Psychiat. en Neurol. Bl., Utrecht.*
2 *Psychiat. et Neurol. Jap.*
2 *Psychiat. Neurol. Wchnschr.*
2 *Psychiat., Washington.*
1, 2 *Psychiat. Quart., Utica, N.Y.*
2, 3 *Psychoanal. Quart., Albany, N.Y.*
2, 3 *Psychoanal Rev., New York.*
1, 2, 3 *Psychol. Abstr., Washington.*
1, 2, 3 *Psychol. Bull., Washington.*
Psychol. Clin.
Psychol. Exch.
3 *Psychol. Forsch.*
Psychol. Index.
2 *Psychol. Monogr., Washington.*
Psychol. Rec.
3, 4 *Psychol. Rev., Washington.*
3 *Psychol. Rev. Monogr.*
Psychol. Stud. Kbh.
Psychol. Stud. Univ. Bp.
Psychol. wychow.
3 *Psychomet., Chicago.*
Psychometr. Monogr.
2 *Psychosom. Med., New York.*
2 *Psychosom. Med. Monogr., New York.*

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

Rass. Neurol. Veget., Firenze.
Rass. Neuropsichiat. Sci. Aff., Salerno.
Rass. Studi Psichiat.
Rev. Argent. Neurol. Psiquiat.
Rev. de Psicoanal., Argentina.
Rev. di Neur. e Psychiat., S. Paolo.
Rev. di Psiquiat., Chile.
Rev. di Psiquiat. y Crim.
Rev. Espan. de Oto-neuro-oftam. y Neurocir.
3 *Rev. Franç. Psychoanal.*
Rev. Ibero-Amer. de Anal. Biblio. de Neurol. y Psiquiat.
Rev. Mex. Neurol. Psiquiat. y Med. Legal., Mexico.
1, 2, 4 *Rev. Neurol.*
2 *Rev. Neurol. de Buenos-Aires.*
Rev. Neurol. Psychiat., Praha.
2 *Rev. Neuro-Psiquiatr., Lima.*
2 *Rev. Oto-Neur.-Oftal. Cir. Neur. Sud-Am.*
Rev. Neuropsiquiatr.
Rev. Psicol. Gen. y Aplic., Madrid.
Rev. Psicol. Pädag.
Rev. Psicoanal., B. Aires.
3 *Rev. Psihol.*
Rev. Psihol. Icor. Aplic., Sibiu.
2 *Rev. Psiquiat. Crim., B. Aires.*
Rev. Psiquiat., Uruguay.
Rev. Psiquiat. y Disc. Con., Chile.
Rev. Psychol., Montreal.
Rev. Sudam. Psicol. Pedag.

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Rev. Tchèque de Neurol. et de Psychiat.
Ric. Psich.
2, 3, 4 *Riv. di Neurol.*
Riv. di Neuro-psiquiat., Peru.
3 *Riv. di Psichol.*
Riv. Ital. di Endocrin. e Neurochir.
2 *Riv. Patol. nerv. ment.*
Riv. Psichol. Norm. Pat., Ferrara.
2, 4 *Riv. Sper. Freniat.*
1 *Rocz. Psychjat.*
2 *Rorschach Res. Exch., New York.*

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

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

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

3 *Z. angew. Psychol.*
Z. Arb. Psychol.
Z. Berufs. des Pflegepers.
Z. Individ. Psychol.
2, 4 *Z. ges. Neurol. Psychiat.*
2 *Z. Kinderpsychiat., Basle.*
3 *Z. Pädag. Psychol.*
Z. Parapsychol.
2 *Z. Psych. Hyg.*
Z. Psychoanalyse, Tokyo.
3 *Z. psychoanal. pädag.*
2, 3 *Z. Psychol.*
Z. Psychother. med. Psychol.
Z. Tierspsychol.
2 *Zbl. Neurochir.*
1, 2 *Zbl. ges. Neurol. Psychiat.*
Zbl. Psychotherap.

ACT. LUSO. ESPAN. DI NEUROL. PSIQUIAT.

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The Serial Sevens Test as a Psychometric Instrument.

By virtue of the frequency with which the Serial Sevens Test has recently been used as an instrument for the rapid screening of mental defectives, the present study has endeavoured to study the relationship between performances of 201 white and 77 negro adult males on the Bellevue-Wechsler (Verbal) Scale of Adult Intelligence (10) and the Continuous-Subtraction examination (7). These men

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ranged in age from 17 to 24 and revealed tested intelligence quotients ranging from 47 to 94. These two samplings, negroes and whites, were selected for study only after psychiatric examinations had revealed the existence of no marked neurological and personality disorders. On the basis of the results obtained here and those reported earlier by other investigators the following concluding statements are made :

(1) For all population samplings reported thus far a low positive coefficient of correlation exists between performance scores earned on a standardized test of general intelligence and the Serial Sevens Test. These coefficients are too low to possess predictive value. Alienation coefficients are above ·90 and suggest that the variables tested in the two sets of scales are relatively independent.

(2) The Serial Sevens Test, accordingly, cannot be used as an abbreviated psychometric examination in the rapid screening of mental defectives. Nor can it be used in the accurate quantification of levels of intelligence. The test does not appear to measure adequately whatever mental functions are tested by the Verbal Battery of the Bellevue-Wechsler Scale.

(3) An average (for 201 white males) success score of 4·0 on the Sevens Test could be earned by any white male aged from 17 to 24 years who has a Bellevue-Wechsler IQ ranging from 55 to 94. For negroes, as tested in this sampling, the IQ range is roughly the same with an average success score of 3·0.

(4) Patterned sequences (see text) are evidenced among the responses of those adjudged to be free from psychiatric disability. No pattern, however, is typical or diagnostic of the ament.

(5) Preliminary study of the optimal ways for the administration of the Sevens Test revealed the need for standardized procedure including especially the use of simple language in setting the task for the examinee.

(6) The present results coupled with those reported by previous investigators indicate that the Serial Sevens Test is restricted in its range of applicability. First, evidence presented by Sherman indicates that error scores do not tend to decrease until an IQ of 90 is reached among the 113 children studied. In the present study only 18 per cent. of those with intelligence quotients between 89 and 94 were able to solve the Sevens problem within a two-minute interval with a maximum of two errors. If the test is to be administered to adults, it would seem advisable only to do so when the intellectual status as quantified by an IQ of 100 or better (Bellevue-Wechsler Scale). Second, the Sevens Test can at best be given only to those of normal intelligence and to those whose educational qualifications (eight grade or better) are such as to insure their knowledge of basic arithmetic processes. If these two restrictions are admitted, then the evidence reported by Bronner *et al.* and Hayman indicate that the Sevens Test is of some value in the detection of psychological deficit.

(7) The wholesale administration of the Sevens Test to consecutive examinees in screening examinations is ill-advised and illustrates one misapplication of the scale. (Author's abstr.)

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The Effect of Anoxia as Measured by the Electroencephalogram and the Interaction Chronogram on Psychoneurotic Patients.

1. Observations on the effect of breathing low oxygen are reported in a series of 67 patients and 42 controls, in whom changes in central nervous system activity were measured by the EEG and changes in behaviour by the interaction chronogram.

2. Most subjects showed a shift in EEG to the slow frequencies during the low oxygen. This was more marked and consistent when the CO_2 was less than ·3 per cent. There was no difference between patients and controls.

3. A decrease in verbal and gestural activity was found in about three-fourths of the subjects. The decrease was greater for the patients than the controls.

4. Subjects with high initial activity while breathing air showed the greatest decrease as a result of low O_2. Subjects with low activity rates in air showed slight decreases and, in many cases, an increase.

5. Subjects with marked changes in EEG tended to show an increase in activity.

6. Four factors are discussed as playing a role in determining the changes in activity due to low O_2.

(*a*) Initial rate of activity.
(*b*) Diagnosis.
(*c*) Electroencephalographic changes.
(*d*) Autonomic activity as measured by heart rate.

(Authors' abstr.)

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Electroencephalographic Patterns from the Base of the Brain.

Electroencephalographic recordings from the base of the brain give valuable supplementary information to data obtained from conventional scalp recordings. Various locations of the deep lead are possible—subsphenoid, spheno-ethmoidal or subfrontal.

Several varieties of basal patterns are described and illustrated. The effect of visual stimulation, overbreathing, drugs, spontaneous and induced electrical discharges in epileptics, and of gross intracranial pathology is described.

In general the basal rhythm response to various stimuli is similar to that of the cortical (superficial) rhythm. Visual stimulation flattens the basal rhythm and blocks the alpha activity. Hyperventilation induces a build-up in size of potentials and a slowing of rhythm, which may be greater or less than that of the cortex. Autonomic drugs (epinephrine and mecholyl) appear to affect base more than cortex. Sodium amytal in amounts sufficient to produce intoxication but not sleep, results in high voltage fast waves in base as well as cortex.

Electrical paroxysms typical of epilepsy usually are more pronounced at the cortex than at the base.

The basal lead is a valuable adjunct in localization of gross intracranial pathology. (Authors' abstr.)

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The Therapeutic Use of Prolonged Sodium Amytal Narcosis.

During the past eight years we have used prolonged sodium amytal narcosis in the treatment of border-line neuropsychiatric disorders. The therapeutic technique is usually so planned as to produce a toxic delirium after the cessation of drug administration. This therapeutic delirium is judged to be reliably restorative and reconstructive. Various degrees of narcoanalysis and narcosynthesis are permitted, but most benefit follows delirious abreaction. All patients to whom the treatment was administered were helped, some more than others. Dissolution of the faulty personality behavior and constructive recasting of the psychiatric problem probably occur through improved physiological rest and a remobilization of thought processes during an irresponsible and impersonal state of psychomotor activity which is temporarily out of volitional control, and is thereafter always reintegrated at a more acceptable level. (Author's abstr.)

Convulsive Shock Therapy in Patients Over Seventy Years of Age with Affective Disorders.

Experience with a group of 30 patients all past 70 shows that convulsive shock therapy is well tolerated by the aged.

Convulsive shock therapy in the aged can be made more safe if curare modification of the convulsion is utilized. The organic defects and diseases of old age are not necessarily contraindications for curare electroshock therapy.

Follow-up studies show that half of this group of patients obtained sustained recoveries or sufficient recovery to remain functional in society.

Evaluation and retreatment of relapses suggest that prompt treatment of recurrences will produce an early remission and prevent prolonged hospitalization.

No conclusions can be drawn regarding the death rate in this group. (Authors' abstr.)

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Sub-coma Insulin and Pentothal Sodium as Aids to Psychotherapy.

1. The technique of combined sub-coma insulin and pentothal narcosis in the treatment of 60 consecutive cases of prolonged anxiety was explained and the results analyzed.

2. Especially encouraging results have been obtained where the anxiety reaction has been superimposed upon a previously stable personality.

3. Although the superficial anxiety is usually all alleviated, if there have been longstanding emotional conflicts, more prolonged psychotherapy is usually necessary to influence them seriously.

4. Sub-coma insulin and pentothal should be looked upon as primarily supportive measures, but definitely serve to promote relaxation and to make the patient more receptive to psychotherapy.

5. It is felt that this form of treatment is practical in cases of prolonged anxiety reaction in civilian practice and is especially applicable to the treatment of this type of case on the wards of a general hospital. (Authors' abstr.)

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

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

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

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

Five hundred neurologically normal persons were studied with reference to the incidence of anisocoria and of differences in the width of the palpebral fissures. Nearly 17 per cent. of the patients showed a slight but perceptible anisocoria. In 4 per cent. the difference in pupillary size was pronounced. Inequality of the

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

Relation of Mental Imagery to Hallucinations.

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

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

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

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

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Relation Between Electroencephalographic and Histologic Changes Following the Application of Graded Force to the Cortex.

A new method for the study of cortical cell change in connection with electroencephalographic deviations is introduced.

Electroencephalographic changes vary with the amount of cortical cell damage within a certain critical range.

Below this critical range cortical cell change occurs without corresponding electroencephalographic deviations.

Within the critical range the amount of electrical and cortical cell change is directly proportional to the amount of force applied to the cortex.

Localized cortical cell damage produces localized electroencephalographic changes.

Histologic changes assume a definite pattern of stratification, according to the amount of force applied to the cortex.

Electroencephalographic changes vary with the amount of force applied to the cortex. Reduction in amplitude is directly proportional to the amount of force delivered. The appearance of slow waves is inversely proportional to the amount of force applied to the cortex.

Unilateral convulsive electrical patterns were produced by the mechanical application of force to the cortex.

An attempt is made to relate the authors experimental results to the clinical findings following trauma to the head. (Authors' abstr.)

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Illinois Psychiatric Society.

The Hostile Dependent Behavior Factor in Rehabilitation of Veterans with Psychoneuroses, etc. *Solomon, A. P.* 777

Loss of Axis-Cylinders in Sclerotic Plaques and Similar Lesions.

Studies by means of the Bodian silver stain for axis-cylinders, which is uniquely specific and especially adapted to the purpose, showed that some degree of damage or destruction of axons occurred in all the sclerotic plaques investigated.

In all but two of the plaques examined the axis-cylinders were reduced to a small fraction of the normal number.

The pathologic appearance of surviving axis-cylinders was more striking in fresh plaques than in old ones.

Similar changes, of about the same degree of intensity, were seen in some other lesions of vascular origin, not sufficiently intense to cause complete necrosis.

The clinical correlation of these observations, especially with respect to treatment, is discussed. (Authors' abstr.)

Electrocerebral Shock Therapy: A Reconsideration of Former Contra-indications.

In a series of 2,181 intramural and extramural patients receiving electric convulsive treatment many presented conditions hitherto considered contra-indications to convulsive shock therapy, such as cardio-vascular disease with and without hypertension, pulmonary tuberculosis, pulmonary fibrosis, skeletal disorders, cerebral arteriosclerosis, general arteriosclerosis, advanced age and organic disease

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of the central nervous system in the form of syphilitic meningoencephalitis. With the exception of one death, that of a patient with known severe cardiac disease occurring four weeks after a course of three treatments, there were no complications of moment, and the results from the psychiatric standpoint were more than gratifying. A second death occurred in a man, aged 44, who offered no contra-indications to treatment. Representative cases are cited in which the aforementioned contra-indications existed and treatment was safely and successfully carried out.

It is felt that the former arbitrary and rigid contra-indications to electric convulsive therapy should be relaxed so that many more persons may derive the benefits to be obtained from such treatment. However, there should be no relaxation in the exercise of proper caution in the selection of patients for treatment, the choice to be determined by the overall physical status of the patient, the severity of the presenting psychosis, the immediacy of the need of treatment and the promise of a favourable result. (Author's abstr.)

Electroencephalographic Study of Electric Shock Therapy: Psychotic Patients Treated in a United States Naval Hospital.

In electroencephalographic studies on a series of 106 psychotic men at a naval hospital given varying courses of convulsive therapy with unidirectional current, the following observations were made:

1. The preshock electroencephalograms showed no more abnormalities than are found in comparable normal control records.

2. With shock treatment almost all the patients manifested disturbances in cerebral physiology easily demonstrable in the electroencephalogram. The degree of change varied roughly with the number and the frequency of treatments, but there were many noteworthy exceptions.

3. In the majority of cases the electroencephalogram showed a considerable or a complete return to normal within two weeks after cessation of treatment. In a few cases the abnormalities were more persistent.

4. A careful comparative analysis of the electroencephalograms of the recovered patients (73 per cent,) failed to reveal any significant difference from the records of the patients who did not recover. It is concluded, therefore, that the electroencephalogram does not offer a prognostic guide in electric shock therapy.

5. Likewise, no significant correlation was found between the disappearance or persistence of individual psychotic symptoms and the electroencephalographic pattern, or between the degree of sensorial disturbance and memory impairment and the degree of abnormality in the brain waves. It is thus concluded that the obvious changes in cerebral physiology registered in the electroencephalogram do not give a direct clue to the mechanism of healing in electric shock therapy.

(Authors' abstr.)

Electroencephalographic Studies Following Electric Shock Therapy: Observations on Fifty-one Patients Treated with Unidirectional Current.

Fifty-one patients admitted to the New Hampshire State Hospital received varying numbers of electric shock treatments administered by a machine delivering unidirectional, fluctuating current. Brain waves were recorded prior to treatment, four days after the last treatment and, again, fourteen days thereafter. An analysis of the records revealed the following facts:

1. The highest percentage of abnormal records was obtained in manic depressive patients, closely followed by that for the schizophrenic group. Patients with involutional psychoses and psychoneuroses demonstrated significantly more normal preshock records.

2. In general, an increase of abnormality in the electroencephalographic record was observed after treatment, characterized by increase in voltage, decrease in frequency and appearance of various other abnormalities.

3. The increase in abnormalities was usually directly proportional to the number of treatments.

4. The electroencephalograms of a large percentage of patients receiving less than ten shock treatments had returned to normal fourteen days after the last treatment. Of the group receiving more than ten treatments, a large proportion retained electroencephalographic abnormalities in this recording.

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5. In the group receiving ten treatments or less, the electroencephalographic changes seemed to be less pronounced after shock treatment when unidirectional current was used than when alternating current was used.

6. The age-groups between 15 and 24 years and between 45 and 62 years showed a much higher percentage of grossly pathologic electroencephalograms fourteen days after treatment than did the middle-aged group, between 25 and 44 years.

7. A small percentage of patients showed "improvement" in the electroencephalogram after electric shock treatments as compared with their preshock record, a fact which could not be explained and which was clinically unrelated to improvement.

8. Post-shock electroencephalograms closely resembled the records of epileptic patients. However, the breakdown during hyperventilation so characteristic of the electroencephalograms of epileptic patients was rarely observed in the records of patients receiving shock treatment.

9. The following clinical relation between various changes in the brain waves and the psychiatric picture were found: (*a*) An abnormal preshock electroencephalogram usually indicated that a longer course of treatment was necessary in order to achieve clinical improvement. (*b*) A highly abnormal electroencephalographic record fourteen days after the last treatment was usually found with patients requiring further hospitalization. (*c*) A normal preshock electroencephalogram promised a better clinical result from electric shock treatment than an abnormal preshock record. (Authors' abstr.)

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The Hippocampus and the Sense of Smell.

On the basis of data from the literature, a review is given of the anatomical and physiological aspects of the hippocampus of mammals, particularly as regards its alleged association with the sense of smell.

The olfactory fibres from the olfactory bulb and the anterior olfactory nucleus have not been traced to the hippocampus proper. A few fibres are found to the so-called anterior continuation of the hippocampus, which is rudimentary in mammals. The olfactory fibres appear to end only in the peri-amygdaloid and prepiriform area of the so-called piriform lobe, whereas it is doubtful if any reach

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its posterior part, the entorhinal area (which in man occupies most of the gyrus hippocampi). The afferent fibres to the hippocampus arise mainly from the entorhinal area, small additional contributions come from the posterior part of the cingular gyrus and probably from the induseum griseum.

All efferent fibres from the hippocampus leave the latter as the fornix. Some of its fibres end in the hypothalamus, the pre-optic region and the septal areas and the habenula, but most of them go to the medial and part of the lateral mammillary nucleus. From this a massive pathway leads through the anterior thalamic nucleus to the cingular gyrus.

From a structural point of view the hippocampus must be considered a typical effector structure, transmitting but a modest proportion of impulses ultimately olfactory in origin, integrated with others the nature of which is not yet known, to the cingular gyrus and to a lesser extent to the hypothalamic, pre-optic and septal areas and the habenula. All the latter connections are probably concerned in influencing subcortical reflexes, olfactory and others, as well as hypothalamic activity. The projection to the cerebral cortex is not understood from a functional point of view. It may be concerned in cortical control of autonomic functions.

Recent physiological experiments have yielded no support for the conception that the hippocampus has important relations to the sense of smell in mammals, nor does clinical evidence seem to favour this view. (Author's abstr.)

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The Adolescent in the Factory.

1. The majority of the adolescents interviewed had been eager to go to work on leaving school at fourteen, because they regarded working as :

(*a*) A new experience, about which there was lively curiosity, or

(*b*) A symbol of growing up, as conferring the status and privileges of the adult, or

(*c*) An opportunity to earn money, which itself was regarded as conferring the prestige and power of the adult, or

(*d*) An opportunity of a fresh start, after failure to make a satisfactory adjustment at school.

2. Owing to ignorance and economic pressure, together with an almost complete lack of guidance, they had been able to exercise little choice of work, with the result that their first eagerness had often been blunted very soon by frustration or disillusioning experiences in the first job.

3. The most prevalent attitudes to work and the work authority revealed by the adolescents in the two factories investigated were those of dissatisfaction and resentment.

4. Neither youth nor sex was found to be the decisive factor in shaping these attitudes. On the contrary, among both sexes the average number of complaints significantly rose with increasing maturity.

5. The dissatisfaction and resentment arose in the work situation itself, and were due to frustration of the adolescent's desires for satisfactory physical development, for security of social status in the factory, and for the acquisition of satisfactory skills in work.

6. These frustrations were attributed by the adolescent workers to physical conditions at work, to long hours, and to mass-production methods in use in these factories, for all of which they had been unprepared, owing to their ignorance of modern factory conditions. They contrasted all these conditions unfavourably with those at school, where the authorities had obviously been concerned about their physical welfare, where hours had been comparatively short, and where they had been given every opportunity to learn.

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7. For all these frustrations at work these adolescents blamed the work authority, because in it they had encountered, for the first time, an organized body of adults who, unlike the school authority, seemed to them to care nothing for their welfare.

8. They did not outgrow these feelings of dissatisfaction and resentment because, for the adolescent as a worker in this type of factory, time brings no such hope of developing individual capacities to maturity as it brings him in the wider field of experience outside. In such a work situation the adolescent, deprived of the opportunity to grow up vocationally, feels a sense of waste and frustration which is cumulative, and may be responsible for the attitude of aggression towards the work authority which is the underlying cause of many modern labour troubles.

(Author's abstr.)

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The Clinical Differentiation of Senile and Arteriosclerotic Psychoses.

Senile psychoses are commoner in women than men. They tend to begin later and to last longer than arteriosclerotic mental disease. The onset is gradual and the course steadily progressive, leading eventually to profound mental deterioration.

Arteriosclerotic psychoses are commoner in men than women. They may begin gradually or abruptly. The acute onset is marked by a confused or delirious state, with or without neurologic accompaniments. If this does not terminate fatally, it tends to subside, leaving as a rule a certain degree of mental deterioration, but occasionally leading to a good remission. When the onset is gradual, the picture is similar in many ways to that of senile dementia, both disorders presenting signs of intellectual failure, frequently with emotional reactions and disturbed behaviour. In arteriosclerotic psychoses, however, attacks of confusion may occur at any point, thereby producing a more stormy course with fluctuations in the severity of the mental disturbances.

The intellectual impairment is usually more pronounced in senile than in arteriosclerotic conditions. An exception to this is provided by the paranoid type of senile psychosis, in which the intellectual faculties may be relatively well preserved. However, outspoken and chronic paranoid syndromes are seldom noted in arteriosclerotic disorders. Severe hypochondriacal-like symptoms are often an early feature of the latter, but are not ordinarily prominent in senile psychoses.

While gross neurologic changes are characteristic of arteriosclerotic psychoses, they often fail to occur in the earlier stages, and they may be completely lacking. Cardiac disturbances are common in arteriosclerotic patients. Other characteristic but less frequent symptoms are headache, dizziness, syncopal attacks, convulsive seizures and explosive laughter or weeping.

Sclerosis of the peripheral arteries occurs with equal frequency in the two psychoses. Hypertension is almost as common in senile as in arteriosclerotic patients, though the latter are more apt to show increased diastolic pressures.

Diagnostic problems involving other mental disorders are discussed. The

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commonest sources of error are provided by psychoses associated with a variety of toxic or somatic conditions, some of which may be particularly difficult to separate from arteriosclerotic mental disease. Many mistakes owe their origin largely to an uncritical attitude whereby one tends to forget that mental illnesses which are neither arteriosclerotic nor senile are common in later life. (Author's abstr.)

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Differential Test Responses of Normals and Mental Defectives.

The present investigation seeks to repeat and enlarge upon current studies of differential test responses of normal and defective subjects of equal mental age. Responses on the 1937 Stanford-Binet Scale, Form L, obtained from 441 defective subjects, were compared with responses of 1,326 members of the standardization group of the scale. A chi-square method of analysis revealed that thirty items of the scale differentiated reliably between the two groups. On eleven of these items the defectives were superior, and on eighteen of the items they were inferior. On one item the younger defectives were superior while the older defectives were inferior. An analysis of the differentiating items casts considerable doubt upon the common belief that defective subjects are superior in rote memory items. On the contrary, rote memory items were relatively harder for defectives than for normals of equal mental age.

Three hypotheses were advanced to account for the results: (1) That the easy items were dependent upon practical experience and therefore could be expected

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to be simpler for the older defectives; (2) that the difficult items involved more freedom from intrapersonal rigidity, as defined by Kounin, and hence might be hard for the older defectives; and (3) that the difficult items were more heavily loaded with the general first factor isolated by McNemar on the Stanford-Binet Scale. Evidence is cited suggesting that the first two hypotheses are not adequately supported by the data in the present investigation. The third hypothesis receives support when mean factor loadings of easy and difficult items are compared. It may be concluded that one explanation of the relative difficulty of certain Stanford-Binet test items for defectives, as compared with normals of equal mental age, is that these items are more heavily saturated with the general first factor which has been statistically isolated. (Authors' abstr.).

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The Test Performance of the Brain Injured.

This paper is a preliminary report of an investigation of the performance of fifty brain injured patients on the Bellevue Intelligence Scale, Form 1. An item analysis is made of the eleven subtests. Pertinent data are presented and discussed. Emphasis is placed on the value of using the information subtest weighted score as a basal point for deviation analysis and patterning.

The findings indicate that the brain injured do poorly on the performance items as compared with the verbal items. Moreover, the full scale score reflects a depressed level of efficiency. The sequelae of brain damage by bullet or shrapnel have both overall effects and specific function impairment. The role of personality disturbance accompanying brain damage is indeterminate but effective.

Information, comprehension, and vocabulary are most resistant to damage. Picture completion and similarities withstand to a lesser extent the onslaught of encephalopathy. Arithmetic and picture arrangement fluctuate too widely for definitive evaluation. Most seriously and consistently affected are digit span, digit symbol, block design and object assembly. The specific functions involved in each are discussed.

The mean information weighted score is significantly higher than eight of the ten mean weighted scores as compared with only four reliable deviations from the mean vocabulary weighted score. The critical ratio values are significant enough to establish information as the most feasible basal point for test profiling of the brain injured.

The results also suggest that time and shift play an especially important part in determining function efficiency. (Author's abstr.)

Psychological Types and Changes with Age.

In a sample of 500 males and 500 females Jung's psychological types were examined for age-changes in successive five-year age groups. The notable inferences are that there is progressive though trivial decrease in the feeling-function, definite decrease in extraversion, and most marked decrease in the intuition-function. Or, conversely, it can be said that, as people grow older, they tend to use their thinking slightly more than in youth, to develop their introverted side more clearly, and to use their sensation-function considerably more than at earlier ages. (Author's abstr.)

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The Use of Certain Psychological Tests in the Evaluation of Brain Injury.

A group of 92 brain injured and 108 control patients were given the Hunt-Minnesota Test for Organic Brain Damage. The groups were compared in regard to T scores, visual and auditory raw scores, learning and retention patterns, and interpolated tests. In addition each group was divided into three sub-groups on the basis of the 1937 Stanford-Binet Vocabulary test scores and were again compared in the way mentioned above. No factors were found which are of practical value in differentiating between the groups.

A comparison of the Shipley and Hunt tests was made. The results indicate that little relationship exists between the scores obtained on the two tests.

(Authors' abstr.)

J. GENET. PSYCHOL.

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The Efficacy of Electroshock Therapy in Preventing or Shortening Hospitalization.

This report deals with 242 patients treated with electroshock therapy in the office of the private psychiatrist. Of this number 152, or 63 per cent., were suffering from affective disorders and 77, or 31·5 per cent., from schizophrenia ; 127 patients, or 52 per cent., recovered ; 191 patients, or 79 per cent., benefited from treatment.

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Fifty-one patients, or 21 per cent., of the total were unimproved. Of these 51, 23 patients discontinued treatment prematurely. Fifteen patients, or 6 per cent., required subsequent hospitalization. It is the thesis of this paper that electro-shock therapy, given at the psychiatrist's office, prevents hospitalization in many cases and that such avoidance of commitment is of real benefit to the patient. (Author's abstr.)

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Distribution of Carbonic Anhydrase in the Pallium in Nineteen Cases of Paretic Neurosyphilis.

From a study of the distribution pattern of carbonic anhydrase by multiple determinations in the right and left hemispheres in the brains of 19 patients with paretic neurosyphilis, 11 were found to show marked irregularities in the enzyme content ; 8 did not show this tendency.

The 11 brains showing irregularities in distribution were from patients whose spinal fluid findings were still strongly positive, although 5 had received long and intensive treatment.

Of the 8 cases in which irregularities in distribution were not found the spinal fluid findings had either become negative or had shown substantial improvement before death.

Of the 8 cases in which differences in carbonic anhydrase content were not found and in which there was serologic improvement, 5 showed no clinical improvement. The 5 brains from these patients showed low uniform content of carbonic anhydrase, the pattern of which lacked the frontal occipital contour which to date is associated with mortality. (Authors' abstr.).

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Further Localization and Analysis of Adrenergic Synaptic Inhibition.

1. The inhibitory action of adrenaline on sympathetic ganglia is localized to the synapses, and sympathetic fibers are shown to be unaffected.

2. When the synaptic action of adrenaline is followed without interruption (by continuous recording or continuous inspection on a suitable viewing screen)

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from injection to the development of full effects, it is evident that the initial action is an inhibition that is not preceded by facilitation.

3. The inhibitory action is interpreted as a primary mechanism reciprocating with the cholinergic excitatory mechanism at sympathetic synapses. A " post-inhibitory" facilitation is described and interpreted as a secondary event comparable to the " rebound " phenomenon, in the production of which the ganglionic ischemia produced by adrenaline may play a role. The interval between administration of adrenaline and the recording of effects will determine whether the primary or secondary effect will make itself apparent as the first recorded action.

4. The synaptic inhibitory action of adrenaline is demonstrated in all types of sympathetic ganglia. The action is, therefore, regarded as a generalized one on adrenergic neuro-neuronal inhibitory junctions. This enhances its importance as a potential physiological mechanism that could participate in synaptic transmission and constitute the basis for a " self-limiting homeostatic mechanism." It does not appear possible that the synaptic action of adrenaline can play any but a protective role in circulatory shock.

5. It is pointed out that it is essential to stimulate sympathetic nerves with fluid, non-polarizable electrodes if quantitative results are to be obtained, unless sufficiently supramaximal shocks are resorted to. Also spontaneous facilitation is apt to occur in sympathetic ganglia unless the stimulus rate is kept low and a good circulation maintained. (Authors' abstr.)

Effect of Parasympathetic Drugs on the Conditioned Response.

The effect of increased intrinsic acetylcholine on the central nervous system has been studied by means of the conditioned response. Eserine, prostigmine, atropine, magnesium sulfate and pilocarpine were used. Only eserine and prostigmine affected the conditioned response ; the latter appeared to alter the response by producing discomfort, due to increased intestinal activity. Eserine abolished the conditioned response for as long as two hours, presumably due to the increased acetylcholine in the brain. Magnesium sulfate and atropine each prevent the action of eserine. Pilocarpine exerts a transitory depression and later may facilitate the conditioned response.

Acetylcholine exerts a profound effect on the central nervous system, as indicated by the extinction of the conditioned response—but the mechanism for this action remains obscure. (Authors' abstr.)

Acetylcholine and Neuromuscular Transmission.

When complete block of neuromuscular impulse transmission is produced by soaking the frog's sartorius in 1 : 500,000 acetylcholine in the presence of 1 : 100,000 prostigmine, a nerve impulse still sets up an endplate-potential. With conditions just critical for neuromuscular block, the ACh e.p.p. is slightly larger than the " curare endplate-potential " and has a time course resembling that of the " curare-prostigmine endplate-potential."

The endplate-potential set up by rapid repetitive stimulation exhibits on cessation of stimulation quite discrete fast and slowly decaying components. The slow component is small with the curare e.p.p., and is selectively increased by prostigmine. It is also large with the acetylcholine endplate-potential.

Evidence is presented in support of the hypothesis that prostigmine abolishes the only means for rapid destruction of acetylcholine. The possible mechanism of acetylcholine block is discussed. (Authors' abstr.)

Acetylcholine and Synaptic Transmission in the Spinal Cord.

The hypothesis that acetylcholine (ACh) mediates synaptic transmission has been tested with the frog's spinal cord by investigating the effects produced by investigating the effects produced by abolishing cholinesterase activity by prostigmine (3 or 6×10^{-5} M) and then soaking the cord in strong ACh solutions (up to 6×10^{-3} M or even $1{\cdot}2 \times 10^{-2}$ M) in addition.

Prostigmine (like eserine) has no detectable effect on the synaptic potentials set up in the anaesthetized spinal cord by dorsal root volleys even when they are

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rapidly repetitive. The strong ACh solutions have about the same depressant action on the synaptic potential as is exerted on the endplate potential by 1/500 times that concentration of ACh.

In the discussion it is argued that, since the cholinesterase will have been virtually inactivated, these observations refute the hypothesis that ACh mediates synaptic transmission in the frog's spinal cord. (Author's abstr.)

Differential Spinal Block. III. The Block of Cutaneous and Stretch Reflexes in the Presence of Unimpaired Position Sense.

1. Position sense and stretch reflex afferents are probably mediated by separate groups of fibers.

2. Under the influence of a differential spinal block, the abdominal, knee-kick and ankle-jerk reflexes are abolished at a time when touch, position sense, vibratory sense and motor power are unimpaired.

3. If the interpretation is correct that the differential blocking effect in the subarachnoid space depends upon the degree of myelination and axon diameter, then it can be concluded that the afferent fibers of the above mentioned reflexes are subserved by relatively small, unmyelinated fibers.

4. If the interpretation is correct that tendon reflex and position sense afferents are of the same axon diameter and myelinization, then it can be concluded that these latter are not the only factors upon which the differential effect in this type of spinal block depends. (Authors' abstr.)

Viscosity Changes in Axoplasm under Stimulation.

1. Axoplasm flows from all cut squid giant axons not stimulated above threshold after varying periods of elapsed time.

2. Axoplasm does not flow from any cut squid giant axon stimulated above threshold.

3. Failure of axoplasm to flow from cut squid giant axons stimulated above threshold indicates that the stimulating current has induced an increase in the viscosity of the axoplasm within the stimulated axons.

4. The resumption of axoplasm flow from cut squid giant axons within varying periods of elapsed time following cessation of stimulation just above threshold indicates that the process which induced the viscosity increase in the axoplasm is reversible.

5. The reversible changes of viscosity observed in axoplasm under stimulation indicate that the biochemical mechanism involved is probably gelation-solvation. (Author's abstr.)

Electrical Activity in Frog Spinal Cord.

1. In frogs, the isolated second segment of the spinal cord which remains in connection with the forelegs through the second spinal nerves manifests electrical activity. This activity is extremely irregular and differs from that of the intact cord by the predominance of slow waves.

2. A similar electrical activity can be registered from two or more segments of the spinal cord, providing they remain connected with the peripheral organs.

3. When the second spinal nerves, supplying the forelegs, are severed, the electrical activity of the isolated 2nd segment of the spinal cord diminished considerably. There remains the actual spontaneous electrical activity proper to the spinal cord, which activity, however, is a much weaker one. The same was observed after severing the nerve roots of the whole (or parts) of the spinal cord.

4. There exists a continuous interaction between the medulla spinalis and the peripheral organs, and also when the latter are in a state of complete rest.

5. The brain distinctly influences the electrical activity of the spinal cord; when the brain is eliminated electrical activity of the completely isolated spinal cord is reduced. (Authors' abstr.)

Inhibition of Cholinesterase by Di-isopropyl Fluorophosphate, Physostigmine and Hexaethyl Tetraphosphate in the Roach.

1. By means of a manometric technique it has been determined that di-isopropyl fluorophosphate (DFP), physostigmine salicylate, and hexaethyl tetraphosphate (HTP), in the concentrations which are toxic to the roach, *Periplaneta*

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americana L., inhibit the cholinesterase activity of roach nerve cord *in vitro* and *in vivo*.

2. The approximate range of concentrations over which these effects were observed were: for DFP, 1×10^{-6} to $1 \times {}^{-4}$ M; for physostigmine, 1×10^{-9} to 1×10^{-4} M; for HTP, 1×10^{-7} to 1×10^{-6} M.

3. With DFP it was found that the percentage of mortality after injection was paralleled closely by the degree of enzyme inhibition which resulted from the same dosage. The comparisons with physostigmine and HTP were less satisfactory.

4. The following LD_{50}s were determined for the compounds by the injection in aqueous solution: DFP, 5·2 mgm. per kgm.; physostigmine salicylate, 15·6 mgm. per kgm.; HTP, 6·75 mgm. per kgm.

5. Although the possibility of other toxic mechanisms for these agents is not excluded, it is concluded that their toxicity is largely a function of their anti-cholinesterase activity. The significance of the findings for certain theories of nervous transmission is discussed. (Authors' abstr.)

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Electrical Investigation of the Monosynaptic Pathway Through the Spinal Cord.

The electrical events involved in transmission through a monosynaptic pathway of the spinal cord (quadriceps afferent fibres to quadriceps motoneurones) have been directly recorded by means of a fine needle electrode (insulated to the tip and inserted into the quadriceps nucleus) and an indifferent electrode. The focal potentials so obtained have been subjected to experimental analysis and to interpretation in the light of the theory of focal recording. It has thus been possible to identify the three main components of the complex electrical potential wave set up in the quadriceps nucleus of the spinal cord by a volley in the quadriceps afferent fibres: The diphasic spike set up by presynaptic impulses propagating to their terminals; the synaptic potential of the motoneurones; the spike response of the motoneurones when they initiate the discharge of an impulse.

The focal potential is simplified by making the orthodromic volley small and by deep anaesthesia. Both these procedures eliminate not only the spike responses of the motoneurones, but also the action on them of impulses relayed through interneurones. The focal potential then is produced by a virtually synchronous volley of impulses in the presynaptic terminals and the resulting synaptic potential of the motoneurones, and it has a standard time course. The synaptic potential begins 0·3 to 0·45 msec. after the arrival of the presynaptic impulses, and it rises to a rounded summit in about 1 msec., thereafter decaying approximately expotentially with a half-time of about 1·5 msec.

The synaptic potential recorded from the emerging ventral root has an identical synaptic delay, but a much slower course of rise and decay. It is shown that this divergence should occur if both potentials were produced by a soma depolarization having an intermediate time course.

The excitability of the motoneurones before and during the synaptic potential has been tested by direct and by antidromic stimulation. No significant change is detectable during the early part of the synaptic delay, but there is an abrupt rise of excitability slightly preceding the rise of the synaptic potential. This excitability then decays more slowly than the focal synaptic potential, but possibly with much the same time course as the soma depolarization. It is shown that

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these excitability changes agree with those disclosed by synaptic excitation (the familiar facilitation curve), and that all three may be attributable to the synaptic potential. Thus even direct recording from the synaptic region reveals no post-synaptic excitatory process other than the synaptic potential and the soma spike potential initiated thereby.

All the observations agree closely with the predictions of the electrical hypothesis of synaptic transmission. (Authors' abstr.)

Cerebral Regulation of Motor Co-ordination in Monkeys Following Multiple Transection of Sensorimotor Cortex.

1. Multiple intersecting knife cuts were made in the cerebral cortex of monkeys throughout the sensorimotor arm field with overlap into neighbouring cortical areas. These incisions extended roughly through the gray mantle in a vertical plane so as to interrupt and distort all patterns of horizontal intracortical transmission either of definitive excitations over neuronal pathways or of mass intercellular electrical currents. At the same time the cuts left intact the interconnections between separated cortical points via fibers through the medulla.

2. When the incisions were confined to the exposed cortex and extended only as deep as the upper third of layer VI without encroaching on the white matter, the effect on motor co-ordination was negligible. Only a slight and transient depression of function resulted when such incisions were extended into the depths of the fissures. Symptoms of functional depression became increasingly apparent as the incisions, especially in the precentral motor area, were made deep enough to invade the medulla. Nevertheless, when cuts extending into the white matter completely through the transition zone in the lower part of layer VI were placed throughout the sensorimotor arm area, including the depths of the fissures and with extensive overlap into bordering cortical fields, no impairment of motor function could any longer be detected as early as three and one-half weeks after operation. With the electrostimulable foci for movement of shoulder, elbow, wrist, and digits as well as the corresponding sensory points permanently separated from each other as described, there was no inco-ordination in arm and hand movements, reflex, or voluntary, nor did brief tests indicate any deficiency in capacity for motor learning. Typical motor reactions were elicited by electrical stimulation of the partitioned motor area following functional recovery, and typical paralysis resulted thereafter upon its mass removal.

3. The functional symptoms which were observed were characteristic entirely of depression and afunction rather than of positive disorganization, and they appeared to be correlated primarily with invasion of the white matter.

4. The results fail to confirm theories of brain function which have assumed that horizontal intracortical transmission either of discrete excitations or of mass field forces plays any major or essential role in cerebral organization.

(Author's abstr.)

Single Fibre Analysis of Inhibition and the Polarity of the Retinal Elements.

Single fibre reponses have been isolated from the nasal region of the cat's retina with the micro-electrode technique and tested by illumination and polarization of the retina between fixed electrodes.

The pure on-elements respond to threshold cathodal polarization with an on-effect. An increase of current strength by some 30 per cent. elicits a threshold anodal off-effect.

The pure off-elements (inhibited by light) have opposite polarity. They respond to cathodal polarization at the threshold with an off-effect, to anodal stimulation of the same strength with an on-effect (not elicitable by light).

The on-off-elements are either " cathodal " or " anodal " depending upon their off/on-ratio determined by illumination at threshold strength. They are held to be combinations of on-paths and off-paths.

The results form the basis of a simple explanation of the nature of inhibition in the retina in terms of the horizonal and amacrine cells. (Authors' abstr.)

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Colour Sensitivity, Contrast and Polarity of the Retinal Elements.

The micro-electrode technique and the cat's retina have been used for a first analysis of the spectral sensitivity of well-isolated retinal elements during anodal and cathodal polarization. It was found that, depending upon the polarity, different spectral regions were enhanced or depressed, so that polarization proved a convenient and very direct method of colour analysis.

The on-elements were sensitive to short wave-lengths only, the off-elements to both long and short wave-lengths ; the on-off-elements had humps or depressions in various regions. The regions in which enhancements or depressions chiefly occurred were (in the order enumerated) 0·520, 0·600, 0·470 and 0·570 μ, the humps in 0·600 μ being particularly large.

The on- and off-components of the isolated spike of an on-off-element were often differentially sensitive to " contrasting " regions of the spectrum, suggesting that the two components are running indifferent but adjacent and well-synchronized fibers. (Author's abstr.)

The Projection of the Frontal Lobe on the Hypothalamus.

By the method of physiological neuronography, discrete projections have been demonstrated from area 6a of the cortex to the mammillary nuclei, the lateral hypothalamic area and to the posterior hypothalamic area. Projections have been demonstrated to the supra-optic and paraventricular nuclei from specific areas of the frontal lobe and the orbital surface, the latter also projecting to the posterior hypothalamic area. (Authors' abstr.)

Respiratory Effects from Stimulation of the Afferent Vagus Nerve of the Monkey.

Electrical stimulation of the afferent vagus nerve in the monkey produces at low stimulus frequencies and low intensities a weak inspiratory reaction. By increasing either the intensity or the frequency of the stimuli, the weak inspiratory effect is converted into one of a strong expiratory pattern. The principle of a frequency-conditioned reversal in vagal respiratory reflexes applies for the monkey as well as for cats, dogs and rabbits. A distinction has been made between the specific vagal respiratory effect and a non-specific acceleration of breathing which may be due to simultaneous stimulation of chemoreceptor or pain fibres.

(Author's abstr.)

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A Mid-Brain Syndrome Following Head Injury.

Nine cases of severe closed head injury with severe signs of mid-brain injury are reported. The dominant clinical signs were cerebellar, and included severe dysarthria and disturbance of balance. The cerebellar signs were usually most pronounced on one side, and the limbs of the side showing the maximum ataxia tended also to have increased tendon reflexes, Parkinsonian-like tremor, and, in one case, sensory loss suggesting injury to the medial fillet. These signs are thought

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to indicate injury to the mid-brain above the decussation of the superior cerebellar peduncles. Additional signs of mid-brain damage were oculo-motor and pupillary disturbances. In at least one case there was early rigidity of all four limbs.

In two cases air encephalography disclosed a marked dilatation of the aqueduct of Sylvius. (Authors' abstr.)

An Outbreak of Atropine Poisoning.

Clark (1940) states that atropine paralyses parasympathetic nerve endings by inhibiting acetylcholine, and that it has a variable stimulating action on the sympathetic, largely masked by the dominance of the action on the parasympathetic endings. Moderate doses produce cerebral stimulation, and there is stimulation of the lower motor centres of the brain. The action is known to be prolonged.

The dose of the liquor is 0·5 to 1 minim, that is 1/200 to 1/100 of a grain of atropine sulphate; 0·5 gr. has proved fatal, but, in a most exceptional case, a dose of 15 gr. was survived. Susceptibility varies enormously. No case in this series had as much as 1 gr.

The acute signs and symptoms are dryness of the skin and secretions, dizziness, impaired vision, dilated pupils, and greatly increased pulse rate, with some increase in respiratory rate and a slight rise of temperature. Excitement, garrulity and restlessness follow, and may lead on to delirium with hallucinations and finally coma. Epileptic attacks may occur, with paralysis of medullary centres. Munns (1929), writing of children under a month old, wonders if the heat-regulating centre is affected.

Young children are known to tolerate its action well, and sensitivity increases with age. Metivier (1935) describes an unusual reaction in a woman of seventy-four, who developed excitement and pleasing hallucinations after being given atropine eye drops. Carter (1940) describes the case of an old man of seventy-three who took 1·2 gr. of atropine. Treatment was not started for ten hours, when convulsions commenced. There was coma, dilated and fixed pupils, retention of urine, dry mouth, stertor, a rapid pulse, and spasticity and profuse perspiration. The spasticity is interesting in view of the rigidity in the attacks described above. Carter's patient was persistently trying to get out of bed and was hallucinated, picking at the bed clothes and later complaining of blurred vision. On the second day he was elated, excited, very talkative, and complained of headache. He had recovered by the fourth day. Concerning the variation in pupillary size, it is interesting to recall the findings of Levine and Schilder (1942) in catatonics. After the instillation of atropine they noted in a proportion of these an inconstancy of pupillary reaction to light and before fixation, suggesting an autonomic imbalance with parasympathetic dominance.

In view of the comparative smallness of the dose of atropine in the cases reported here, and the fact that the prescription was spread over a period of up to ten days, the conclusion can hardly be escaped that the narcotic not only masked the action of the atropine effectively, but also in some way reduced its excretion, so that at the end of treatment an effect was rapidly produced as if something like the total atropine given was acting as a single dose. There was no evidence of renal damage, but there may have been selective changes in kidney function. The striking nature of the parasympathetic-sympathetic swings, which gradually grew in intensity following the cessation of treatment, suggest a " blocking " of hypothalamic cells with dial, followed by a sudden invasion of atropine as the dial was excreted.

Mental illnesses indistinguishable from schizophrenia have been produced by the events here described. These cases closely simulated catatonic excitement, and four cases showed the almost pathognomonic " thought reading and influence by external agencies " of schizophrenia. Daube (1942) has described four cases of " pervitin " psychosis with a general picture of paranoid ideas, illusions, hallucinations, restlessness, irritability, and pronounced anxiety. Some patients were euphoric. These symptoms are similar to those described in the present paper, and suggest a non-specificity in the causal agents which, acting on cortex or mid-brain, or both, can produce schizophrenia-like reactions. Ivy and Goetzl (1943) also have described the excitement produced by " pervitin," and benzedrine-like substance. The strong resemblance to schizophrenia produced by mescaline intoxication which was described by Stockings (1940) is closely paralleled by the cases

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described in this paper. The cortical effects of atropine must not be forgotten, but it is tempting to postulate that the dial facilitated a preponderating effect on the hypothalamus. The autonomic disturbances, and the unusual resemblance to insulin coma in one case, suggest a hypothalamic intoxication producing an illness indistinguishable from some forms of schizophrenia. Insulin acts primarily on the parasympathetic, presumably causing a pendulum over-action of the sympathetic and waves of adrenaline secretion. Here the parasympathetic may be paralysed, possibly freeing the sympathetic, or the actual hypothalamic cells may be disturbed in their action. (Author's abstr.)

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Lesions of the White Matter of the Central Nervous System.

A detailed histopathologic study was made of cases of encephalopathy following chemotherapy, brain injury, cerebral fat embolism, inflammatory disease of the nervous system and carbon monoxide exposure where the brunt of the disease fell on the white matter. A characteristic vascular alteration, described under the heading of *vasoparalysis*, was demonstrated in many of these cases. *Vasoparalysis* was confined chiefly to the veins and capillaries of the white matter.

The retarded circulation interfered with an adequate supply of nutrition to the vessel wall itself; if the alteration was severe enough and of prolonged duration, there occurred degeneration of the vessel wall which led to increased permeability. This mechanism would account for edema and hemorrhage, which were frequently observed to be confined to the white matter.

Different regions of the central nervous system are characterized by differences in pattern of their blood supply. The view has been expressed that the regional peculiarities of vascularization of the white matter appeared to be responsible for its selective vulnerability. It was demonstrated that the severe form of tissue destruction was seen in areas with the poorest blood supply. The region with the most abundant vascular supply, the central cortex, was relatively spared in these cases. (Author's abstr.)

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Modern Considerations of the Man with Brain Injury.

The continued management of the man with brain injury requires healthy optimism and enthusiasm balanced by an acute sensitivity to each man's distress and deficits and what these mean to him. Each patient must be surveyed biologically and understood as a complex, individual, peculiarly integrated organism, incomprehensible if we restrict ourselves to only a few methods of examining him.

In rehabilitation great possibilities and resources lie within the host himself, for it is his biological make-up and resiliency that remain as potent factors with which to work.

Without therapeutic push under supervision we shall never fully appreciate what assets each patient can muster. With good rapport, knowledge of the patient and his tolerances, and the control of extraneous or experiential factors that hinder these tolerances, each patient will continue to improve for a long time.

The constant presence, inseparability and interaction of organic and functional aspects must be appreciated and worked with. Time is ill-spent in impossible attempts to label each patient as functional or organic. The neurophysiological integration of each individual differs and resounds to the intracranial alterations in its own peculiar manner. Only when the individual who has the brain injury is known can the problems of distress, deficit and disability be comprehended.

It is dangerous to oversimplify these problems merely because organic findings are present. A ventricular dilatation or abnormality in the EEG tracing do not account for every symptom. The future of these men will be tragic if management is oriented only to the cerebral scar, the EEG tracing, the aphasia or the hemiplegia.

The physician himself may present experiences to the patient which have long disabling repercussions. Vacillation, overcaution, slips of the tongue, pessimism, failure in formulations to the patient or relatives, reference to the EEG tracings and X-rays and the constant encouragement of invalidism are avoidable. Emphasis is put on the cheerful spirit of rehabilitation and indicating to each patient his own responsibilities and resources in convalescence.

Headaches, dizziness, paralysis, sensory losses, convulsions, intellectual deficits, emotional instability and psychotic reactions may continue in the traumatized organism. Regardless of what physiological functions are fundamentally disturbed, these have already been peculiarly altered by the life-long and concurrent accumulation of experiences, associations and conditionings contained in the individual organism.

Physician and patient alike must recognize that the brain, like other vital systems, provides a margin of safety whereby alteration of some portions may effect little functioning deficiency. It is unwarranted to assume that brain damage must equal disability, gram for gram, or per cent. for per cent.

(Author's abstr.)

Cerebral Swelling. Histopathology, Classification and Clinical Significance of Brain Edema.

The gross and histopathologic findings of cerebral swelling in 125 cases have been studied.

Regardless of the primary cause of the cerebral swelling (brain tumor, cerebral abscess, massive hemorrhage or cerebral infarction), the findings in all cases were identical.

Attention is called to the incompleteness of understanding of cerebral swelling on the part of both clinicians and pathologists, and to the prevalence of contradictory concepts relative to the condition.

" Cerebral swelling " is the term proposed to denote the gross appearance of a brain characterized by a local or diffuse increase in bulk of one or both hemispheres.

The condition referred to grossly as " cerebral swelling " is represented microscopically by three types of histopathologic change, described as tumefaction, edema and liquefaction. The characteristic histological criteria for recognition of and differentiation among the three types of lesions are given in detail.

Despite discrepancies in their histopathologic features, it is assumed that fundamentally the three conditions represent different stages of the same biologic process; occasionally they may merge insensibly one with another. Attention is

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drawn to the significance of unilateral cerebral swelling in the production of transtentorial brain stem herniation.

The role of cerebral swelling in the production of midbrain hemorrhages is emphasized. These are believed to be perivenous in origin, and to be caused by an extreme degree of venous congestion resulting from compression and strangulation of the veins of the herniated midbrain.

In view of the gravity of the clinical symptoms resulting from transtentorial herniation of the brain stem, an attempt to distribute pressure more evenly by means of the establishment of ventricular drainage or by means of section of the free edge of the rigid tentorium may be a life-saving measure, pending final and more radical treatment. (Author's abstr.)

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Central Control of Nervous Functions and the Problem of Sleep.

After a review of the chronaxie theory and the experimental work on identification of the role of the cerebellar Purkinje cells and the red nucleus of the midbrain in effecting the isochronism between peripheral and cortical cells which determines the routing of nerve impulses, the writer goes on to a consideration of the effect of this regulating center upon cortical activity. Suppression of the " subordinating " influence of the center allows the peripheral neurons to return to their " constitutional " chronaxie and results in an increase in cortical chronaxie as well—the inference being that this higher level represents the constitutional chronaxie of the cortical cells. When the level becomes too high the cortex no longer gives evidence of excitation, and simultaneously, the cerebellar regulating center ceases to function. With variations this is the state of affairs in hemiplegia, anesthesia, hypnosis, insulin shock and sleep. The last may be the effect of shutting out afferent impulses to the cortex, which in turn suppresses the cerebellar center, or may be at other times the result of a protective reflex controlled by a center anterior to the red nucleus responding to the toxins of fatigue.

M. R. SHEEHAN (Psychol. Abstr.).

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Effects of Vitamins A and D in Convulsive States.

No appreciable change either in the frequencies of attacks or in the general physical and mental conditions of the patients were noted after two to three months of vitamin A and D feeding. (Authors' abstr.)

Shock Therapy During Pregnancy.

1. Three cases of pregnant patients who have been treated with various forms of shock therapy are added to those already reported.

2. One manic-depressive went through pregnancy uneventfully while receiving electric convulsive therapy in the sixth and seventh months of gestation.

3. One paranoid schizophrenic miscarried at about four months while receiving her third course of combined electric convulsive therapy and ambulatory insulin.

4. One paranoid schizophrenic went through pregnancy to normal delivery while receiving 90 days of insulin (including eight genuine coma days) and 20 electric convulsive treatments in the fifth, sixth and seventh months of gestation.

5. Pregnancy should not necessarily be considered an indication to deprive a psychotic woman of needed shock therapy. (Author's abstr.)

Clinical Evaluation of a New Sedative-hypnotic (3, 3-*Diethyl*-2, 4-*Dioxotetrahydropyridine*) *in Psychiatric Conditions.*

The study comprised 100 psychiatric patients. NU-903 was used as a somnifacient in 90 cases, who received a total of close to 600 individual doses, usually 0·2–0·4 gm. Results were good to excellent in 61 patients and unsatisfactory in only four. NU-903 was administered for daytime sedation to 43 patients of whom 12 showed poor results and 17 responded with relaxation. The balance of the cases in both groups were classified as fair responses.

The drug proved to have a negligible percentage of after-effects. Six patients whose intake of NU-903 ranged from 17·6 to 33·2 gm., with the medication extending from 31 to 105 days, experienced no ill effects whatever. Moreover, the drug

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proved free from habit-forming effects, and its efficacy was not reduced by continued administration.

The effect of prolonged medication on the blood picture was studied in 10 cases. With some deviations these subjects received 0·6 gm. of NU-903 nightly over a period of four weeks. No striking changes in either the red or white blood picture were observed. However, one patient developed a transient, slight leukopenia. Whether the prolonged administration of the drug caused the shift in the white blood count was impossible to ascertain, since repetition of the test had to be interrupted after 19 days. At that time and after a total intake of 11·4 gm. of NU-903 blood findings were normal in this patient.

Results attending the use of NU-903 as a daytime sedative were satisfactory in patients presenting mild tension, anxiety and restlessness. In cases of severe agitation, however, the drug was not sufficiently effective to warrant its recommendation in such a type of psychiatric disturbance.

NU-903 has a distinct value as a quick-acting hypnotic of comparatively short duration in cases of mild and medium insomnia. Except for cases of very severe insomnia in which the preparation was not tried, NU-903 has the advantage over barbiturates of lesser toxicity and therefore better tolerability. Thus, clinical results substantiate the salient pharmacological findings. (Authors' abstr.)

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Stereotypy in Schizophrenia. *Myers, H. J.* 294
Cerebral Arteriosclerosis in the Paranoid State. *Alpert, H. S., et al.* . . 305

A Study of First Admissions with General Paresis to Hospitals for Mental Disease in New York State, Year ended March 31, 1945.

1. The rates of first admissions with general paresis have been declining steadily since 1918. The declining trend is more marked among males than females.

2. There has been a declining trend in the percentage of cases in which syphilis was considered a causative factor in mental disease.

3. First admissions with general paresis are younger than all first admissions. Male general paretics are older than female general paretics.

4. The rates of first admissions with general paresis rise to a maximum of 28·2 per 100,000 population among males at the ages of 45 to 49. Among females they rise to a maximum of 7·0 at the ages of 40 to 44.

5. In those age groups with significantly large totals of first admission, the annual rates of first admissions among males exceed those of females in ratios of 3 and 4 to 1.

6. The percentage of first admissions among general paretics with subnormal intelligence is significantly lower than that for first admissions with alcoholic psychoses and for those with dementia praecox, but much higher than that among manic-depressives.

7. First admissions with general paresis include a high percentage with low levels of education, as compared with the general population.

8. General paretics include a higher percentage with normal personality make-up than do all first admissions.

9. Rates of first admissions with general paresis are highest among the divorced and separated. Among males the married have a lower rate than the unmarried. Among females, on the contrary, the unmarried have lower rates than the married.

10. Rates of first admissions with general paresis are higher among urban than rural populations. The farm population has a lower rate than the non-farm population in rural areas.

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11. The rate of intemperance is higher among first admissions with general paresis than among any other groups of first admissions, exclusive of those with alcoholic psychoses. Intemperance is especially high among female paretics.

12. Negroes and other colored races (i.e., Chinese) have higher rates of general paresis than whites.

13. Foreign-born white males have a higher rate of general paresis than native white males. Foreign-born white females have a lower rate than native white females.

14. Those born in Ireland and Russia have low rates of general paresis. Foreign-born groups with high rates include those from Scandinavian countries and the West Indies. (Author's abstr.)

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Psychological and Psychophysiological Significance of the Electroencephalogram.

Failure of electroencephalography to make important and extensive contributions in the field of psychology is inferred to indicate either (1) that we have not understood the psychophysiological implications of the electroencephalogram or (2) that the more prominent features of the EEG do not provide a record of the integrative activity of cortex. That the EEG is not primarily a record of the integrative activities but of facilitative and homeostatic regulatory processes which contribute to but which are not essential to integrative cerebral function is shown from the available evidence. It is shown that the activity recorded by the electroencephalogram is part of a mechanism of regulation which maintains varying degrees of equilibrium among the four variables, alpha rhythm, cortical integrative activity, chemical condition and cerebral circulation, with the autonomic nerves to the brain providing an important contributing influence. It is shown how each of these affects each of the others and how an imbalance in the direction of either under- or over-regulation may give rise to psychopathological effects. Implications regarding possible mechanisms of " tension " anxiety, schizophrenia and emotional " functional decortication " are considered with respect to frequently observed effects on the electroencephalogram. Applications in psychology are considered. (Author's abstr.)

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

The C.S.F. and the F. W. Lorenz Reaction for Diagnosis of Syphilis. Covarrubias, A. R. [*Arch. farm. y Bioquím., Tucumán.*, **3**, 45 (1946).]

The Lorenz Reaction was found to be rapid, convenient and fully as reliable as the other commonly used reactions. L. E. GILSON (Chem. Abstr.).

Comparison of the Colloidal Benzoin Reaction with the Reaction of Dognon in Pathological Spinal Fluids. Guillain, Georges, Laroche, Guy, and Lereboullet, J. [*Bull. acad. med.*, **130**, 432–4 (1946).]

Dognon's reaction requires less cleanliness of equipment and can be performed with 6 drops of liquid, but is less sensitive than the colloidal benzoin reaction. A. E. MEYER (Chem. Abstr.).

Investigations of the Cerebrospinal Fluid in Cases of Rheumatoid Arthritis. Sundelin, Frederick (*Nynas Sanatorium, Nynashamn, Sweden*). [*Am. J. Med.*, **2**, 579–87 (1947).]

The spinal fluid was examined in 141 cases of rheumatoid arthritis. Almost half of these patients showed some abnormality of their fluid. An increased average globulin-albumin quotient is due to an increase in globulin and decrease in albumin. Although such abnormalities could not be correlated with neurological changes, these manifestations may be an indication of nervous system involvement in rheumatoid arthritis. BARBARA R. MURRAY (Chem. Abstr.).

Determination of Protein in Serum and Cerebrospinal Fluid by Formation of Unimolecular Films. Bateman, J. B. (*Mayo Clinic, Rochester, Minn.*). [*J. Cellular Comp. Physiol.*, **29**, 85–9 (1947).]

The protein in a volume of 0·0001 to 0·02 c.c. is caused to spread over the surface of a 3 per cent. NaCl solution. The film is compressed until a spot of " indicator oil " shows first-order blue color. The relation between concentration and area covered by the protein at a given surface pressure is linear for diluted normal and nephrotic serum, serum albumin and globulin and cerebrospinal fluid at concentrations below 100 mgm./100 c.c. H. L. MASON (Chem. Abstr.).

Urobilinogen in Cerebrospinal Fluid. Naumann, Hans N. (*Taunton State Hosp., Taunton, Mass.*). [*Proc. Soc. Exptl. Biol. Med.*, **65**, 72–4 (1947).]

Of 41 post-mortem cerebrospinal fluids examined, 6 contained urobilinogen in amounts from traces up to 9 mgm. per cent. L. E. GILSON (Chem. Abstr.).

Changes in [*Plasma*] *Electrolytes During Post-convulsion Coma. Cicardo, V. H.* [*Rev. Soc. Argentina Biol.*, **22**, 255 (1946).]

In dogs, coma following intense convulsions provoked by electrical stimulation of the brain, or by metrazole is accompanied by a marked increase in plasma K and total acid-soluble P. The plasma K reaches its highest concentration during the coma and decreases during recovery. Total acid-soluble P generally reaches its highest value only after complete recovery of the animal. This suggests that K may be the toxic agent which is responsible for post-convulsion depression. Liberation of K and phosphate is due to tissue anoxia. Much K is liberated by the liver. L. E. GILSON (Chem. Abstr.).

The Influence of Carbon Monoxide on Higher Nervous Activity. Frolov, Yurii P. [*Am. Rev. Soviet Med.*, **4**, 90–1 (1946).]

Various degrees of CO poisoning can be observed by giving subthreshold doses of CO which will accustom an organism to the poison. Severely poisoned newborn white rats and dogs whose brain cortex is not yet fully developed are not sensitive or show little reaction to CO in large concentration (4·1–7·5 mgm./1). Although the absorption of CO by the blood of both adult and young animals was the same and the respiratory functions in both cases were reduced to 70–80 per cent., the absence of a developed brain cortex in the newborn prevented death even with strong concentrations. In experiments on 6 dogs with different forms of higher

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nervous activity behaviour, single and repeated CO poisonings showed clear-cut functional changes in the major cortical processes of excitation and inhibition, while the lower parts of the brain and the pons variolii were unaffected. In particular the unconditioned salivary reflexes remained unchanged; there was a considerable decrease in the conditioned salivary reflexes and a weakening of active internal inhibition. A weakening of the conditioned motor reflexes indicated changes in the motor zone of the cortex. Disturbances of peripheral type were observed, especially eczema. W. R. HENN (Chem. Astr.).

Direct Action of Chemical Substances on Nerve Centers in Physiology and Pathology. Shtern, L. S. (Physiol. Inst. Acad. Sci., Moscow). [*J. Physiol. (U.S.S.R.)*, **32**, 577–88 (1946) (*in Russian*).]

Review of literature with 31 references precedes a *résumé* of more recent and current work of direct application of chemicals to the nerve centers in medicine and biology, which is based on the existence of the hematoencephalic barrier and of an antagonism between the central and the peripheral nervous systems in their reactions to chemical reagents. The method has been used successfully in work with tetanus and encephalitis; the impermeability of the barrier to the treating agents makes the conventional treatment rather ineffective, whereas the direct administration, such as injection into the spinal fluid, serves to eliminate this difficulty. The differences (antagonism) between the central and peripheral nervous systems to such agents as salts of K, Ca, hormones and hormone-like substances are discussed; these substances when introduced into cerebral ventricles cause an effect which is opposite to that produced when they directly come in contact with the peripheral elements. Positive results were obtained in traumatic shock when K phosphate was introduced into cerebral ventricles; similar results were secured in cases of otosclerosis, gastric ulcer, bronchial asthma and other cases of diminished sympathetic or increased parasympathetic tonus. Introduction of tissues, gastric mucosa, pituitary gland, into direct contact with nerve centers, produces an effect which is opposite to that caused by the same metabolites introduced in general circulation. G. M. KOSOLAPOFF (Chem. Abstr.).

Variations in the Angioscotoma in Response to Prolonged Mild Anoxia. Smith, G. M., et al. [*J. Aviat. Med.*, **17**, 590–595 (1946).]

The peripheral blind areas (angioscotomata) of 15 subjects were measured five times during a 7·5 hour exposure to a simulated altitude of 10,000 feet. Control tests were made at a simulated altitude of 1,800 feet with the same subjects. There is a statistically significant increase in the size of the scotoma at altitude. The results also show a progressive and significant increase in the size of the scotoma throughout the test period at altitude. A CHAPANIS (Psychol. Abstr.).

The Electrical Constants of a Crustacean Nerve Fibre. Hodgin, A. L., and Huxley, A. F. [*Proc. roy. Soc.* B**133**, 444–79 (1946)].

Theoretical equations are derived to describe the characteristics of the local excitatory process when a subthreshold stimulus is suddenly applied. Observations on a nerve taken from the walking legs of lobsters showed that (1) the rise and fall of the extrapolar potential at different distances from the point of stimulation conformed to the theoretically derived curves; (2) the steady extrapolar potential declined expotentially with distance; (3) the voltage gradient midway between two distant electrodes was uniform, and (4) the potential recorded was in fact from the membrane. Values (constants) were determined for the electrical resistance of the fluid outside the nerve fiber, the resistance of the axoplasm, the capacity, and the resistance of the surface membrane. The local response was also studied as the strength of the subthreshold stimulus was increased. Matters relating to theories of the nerve impulse are discussed.

A. C. HOFFMAN (Psychol. Abstr.).

Potassium Leakage from an Active Nerve Fibre. Hodgkin, A. L., and Huxley, A. F. [*Nature, Lond.*, **158**, 376–377 (1946).]

"According to the membrane theory of nervous action, a minute quantity of potassium ions should leak out of a nerve fibre each time that an impulse travels along it." Studies of the membrane conductance of stimulated axons immersed

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in oil indicate " that activity is associated with the leakage of a substance the effect of which on the nerve membrane is very like that of potassium . . . during the period of recovery, potassium appeared to be re-absorbed."

A. C. HOFFMAN (Psychol. Abstr.).

Effect of the Extirpation of the Abdominal Sympathetic Chain and the Removal of the Cerebellum on the Blood Sugar. Yankovskaya, Ts. L. [*J. Physiol.* (*U.S.S.R.*), **32**, 365–76 (1946) (*in Russian*).]

Unilateral removal of the abdominal sympathetic chain causes a drop and in several experiments, also absence of the hyperglycemic reaction due to sugar in a dog. The effects of the extirpation of the cerebellum and of unilateral sympathectomy on the hyperglycemic reaction in dogs after sugar intake are opposite. The sympathetic nervous system is not a conductor of the reaction between the cerebellum and the carbohydrate metabolism. Both systems affect the blood sugar after sugar intake and independently. W. R. EICHLER (Chem. Abstr.).

Decrease of Phosphocreatine in Regenerating Neurons. Bodian, David, and Mellors, Robert C. (*Johns Hopkins Univ. Baltimore, Md.*). [*J. Biol. Chem.*, **167**, 655–61 (1947).]

Phosphocreatine determinations were made on normal and regenerating neurons of the ventral gray columns of rhesus monkeys. Regenerating ventral horn cells were produced by sectioning the left brachial plexus and the left lumbosacral roots at their exit from the intervertebral foramina. Regeneration was allowed to continue 6–30 days before analyses were made. The lumbosacral and cervical cords were removed from the living animal under ether anesthesia, then frozen quickly in alcohol dry ice mixture. The frozen segments were split longitudinally, the dorsal quadrants were cut away, then the gray matter of the central horns was isolated by scraping away the white matter. The ventral columns weighed about 80 mgm. each. Chemical determinations were made with a Coleman universal spectrophotometer. Right and left horns of the same section were compared. An average decrease in phosphocreatine of about 40 per cent. was found in regenerating anterior gray, as compared with normal gray columns. Adenosinetriphosphate values were too low for adequate analyses, but its value combined with inorganic phosphate was not significantly different from normal tissue.

ELVA G. SHIPLEY (Chem. Abstr.).

Succinic Dehydrogenase in Regenerating Neurons. Howe, Howard A., and Flexner, Josefa B. (*Johns Hopkins Univ., Baltimore, Md.*). [*J. Biol. Chem.*, **167**, 663–71 (1947).]

Comparison in succinic dehydrogenase content was made between normal anterior horns at the limb plexus level and corresponding tissues of animals with extremities completely paralyzed by poliomyelitis. In addition comparisons were made on normal and operated sides of the same animal. Rhesus monkeys were used throughout; the operations consisted of unilateral sectioning of the nerve roots at levels C4–Th1 and L3–S1. The animals were sacrificed at intervals from 7 to 54 days. Tissues were removed and frozen directly on a block of dry ice, and the white matter dissected away, leaving only the anterior gray cell column. Levels C5–Th1 and L5–S1 were used in the determinations, as these contained all the cells innervating an extremity (a limb segment). Succinic dehydrogenase was determined by the method of Schneider and Potter (*C. A.*, **37**, 5738[9]) or the method of Quastel and Wheatley (*C. A.*, **32**, 7069[2]). The isolated anterior horns of monkeys with limb paralysis following poliomyelitis were found to have approximately 40 per cent. less succinic dehydrogenase than corresponding tissue from normal monkeys. The difference is believed to be due primarily to the absence of anterior-horn cells, and calculations could be made for the activity of single motor neurons from the total normal activity and the number of cells. Maximal reductions of 12 per cent. in succinic dehydrogenase activity were found in anterior horns of animals with unilaterally sectioned nerve roots, as compared with normal sides of the same animal. Nerve section produces retrograde changes only in the motor cells of the anterior horn; thus the decreased activity was calculated to represent 30 per cent. reduction in enzyme activity in the motor cells.

ELVA G. SHIPLEY (Chem. Abstr.).

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Resonance of Excitable Tissues. II. Influence of Temperature and Decalcifiers on the Periodic Activity of Nerves. Monnier, A. M. (*Lab. physiol. gen. Sorbonne, Paris*). [*Arch. intern. physiol.*, **54**, 348–71 (1947); *cf. ibid.*, **48**, 129 (1939).]

Nerve preparations exhibit autorhythm in a medium low in Ca or containing Ca-binding ions, such as citrate, oxalate, or phosphate. The effect is greater for non-myelinized nerve preparations, and for specimens obtained from frogs kept at low temperatures. Maximum response of a given experiment is at 25–30°, but this temperature is lowered to 10° by 6–8 cycles of alternatively heating and cooling the nerve. H. L. WILLIAMS (Chem. Abstr.).

Inhibition by Sugars of the Stimulation of the Nervous System by Xanthine Bases. Chauchard, P., Mazoue, Henriette, and Lecoq, R. [*Compt. rend. soc. biol.*, **139**, 12–13 (1945); *Chimie and industrie*, **56**, 42 (1946).]

Subcutaneous or intraperitoneal injection of 0·005–0·010 gm. doses of theobromine or caffeine in the albino rat produces in about a week's time a decrease in chronaxia of motor nerves. If 0·5 c.c. of 0·5 per cent. lactose is injected simultaneously, this effect is prevented or cured after two injections. It was observed that this protective action was not specific for lactose but was shared by other ordinary glucides, such as sucrose, galactose, glucose, at the same dose. The same effect is obtained by oral administration.

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

Mechanism of Paralysis Resulting from Toxin of Clostridium botulinum. *Action of the Toxin on Acetylcholine Synthesis and on Striated Muscle.* Torda, Clara, and Wolff, Harold G. (*Cornell Univ. Med. Coll., New York, N.Y.*). [*J. Pharmacol.*, **89**, 320–4 (1947).]

The synthesis of acetylcholine by frog brain or mouse brain *in vitro* under either aerobic or anaerobic conditions was markedly diminished by very small amounts of toxins of *Cl. botulinum* types A and B. The responsiveness of frog rectus abdominis muscle to acetylcholine was not modified by low concentrations of the toxins (1–100 mouse LD_{50} per 100 c.c.) and was moderately increased by high concentrations of the toxins (10,000 LD_{50} per 100 c.c.). It appears that decreased acetylcholine synthesis, as far as it is related to myoneural function, is mainly responsible for the "functional paralysis" observed in animals affected by the toxins of *Cl. botulinum*. L. E. GILSON (Chem. Abstr.).

Effect of BAL on Pyruvate Oxidation in Pigeon-brain Dispersions. Whittacker, V. P. (*Dept. Biochem., Oxford*). [*Biochem. J.*, **41**, 52 (1947).]

Low concentrations of BAL (0·5 mm.) cause an increase in the O uptake, in the presence of pyruvate, by pigeon-brain dispersions. This is due to a stimulation of the pyruvate oxidase system. S. MORGULIS (Chem. Abstr.).

Effect of Frontal Lobectomy on Blood Sugars of Normal Cats and Monkeys and Adrenal Denervated Cats. Kennard, Margaret A., Hampel, C. W., and Willner, M. Dorrit (*New York Univ. Coll. of Med., New York, N.Y.*). [*Am. J. Physiol.*, **149**, 246–53 (1947).]

In cats in which sham rage is produced by bilateral lobectomy, the blood-sugar level under dial or nembutal anesthesia is increased within half an hour following frontal lobectomy, and may continue raised for at least four to five hours thereafter. No such rise in blood sugar occurs in cats which are anesthetized with barbiturates without frontal lobectomy. Bilateral removal of an amount of occipital lobe approximately equal to that of bilateral frontal lobectomy causes no such rise in blood sugar. There is an accompanying rise of pulse and respiratory rate when blood sugar rises. Previous adrenal denervation causes the blood-sugar rise which appears after frontal lobectomy to fall within three to four hours. No rise in blood pressure occurs after frontal lobectomy, although blood sugar, pulse, and respiration increase. In monkeys, which do not develop sham rage after cortical ablations, there is no change in blood sugar, pulse, respiration or blood pressure after bilateral frontal or occipital lobe ablation.

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

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The Antagonism of Nicotinamide and Histamine on Isolated Organs with Smooth Muscles. Halpern, B. N., and Dainow, I. [*Z. Vitaminforsch.*, **15**, 260–7 (1944).]

An antagonism between nicotinamide and histamine could be demonstrated on the isolated intestine and the uterus of guinea-pig. The necessary doses of nicotinamide were the same as those of certain amino acids arginine, histidine, cysteine and are much greater than those of antergan. Nicotinamide diminishes the stimulant effect of acetylcholine and of $BaCl_2$ on the isolated intestine, but it seems without effect on the uterine contraction produced by posterior pituitary extract. The specificity and mechanism of the antihistaminic activity are discussed. LEOPOLD SCHEFLAN (Chem. Abstr.).

Experimental Studies of a New Pharmacodynamic Property of Nicotinamide. Antagonistic Action to Certain Effects of Histamine. Halpern, B. N., and Daino, I. [*Z. Vitaminforsch.*, **15**, 250–9 (1944).]

An antagonistic action of nicotinamide against the asthma produced by the inhalation of aerosols of histamine was demonstrated. This action is of specific nature against histamine and cannot be produced against the bronchospasm of acetylcholine. LEOPOLD SCHEFLAN (Chem. Abstr.).

Role of Adrenaline in Recovery of Inhibited Conditioned Reactions. Gellhorn, Ernst (*Univ. of Minnesota, Minneapolis*). [*Proc. Soc. Exptl. Biol. Med.*, **64**, 375–7 (1947); *cf. C. A.*, **39**, 4150⁹.]

Conditioned reactions which have been inhibited by lack of reinforcement in rats can be restored by insulin coma in normal and in adrenodemedullated rats. Apparently a secretion of adrenaline which is observed under conditions of insulin coma and electro-shock does not play a part in the mechanism of restoration of inhibited conditioned reactions. Restoration is not effected in normal rats by injection of insulin. It appears that the restitution of inhibited conditioned reactions is linked up with a hypothalamic-cortical discharge and not due to the liberation of adrenaline which invariably accompanies the excitation of hypothalamic centers under conditions of insulin coma and electroshock.

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

Role of Adrenalin in Recovery of Inhibited Conditioned Reactions. Gellhorn, E. [*Proc. Soc. exp. Biol., N.Y.*, **64**, 375–77 (1947).]

Two series of experiments, using 6 rats as subjects, were performed in order to determine whether increased adrenalin secretion or hypothalamic-cortical effects were responsible for the reappearance of an inhibited conditioned escape response consequent to insulin coma and electrically induced convulsions. Results indicate that (1) restoration of unreinforced conditioned responses after coma or electroshock, occurs in adreno-medullated as well as in normal rats; (2) injections of adrenalin alone fail to restore these responses. The results are discussed theoretically and are related to the problem of efficacy of shock therapy in schizophrenia.

L. A. PENNINGTON (Psychol. Abstr.).

The Influence of Extracortical Factors on the Function of the Central Nervous System. Orbeli, L. [*Amer. Rev. Soviet Med.*, **4**, 206–211 (1947).]

This is a review article presented to the Academy of Sciences, U.S.S.R., 16 May, 1940, which briefly describes the results of experiments performed at the Pavlov Institute. Among the extracortical factors discussed are the effects of castration, removal of the cervical and other sympathetic ganglia, damage to the thyroid, hypophysis, suprarenal and parathyroid glands, and destruction of the hypothalamus and cerebellum. As measured by conditioned reflex techniques these extracortical traumata produce "a weakened function of the cerebral cortex and a disturbance in equilibrium with increase of inhibition. The increased inhibition is relative and follows a weakening of stimulation."

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

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Action of Thiamine Applied Directly to the Cerebral Cortex. Dias, M. V. [*Science*, **105**, 211–13 (1947).]

Small filter paper squares, soaked with thiamine hydrochloride in solutions of 1, 2, 5 and 10 per cent., were directly applied to one of the " motor " points in dogs which were craniectomized and a small region of the cortical " motor " area of one side exposed. Rhythmic muscular contractions occurred in the muscle or muscle group corresponding to the cortical " motor " point stimulated. A second application aroused stronger contractions which increased in intensity and frequency. Peripheral stimulation facilitated the response and lead to responses exhibiting the characteristics of localized convulsive reactions. In 34 of the 45 dogs used epileptiform convulsions were obtained with solutions of 2 to 10 per cent. In the remaining 11 dogs only localized muscular clonic reactions were obtained.

F. A. MOTE (Psychol. Abstr.).

A Simplified Encephalophone. Conrad, Matthew, and Pacella, B. L. [*Science*, **105**, 216 (1947).]

This article gives a wiring diagram and describes the action of a simple adapter which converts the low frequency varying voltages obtained with an electroencephalograph into variations in the pitch of an audible tone.

F. A. MOTE (Psychol. Abstr.).

Electroencephalography and Ophthalmology. Callahan, A., and Redlich, F. C. [*Amer. J. Ophthal.*, **29**, 1522–33 (1946).]

Recordings of electrical eye potentials following eye movements observed only when the retina is present, are believed to be due to corneo-retinal potential differences. Opening and closing the eyes in the dark and in the light produce similar changes in the occipital rhythm. There was no characteristic finding in amblyopia *ex* anopsia. The effect of opening the eye on the normal occipital rhythm does not differentiate true from malingered or hysterical blindness. Galvanic skin responses recorded on stimulation of a seeing eye can be used to differentiate blind from seeing eyes, thus identifying malingered blindness.

D. J. SHAAD (Psychol. Abstr.).

Frequency Analysis of Electroencephalograms. Gibbs, F. A. [*Science*, **105**, 132–34 (1947).]

The inadequacies of existing types of electroencephalogram frequency analyzers are pointed out; for example, frequency analyses are not satisfactory for clinical purposes. Furthermore, the phase component of wave form is not adequately revealed by frequency analysis. The electroencephalogram is a large, detailed, and complicated picture, which fairly easily yields to visual analysis and interpretation; the task for a machine is almost impossible. Improvements in electroencephalography will come when more attention is given to the selection and training of electroencephalographers and to the taking of easily interpreted, undistorted, and artifact-free records. F. A. MOTE (Psychol. Abstr.).

A New Type of Electroencephalographic Electrode Co-ordinator with Semipermanent Electrodes. Buffington, M. A., and Weil, A. A. [*Science*, **105**, 185–6 (1947).]

Described is an electrode wire and a unit for holding up to 18 wires in such a position that the greatest part of the weight of the wires is borne by the holding unit, thereby allowing the subject considerable freedom of movement. The region of attachment of electrode and wire is covered by acetone resisting tape. This type apparatus has been found to have long life, to segregate the electrodes, to produce few artifacts, and to give the operator a clear view of the subject's head during the recording. F. A. MOTE (Psychol. Abstr.).

A Contribution to the Question of Restriction of the Visual Field Due to the Diencephalon. Knapp, P., and Schwarzmann, A. [*Ophthalmologica*, **111**, 270–8 (1946).]

That there exists a direct connection of the optic chiasma with the midbrain has been known for some time. Eugen Frey clearly demonstrated in animals and man that fibers separating themselves from the dorsal part of the chiasm run with

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or without crossing to the median section of the tuber cinereum. The physiological significance of a direct connection between chiasm and midbrain was first demonstrated by W. R. Hess, who produced a left-side diathermic coagulation in the midbrain, leaving the optic nerves completely intact, after which there appeared a right-sided hemianopsia. With a diathermic coagulation produced on both sides of the midbrain the animal appeared to be blind, ran into a wall or ran beyond the edge of the table. The present authors cite as further evidence of the connection of the midbrain with restriction of the visual field a case of a woman patient of theirs who began to suffer from concentric narrowing of the visual field, hyperthyroidism, secondary amenorrhea, migraine, collapse, and cyanosis of the extremities. They are convinced that this non-hysterical restriction of the visual field is due to disturbance of the hypophysial-midbrain system which has long been known as seat of hormonal as well as vasomotor functions.

F. C. SUMNER (Psychol. Abstr.).

The Fine Structure and Topochemistry of the Nucleus of the Neurones. Sosa, Julio María (Inst. de Investigación de Ciencias Biólogicao, Montevidea, Uruguay). [*Anales facultad med. Montevideo*, **30**, 319–40 (1945).]

With basic aniline, Ag, and Feulgen-Rossenbeck's nuclein staining techniques, determination was made of the organization of and nuclein in the nucleus of the argyrophilic spherules in the nucleolus of the large nerve cells (pyramidal, Purkinje, mitral and anterior horn multipolar) of the central nervous system of chickens, pigeons, cats, rats, guinea-pigs, mice and man, both adult and embryo. The dispersion of the argyrophilic spherules in a reticular network or agglutinated as spheroid masses was a reflection of the metabolic activity of the cells. Failure to demonstrate nuclein in the nucleolus indicated that the spherules could not be elementary chromosomes as proposed by Cajal.

GEORGE K. DAVIS (Chem. Abstr.).

Phosphorus Metabolism in Active and Inactive Nerves. Bucher, Karl (Univ. California, Berkeley). [*Proc. Soc. Exptl. Biol. Med.*, **65**, 24–6 (1947).]

No difference was found by means of radioactive P^{32} in the P metabolism of stimulated and unstimulated rabbit nerves. L. E. GILSON (Chem. Abstr.).

Effect of Electrically Induced Convulsions on Rate of Alcohol Metabolism in Man. Newman, Henry W., and Yee, James (Stanford Univ. Med. School, San Francisco, Calif.). [*Proc. Soc. Exptl. Biol. Med.*, **65**, 122–3 (1947).]

The convulsions had no influence on the rate of disappearance of EtOH from the circulating blood. L. E. GILSON (Chem. Abstr.).

Analysis of the Effect of Barium upon Nerve with Particular Reference to Rhythmic Activity. Lorente de No, R., and Feng, T. P. (Rockefeller Inst., New York, N.Y.). [*J. Cellular Comp. Physiol.*, **28**, 397–464 (1946).]

Over the range 0·0037–0·043 M Ba ions have a depolarizing effect on frog nerve. The rate of establishment and magnitude of the demarcation potential between the treated segment and untreated nerve increases with increasing Ba ion concentration and reaches a value of 8–10 mv. after 300–400 minutes. In 95 per cent. O_2–5 per cent. CO_2 hyperpolarization often precedes the depolarization that takes place to a smaller extent than in O_2. In N_2 Ba reduces the rate of anoxic depolarization. The reversible stage of conduction block by Ba can be relieved by an applied anodal current and is reinforced by cathodal polarization and rhythmic activity. A concentration of Ba causing severe block in a nerve in O_2 may cause irreversible block in an atmosphere of 95 per cent. O_2–5 per cent CO_2. Myelinated fibers are more susceptible to Ba than unmyelinated fibers. Ba-treated nerve displays spontaneous slow potential oscillations with periods of approximately 1 minute and amplitudes of 0·05–0·1 mv. H. L. MASON (Chem. Abstr.).

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Effect of Brain Metabolites on the Secretion of Gastric Glands. Gerchikova, K. A. [*Byull. Eksptl. Biol. Med.*, **21**, *No.* 5, 44–7 (1946).]

The experimental results show the antagonistic action of brain metabolites on the secretion of gastric glands depending on whether they are introduced suboccipitally or in the general circulation. Brain metabolites introduced suboccipitally lower the secretion of gastric glands and introduced in the blood increase this secretion. The mechanism of this antagonistic action is not yet known and is the subject of further study. W. R. EICHLER (Chem. Abstr.).

Autonomous Nervous System in the Regulation of Water-mineral Metabolism. Blokhin, N. N., and Pravdina, K. I. [*Byull. Eskptl. Biol. Med.*, **21**, *No.* 5, 26–8 (1946).]

Suboccipital injection of K and Na salts reacts on the autonomous nervous system and increases the tonus of the individual systems. Injection of K phosphates causes retention of H_2O by muscle and brain tissue and greatly decreases recovery of the H_2O. When strong parabiotic agents like K phosphates are injected directly into the ventricle, temporary depression of the parasympathetic centers of parabiotic nature occurs, especially of the sympathetic nervous system. Inhibition of the H_2O metabolism by injection of K phosphate possibly is the result of increased production of pituitrin in the posterior hypophysis, caused by sharp stimulation of the tonus of the sympathetic nervous system.

W. R. EICHLER (Chem. Abstr.).

Disturbances of Metabolism Associated with Head Injuries. Pickles, Wilfred (*Rhode Island Hosp., Providence*). [*New Engl. J. Med.*, **236**, 858–62 (1947).]

Seven cases of disturbances in sugar, H_2O or fat metabolism were observed among 2,500 patients with head injuries: 1 had transient glucosuria and subsequent diabetes insipidus, 1 had temporarily resistant diabetes mellitus, 4 had symptoms of diabetes insipidus (in 3 cases responding to pitressin or pituitrin) and 1 had lipemia. Traumatic lesions of the hypothalamic region of the brain are suggested as a possible cause for such disturbances.

MARION HORN PESKIN (Chem. Abstr.).

The Protective Action of Sodium Diphenylhydantoinate against Convulsions Induced by Niketamide in White Mice. Granier-Doyeux, Marcel. [*Rev. sanidad y asistencia social* (*Venezuela*), **11**, 377–85 (1946).]

The convulsions induced in white mice by subcutaneous injection of 2 per cent. niketamide [" Coramine " (N,N-diethylnicotinamide)] solution can be prevented by oral administration of 0·2 per cent. solution of Na diphenylhydantoin (Na dilantin) 6 to 12 hours before the injection. This observation could serve as a basis of a biological method for evaluating anticonvulsive drugs.

H. H. SZMANT (Chem. Abstr.).

Investigations on the Passage of Tracer Phosphorus into the Nervous System, a Special Use of the Indicator Method. Roeder, F. (*Deut. Forschungsanstalt Psychiatrie, Munich*). [*Naturwissenschaften*, **33**, 111–18 (1946); *Chem. Zentr.*, **1**, 51–2 (1947).]

The central nervous system is composed not only anatomically but also chemically of various kinds of structural units. Within the individual regions there exist in part considerable differences in the Fe and vitamin contents, in the O consumption, etc. The isotope method was used to follow the passage of substances from the blood vessels into the neutral tissue and to study their different behaviour in the individual regions. Phosphates were chosen as the test substance, since they are very closely associated with the various processes of the metabolism of the brain. Radioactive P (P^{32}) was used mixed with inactive P as Mg $(NH_4)PO_4$. This was dissolved in 1N HCl and further diluted with physiological salt solution and then neutralized. The resulting physiologically indifferent solution was similar in composition to Ringer solution. The P was present as the PO_4 ion. Experiments were carried out on 15 dogs, 43 rabbits, and 47 guinea-pigs. The dogs received about 200 microcuries, according to their weight, and the smaller animals received correspondingly smaller amounts. The phosphate solution was injected intra-

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muscularly and in no case contained more than 1/30 of the animal's daily phosphate requirement. After a definite interval the animals were killed and the specific activity of individual tissue samples was obtained by determination of the ratio of radioactive P of total P. Total P was determined colorimetrically by the eikonogen method. The frequency with which electrons were emitted from P^{32} was measured by the use of the Geiger-Muller counter. The phosphate was precipitated as molybdophosphoric acid. The specific activity obtained for the central nervous system was very low as compared with that of other organs. The various regions of the brain and the nuclear region behaved very differently. The same values were obtained for identical brain sections taken from the right and left sides of the same animal. Special regions, as the tuber cinereum, showed peculiarities. There was a very pronounced transfer of the tracer phosphate into the peripheral nervous system and into the optic nerves. The influence of the blood content on the specific activation of the brain tissue was studied, as was also the relation between the tracer phosphate and the lipoids of the brain.

M. G. Moore (Chem. Abstr.).

Influence of the Female Sex Hormone (Folliculin) on the Elaboration of Mediators of the Central Nervous System. Kakushkina, E. A., and Tatarko, T. (Timiriazev State Museum). [*Compt. rend. acad. sci. U.R.S.S.*, **55**, 267–9 (1947) (*in French*).]

The content of acetylcholine-like substances of the rat brain is not altered by the injection of folliculin; however, the activity of the esterase is greatly diminished thereby raising the acetylcholine coefficient. R. W. Fleming (Chem. Abstr.).

So-called Popa's Cerebrostimuline. Hamanaka, Shinzo, and Kurome, Kitaro. [*Folia Endocrinol. Japon*, **19**, 381–97 (1943).]

The presence of cerebrostimuline, which accelerates the tissue respiration of the cortex, in mouse cerebrospinal fluid cannot be denied because the R.Q. of the cortex (determined by Warburg's method) tends to be slightly higher in cerebrospinal fluid than in the auto-serum. The cortical R.Q. is not affected by injection of Praehormone (anterior hypophysis preparation), but is markedly inhibited by elimination of KCl from the perfusion fluid, while the R.Q. of liver and kidney is unaffected by lack of KCl. Hence KCl seems to be functionally related to cerebrostimuline, if not its substitute. J. G. Yoshioka (Chem. Abstr.).

Effect of Insulin on the Nervous System. Glazov, V. A., and Petrov, F. P. (Skvortsov-Stepanov Hosp., Leningrad). [*Byull. Eksptl. Biol. Med.* (*U.S.S.R.*), **11**, 291–3 (1941).]

In frog sciatic-gastrocnemius preparations insulin produced a block of the parabiotic nature, removed by a direct current anode, and intensified by the cathode. Insulin applied directly to cut surface of spinal cord increased the latent period of the reflex. Adrenaline, under similar conditions, decreased the latent period and removed the insulin-induced block.

G. M. Kosolapoff (Chem. Abstr.).

Changes in the Activity of Cholinesterase of Nervous Tissue under the Influence of Constant Current. Babsky, E. B., and Minaev, P. F. [*Nature, Lond.*, **158**, 343–4 (1946).]

By means of biological assay of the dorsal muscle of the leech and the m. rectus abdominis of the frog, it was found that "... in 90 per cent. of the experiments the activity of cholinesterase was definitely affected by polarization. ... This influence of polarization upon the activity of cholinesterase was equally manifested in the cerebral cortex and in the nerve fibres. ... The fact that the cathode of constant current lowers the activity of cholinesterase, while the anode produces the opposite effect, that is, increases the activity of this enzyme, may be explained on the basis of the changes that take place in the distribution of ions in the nerve under the influence of polarization."

A. C. Hoffman (Psychol. Abstr.).

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The Action of Some Alkaloids of Opium on Cholinesterase. Mihailesco, Vintila V. [*Bull. acad. med. Roumanie*, **18**, *No.* 1/3, 53–5 (1946).]

The rectus abdominis of a frog was suspended in 35 c.c. of oxygenated Ringer solution at room temperature and its contraction measured when 50γ of acetylcholine (I) was added. The smallest amount of serum which would hydrolyze the (I) in 5–10 minutes was determined, and it was shown that morphine sulfate (II), codeine phosphate (III), dionine-HCl (IV) and papaverine-HCl (V) in concentrations of 5 mgm./c.c. did not affect the muscle directly when alone or with serum. In concentrations of over 100γ/c.c., (II) inhibited the serum cholinesterase (VI), whereas (III) and (IV) inhibited it in concentrations of 10, 25, 50, 100 and 250γ/c.c. to an extent proportional to the concentration. In concentrations of 10, 25, 50, 100, 250 and 500γ/c.c., (V) inhibited the (VI). None of these alkaloids changed the pH of the serum. MARSHALL E. DEUTSCH (Chem. Abstr.).

The Role of Cholinesterase in the Action of Estrone on the Vegetative Nervous System. Mihailesco, Vintila V., and Radulesco, Maria. [*Bull. acad. med. Roumanie*, **18**, *No.* 1/3, 56–8 (1946).]

When used by a previously described technique (*cf.* preceding abstr.), estrone (as its benzoate) in concentrations greater than 25 units/c.c. is shown to inhibit cholinesterase. Thus it allows acetylcholine to be stored and improves capillary circulation. MARSHALL E. DEUTSCH (Chem. Abstr.).

Nerve Conduction after Inactivation of Choline Esterase. Boyarsky, L. L. [*Proc. Soc. exp. Biol., N.Y.*, **64**, 106–8 (1947).]

The sciatic nerve of the frog, " exposed to di-isopropyl fluorophosphate (DFP) in a concentration and for a time sufficient fully to inactivate its choline esterase, can still conduct impulses with entirely normal action potentials." It is concluded that choline esterase is not essential to nerve conduction. A brief review of the recent literature is given. L. A. PENNINGTON (Psychol. Abstr.).

Combined Action upon Muscle of Adenosine Triphosphate, Acetylcholine and Potassium, Calcium and Magnesium Ions. Babsky, E. B., and Minaev, P. F. [*Nature, Lond.*, **158**, 238 (1946).]

Work with the dorsal muscle of the leech and the m. rectus abdominis of the frog indicates that adenosine triphosphate, potassium and magnesium, but not calcium, increase the sensitivity of muscle to acetylcholine.

A. C. HOFFMAN (Psychol. Abstr.).

Experimental Antagonistic Action of Anterior Hyophysis Hormones and Acetylcholine on Cerebral Blood Vessels. Relation to Experimental Catalepsy. Baruk, H., David, M., Racine, M. Vallancien, and Borenstein, P. [*Compt. rend. soc. biol.*, **140**, 398–9 (1946).]

In adult male rabbits with the skull trepanned, the intravenous injection of a large dose of anterior hypophysis extract produced a decrease in cerebral vessel diameters, and brain volume, with resulting cataleptic symptoms. Injection of lethal or near lethal doses of acetylcholine caused enlargement of cerebral blood vessels, increase in brain volume and stupor. The two agents given together counteracted each other's effect. L. E. GILSON, (Chem. Abstr.).

Curative Effects of a Complex Choline Compound on the Impaired Metabolism of Choline-deficient Rats. Abdon, N. O., and Borglin, N. E. (*Univ. Lund.*). [*Nature*, **159**, 272–3 (1947).] ; *cf. C. A.*, **41**, 1296i.]

Addition of an acetone-precipitated fraction from extract of splenic tissue (I) (*C. A.*, **39**, 4902[9]) increases the metabolism of muscle tissue of choline-deficient rats to values approaching normal, but does not affect the metabolism of normal muscle tissue. (I) resembles acetylcholine precursor, being soluble in alcohol and H_2O, and insoluble in ether and petroleum ether. (I) is precipitated from aqueous solution by acetone and by Ba salts, but the activity cannot be regenerated from the Ba precipitates. (I) activity is destroyed by boiling in 2N HCl or in 1N NaOH for 15 minutes, but not by boiling at pH 4 for 30 minutes.

CARL C. SMITH (Chem. Abstr.).

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Relationships Between Anaphylactic Shock and Acetylcholine Shock. Yañez, Arsacio Peña, and Goñi, Pedro María (Facultad med. Cádiz). [*Rev. españ. fisiol.*, **1**, 232–7 (1945).]

Acetylcholine chloride (I) was administered to guinea-pigs in doses of 0·5–2 mgm./100 gm. intracardially. Shock was immediately manifested by convulsions, dyspnea, bradycardia, salivation, lachrimation and frequent defecation and micturition. Recovery took 8–10 minutes for animals not in a state of apnea. Intraperitoneal injection of vitamin B_1 sensitized the animals to (I) and made it possible to produce shock with smaller doses of it. The bradycardia and salivary and lachrimal hypersecretion were not characteristic of anaphylactic shock. Further differences were found in experiments with dogs. Anaphylactic shock was accompanied by an increased coagulation time and a leucopenia. Neither effect was shown by dogs in acetylcholine shock. It is concluded that the two types of shock do not have a common mechanism. MARSHALL E. DEUTSCH (Chem. Abstr.).

Thiamine and the Metabolism of Acetylcholine in the Central Nervous System. Egana, Enrique (Univ. Chile, Santiago, Chile). [*Pub. lab. med. exptl. clin. med. Prado-Tagle, Univ. Chile* (1), 127 pp. (1946).]

Acetylcholine was determined in the brain of the rat by using the anterior rectus abdominis muscle of *Caliptocephalus gayi* or of *Bufo chilensis*. Average values for normal and avitaminotic rats are: Whole brain 2·60 and 1·50γ; the cortex contained 2·8 and 1·4γ per gm., respectively; the gray matter 6·8 and 4·2γ per gm. The oxidation of choline by cholineoxidase, prepared preferably according to Mann and Quastel (*C. A.*, **31**, 7908[3]), was studied in the Warburg apparatus. Thiamine has no direct effect on the liver choline-oxidase system of normal and avitaminotic rats. Brain and cortex extracts of normal and avitaminotic animals cannot oxidize choline. Addition of the liver enzyme to cortex extracts increases notably their O consumption. In the absence of substrate, cortex, gray matter, and liver of normal animals form acetoacetate; the amount is less in avitaminotic liver and gray matter, but not in cortex. Presence of acetate decreases acetoacetate in normal gray matter, increases it in cortex, and has no effect in liver. In avitaminotic tissue, addition of B_1 decreases acetoacetate. Citrate decreases acetoacetate in gray matter and liver, possibly by blocking the respiration, while the values in the cortex are increased. B_1 indirectly increases acetoacetate. Pyruvate increases acetoacetate in normal cortex and liver, but decreases it in gray matter. Addition of B_1 causes a marked increase in gray matter and liver. Acetyl phosphate has no influence on acetoacetate formation in normal cortex and liver; addition of B_1 to avitaminotic tissues increases acetoacetate. In gray matter, acetyl phosphate decreases acetoacetate; addition of B_1 causes further decrease. In the brain of avitaminotic rats the activity of cholinesterase is decreased; addition of B_1 or of diphosphothiamine activate it. In the absence of substrate, normal and avitaminotic cortex synthesize acetylcholine to the same amount; avitaminotic gray matter synthesizes it better than normal tissue. Addition of B_1 brings acetylcholine to normal values. Pyruvate increases it, while citrate decreases it slightly. The cholinesterase content of different parts of the rat brain decreases in the following order: pineal gland, gray matter, cortex, cerebellum. In avitaminotic brains all values are slightly higher. *In vitro* B_1 and diphosphothiamine have no influence on cholinesterase; acetylcholine inhibits it in all organs studied. K. SCHOEN (Chem. Abstr.).

Further Proof of the Acetylcholinergic Action of Antigens. Danielopolu, D., and Popesco, Marin (Acad. Med., Bucharest, Roumania). [*Compt. rend. soc. biol.*, **140**, *No.* 9–10, 243–5 (1946); *cf. C. A.*, **39**, 2563[2, 6]; **41**, 2155d.]

As previously shown, all antigens (foreign serums, bacterial extracts, tuberculin, etc.), produce inhibition in all organs where the parasympathetic system is inhibitory. The cells in the presence of the antigen liberate acetylcholine (I). The effect is inhibited by atropine, which prevents the parasympathomimetic action of (I) and augmented by eserine and strophanthin, which inactivate cholinesterase (II). With isolated unsensitized rabbit intestine in Tyrode solution at 38° the addition of horse serum provokes contraction due to liberation of (I) from a precursor contained in the tissues. If the bath fluid is now changed and horse

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serum again added, no contraction occurs because the (I) precursor is exhausted. If the bath fluid is changed again and (I) is added, contraction occurs for a time and the (I) precursor is reformed in the tissues by hydrolysis of (I) by tissue (II) and conversion to precursor. If the bath fluid is now changed again and horse serum is added, contraction occurs again as in the first part of the experiment. This sequence of effects can be repeated several times with the same segment of intestine.

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

Acetylcholine and Adrenaline Shocks. Danielopolu, D. (Univ. Bucharest.). [*Bull. acad. med. Roumanie*, **13**, *No.* 1/2, 57–67 (1943); *cf. C. A.*, **40**, 6668[6].]

General acetylcholine shock is caused by production of acetylcholine (I) so rapidly that it passes into the blood directly instead of first being transformed into a complex. A similar mechanism can be used to explain the syndrome due to an excess of adrenaline or sympathin. The hyperproduction of (I) is always associated with or followed by the hyperproduction of adrenaline or sympathin and the inverse is also true. Proposed mechanisms are discussed.

MARSHALL E. DEUTSCH (Chem. Abstr.).

Acetylcholine Shock. Danielopolu, D. [*Acta Med. Scand.*, **126**, 595–601 (1947).]

Acetylcholine (ACh) shock is an acute condition characterized by hyperfunction of organs in which parasympathin (P) is the excitor and sympathin (S) the inhibitor, or by hypofunction of organs where P is the inhibitor and S the excitor. The symptoms include bradycardia, A-V block, hypotension, hypothermy, hypermotility of the digestive tract, uterus, or bladder, bronchial constriction, convulsions, leucopenia with mononucleosis and eosinophilia. The shock may be transitory or may end in death. It is associated with an increased production or with a decreased destruction of ACh. This type of shock can be provoked by intravenous injections of ACh. It can be prevented with atropine. In the atropinized animal ACh has a sympathomimetic action, causing hypertension. A similar shock can be provoked by stimulating the peripheral end of the vagus, whereby over-production of ACh is effected. Asthma is due to ACh shock. The disease is associated with a localized parasympathetic preponderance. Similarly, *sea sickness* is a generalized ACh shock caused reflexly through the vestibular organ and can be forestalled with atropine. ACh shock also can be produced by decreased destruction; for instance, by the aid of eserine, but this action is very complicated because of the adrenosecretory action of the eserine. Intoxication by digitalis or strophanthin is also due largely to ACh, since they inactivate cholinesterase. The protective mechanisms which the organism can release against ACh shock are discussed.

S. MORGULIS (Chem. Abstr.).

New Proofs of the Acetylcholine Nature of Paraphylactic (Anaphylactic) Shock Studied on Isolated Organs. Danielopolu, D. [*Acta Med. Scand.*, **126**, 589–94 (1947).]

According to D.'s conception, anaphylactic shock is due to the liberation of acetylcholine. The antigen produces two actions: A non-specific effect (paraphylaxis) common to all antigens and associated with liberation in the cells of acetylcholine, and a specific effect due to the particular antigen to which the cell responds with production of antibodies which are formed by a direct union with choline (antibody-choline) which imparts immunity or phylaxis. When a second dose of antigen is introduced, the antigen-antibody-alexin complex is formed and the choline is split off as acetylcholine, which provokes the paraphylactic shock. In experiments on the guinea-pig uterus this latter condition has been shown to occur. It has been further proved that the anti-paraphylactic phenomenon is due not merely to the complete loss of antibodies, but also to the exhaustion of choline in the tissues.

S. MORGULIS (Chem. Abstr.).

Effect of Acetylcholine on the Isolated Spinal Cord of the Frog. Kirillova, A. A. [*Bull. biol. med. exptl. U.R.S.S.*, **16**, *No.* 7/8, 53–6 (1943); *Am. Rev. Soviet Med.*, **4**, 269 (1947).]

With the spinal cord kept in Ringer solution containing 1 : 300,000 of eserine, concentrations of 2×10^{-8}–1×10^{-6} acetylcholine were added to the renewed solution after the threshold of reflex irritability was established; 10^{-6} reduced the

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irritability markedly, whereas concentrations of 10^{-7} had either a stimulating or an inhibitory effect; lower concentrations increased the irritability. In graphic recording of spinal cord reflexes concentrations of 10^{-6} resulted either in the disappearance of reflex muscle contractions or in their rapid decline, whereas 5×10^{-8} and $3{\cdot}3 \times 10^{-8}$ stimulated the reflexes of the opposite calf muscles. In high concentrations, acetylcholine depressed the isolated spinal cord of the frog, while low concentrations increased reflex reactions. No contraction of muscles connected with nerve centers was observed. This contradicts the role of acetylcholine as an agent transmitting the impulses via the nerve centers; the action of acetylcholine consists in the release or depression of reflex reactions.

W. R. HENN (Chem. Abstr.).

The Acetylcholinergic Action of Antigens and the Acetylcholinic Nature of Paraphylactic (Anaphylactic) Shock. Nicolau, C. T., and Cristesco, N. (First Med. Clinic, Bucharest). [*Bull. acad. med. Roumanie*, **17**, *No.* 4/6, 10–17 (1945).]

Intravenous injection, in human subjects, of horse serum antigonococcus vaccine, and acetylcholine produced leucopenia and increased eosinophiles and monocytes. The effects on pulse rate and blood pressure varied somewhat. The results confirm Danielopolu's conclusions (*C. A.*, **39**, 2563[2]) concerning the acetylcholinergic action of antigens and the acetylcholine nature of paraphylactic shock.

MARSHALL E. DEUTSCH (Chem. Abstr.).

Shock and Ovarian Acetylcholinogenesis. The Acetylcholinergic Function of the Follicular Hormone. Crainicianu, Al. [*Bull. acad. med. Roumanie*, **17**, 133–40 (1945) (*in French*).]

A theory of the mechanism of the cardiovascular action of folliculin (I) is presented. Injections of (I) cause the liberation by the ovaries of a considerable quantity of acetylcholine which passes into the blood and causes hypotension and shock. This theory explains the fact that (I) causes hypotension only in the case of the female and then only if the ovaries are not destroyed or removed.

H. H. SZMANT (Chem. Abstr.).

Effect of Adenosine Triphosphate on Muscular Sensitivity to Choline and Acetylcholine. Minaev, P. F. [*Byull. Exptl. Biol. Med.*, **21**, *No.* 5, 37–40 (1946).]

Choline acetylase (*C. A.*, **40**, 7258[7]) from nervous tissue was found active in the presence of adenosine triphosphate. The latter sensitized muscle to acetylcholine. Immersion of muscle tissue in adenosine triphosphate alone did not show a marked effect. However, after washing the adenosine triphosphate from the muscle and immersing in choline marked sensitivity was observed which increased on repetition of washing and immersion. Simultaneous action of the two solutions further increased the sensitivity of muscle. It is, therefore, concluded that the action of adenosine triphosphate is caused by formation of acetylcholine in the muscle itself. The effect may be due to inactivation of cholinesterase present in nervous tissue, since it is known that the anticholinesterase agents, eserine and prostigmine, increase the sensitivity of muscle to acetylcholine. Experiments are being continued. W. R. E. (Chem. Abstr.).

Mechanism of the Strengthening Action of Parasympathomimetic Drugs on the Effect of Acetylcholine. Koiwaya, Osamu. [*Folia Pharm. Japon.*, **39**, 116–33 (1943).]

The dilatation of the auricular vein of a perfused rabbit ear by acetylcholine is strengthened by an addition of rabbit serum or pretreatment with eserine or prostigmine, but not so markedly with pilocarpine. The depression of rabbit blood pressure by acetylcholine is strengthened for a long time when the animal has been pretreated with eserine or prostigmine, but not with pilocarpine. The excitation of rabbit intestine is strengthened by eserine or prostigmine, which itself has no such action. Pilocarpine is synergistic with acetylcholine in its action on the perfused intestines. The contraction of frog dorsal muscle by acetylcholine is markedly strengthened by pretreatment with eserine, prostigmine, or pilocarpine which, however, is not synergistic when acetylcholine is given first. Eserine and pilocarpine are slightly synergistic in this action. The excitation of frog dorsal muscle

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by Ba is strengthened by pretreatment with eserine, prostigmine, or pilocarpine. Acetylcholine is synergistic when given simultaneously, but not when given first. The depressing action of acetylcholine on a perfused frog heart is counteracted or weakened by the extract from the rabbit blood or intestines and also from the frog dorsal muscle owing to the presence of cholinesterase in the tissues. Eserine and prostigmine in a small amount inhibit cholinesterase activity, but pilocarpine does not. All three, however, heighten the inhibition of frog heart induced by electric stimulation of the vagus nerve and markedly excite the frog orbicularis oculi and the parasympathetic peripheral nerve endings. The tonic action of acetylcholine on the perfused frog dorsal muscle and rabbit blood vessels and intestines is strengthened by all three, but that on rabbit blood vessels and heart *in situ* is heightened only by eserine and prostigmine. Here the synergistic effect in the former case is due to the inhibition of cholinesterase action and in the latter more likely to excitation of the parasympathetic nerve endings.

J. G. YOSHIOKA (Chem. Abstr.).

Effect of Direct Current Anode on the Acetylcholine Content of the Brain. Raspopova, N. A. (State Pedagog Inst., Moscow). [*Byull. Eksptl. Biol. Med. (U.S.S.R.)*, **11**, 238–40 (1941).]

In cat (or dog) experiments, electrodes were placed on the exposed cortex of the two hemispheres and a third electrode was placed on neck muscle. The " brain " electrodes were run as cathodes for 10 minutes, then one was disconnected and the other two hemispheres in eserinized Ringer solution were tested for acetylcholine. " Anode " application immediately after " cathode " application led to a drop in acetylcholine level ; this is explained either by repression of its formation or by acceleration of its hydrolysis. G. M. KOSOLAPOFF (Chem. Abstr.).

Comparative Study of the Acetylcholine Content of Vertebrate Nerves. Filippova, A. G., and Korenebskya, O. G. (State Pedadog. Inst., Moscow). [*Byull. Eksptl. Biol. Med. (U.S.S.R.)*, **11**, 234–7 (1941).]

Dissected nerve tissues of Anodonta and of frogs, cats and dogs, were macerated in eserinized Ringer solution, and the extract tested on leech muscle. Generally the invertebrate's nerve was found to have more acetylcholine than the vertebrate nerve. The average values were : Anodonta 3·3–6·6γ/gm. ; frog 1·3–2·5 ; dog 0·45–0·9. A possibility exists of the presence of an unknown sensitizer in the Anodonta nerve extract. G. M. KOSOLAPOFF (Chem. Abstr.).

Action of Acetylcholine on Chronaxie and Speed of Conduction of Frog Nerves. Sozer, F., and Winterstein, H. (Univ. of Istanbul, Turkey). [*Arch. intern. pharmacodynamie*, **73**, 159–77 (1946).] *Cf. following abstract.*

Concentrations of 10^{-3} to 10^{-6} acetylcholine have no effect on the rheobase. A concentration of 10^{-3} increases chronaxie, 10^{-4} decreases it, and 10^{-5} increases it again. Thiamine in concentrations of 10^{-4} to 10^{-6} increases chronaxie. The excitability of degenerated nerves is not restored by acetylcholine. The effect of different concentrations of acetylcholine on the speeed of conduction is such that speed is increased when chronaxie is decreased and *vice versa*.

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

Action of Acetylcholine on Reflex Time. Sozer, F., and Winterstein, H (Univ. Istanbul, Turkey). [*Arch. intern. pharmacodynamie*, **73**, 294–8 (1946).] *Cf. preceding abstract.*

Intraperitoneal injection of 1·0 ml. of 10^{-3} acetylcholine into the frog prolongs the flexor reflex time. M. L. C. BERNHEIM (Chem. Abstr.).

Analysis of the Functional Role of Acetylcholine in Electrotonus of the Central Nervous System. Markosyan, A. A., and Rachkovoi, G. I. (Lenin Pedagogical Inst., Moscow.)

Experiments were performed with spinal frogs employing non-polarizable electrodes using the latent period of the flexion reflex of the leg as indicator of change in central excitability. Eserine, prostigmine, and atropine were applied locally to the spinal cord. It was found that an ascending current increased the

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latent period while a descending current decreased it. Eserine and prostigmine caused the anelectrotonic prolongation of reflex time to disappear, while further enhancing the catelectrotonic decrease. In several experiments after eserinization a sharp increase in latent period was observed on applying the descending current. Atropine produced a complete disappearance of the changes in latent period produced by anelectrotonus or catalectrotronus. The observations are related to possible changes in acetylcholine concentration under the electrodes.

EUGENE ROBERTS (Chem. Abstr.).

Effect of Calcium Ions on the Formation of Acetylcholine in the Central Nervous System and the Nerve "Trunks." Pugachev, A. G. (State Pedagog. Inst., Moscow). [*Byull. Eksptl. Med. Biol. (U.S.S.R.)*, **11**, 241–3 (1941).]

In experiments on dogs and cats, filter papers saturated with 1–2 per cent. $CaCl_2$ solution were applied locally. In the cortex experiments in most cases the acetylcholine level was significantly depressed (smaller number indicated no change or increase). Sciatic nerve experiments gave similar results, but the decrease of acetylcholine was generally less pronounced.

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

2. Pharmacology, Treatment and Psychiatry.

Experimental Study of Chronic Alcoholism. Mezey, K. [*Anales soc. Biol. Bogota*, **1**, 18 (1946).]

In frogs which had been treated with EtOH for 3–5 months the fat content of brain, liver, kidneys and striated muscles was increased by 39–67 per cent., while N content diminished. The liver lost 90 per cent. of its glycogen. Also the total fat in the brain of frogs and rabbits was increased by 24 per cent. Conclusions: Tolerance to alcohol is due to a change in its distribution in the various organs. This probably explains the altered reaction of the alcoholic toward anaesthetics.

F. FROMM (Chem. Abstr.).

Ocular Psychoneuroses. Davenport, R. C. [*Trans. Ophthal. Soc. U.K.*, **64**, 24 (1944).]

Eye complaints may be roughly divided into those with an obvious organic state to cover the symptoms, those where there is present an incontrovertible organic lesion upon which is overlaid the element of neurosis, and those with quite inadequate organic grounds. Crucial for the recognition of psychoneurotic overlay as well as the more defined psychoneuroses are: (1) An appreciation of the personality make-up of the individual meeting the stresses of life; (2) absence of organic state to cover the symptoms after careful examination; (3) relief of symptoms with insignificant correction or persistent complaint despite every possible correction of organic difficulty; (4) ascertainment of what the patient has to gain from the eye complaint. F. C. SUMNER (Psychol. Abstr.).

Ocular Psychoneuroses. Doggart, J. H. [*Trans. Ophthal. Soc. U.K.*, **64**, 29 (1944).]

Certain elements in the case history, such as the patient's attitude toward his occupation, emotional tension, fantastic symptoms, or suggestibility can lend support to a diagnosis of ocular psychoneurosis. During the examination the hesitant answering of questions, inconsistent performance on the ocular test, perplexity in the Maddox rod test and in the Bishop Harman diaphragm test, frequent blinking, flinching, squeezing together of eyelids, and absence of any organic handicap are features of the ocular psychoneurotic. Difficulty in a differential diagnosis between malingering and psychoneurotic inhibition is encountered only at the borderline. Mirror cases may be helped by joint discussion between patient and the ophthalmic surgeon or by prescribing glasses of small refraction error and having nothing to do with the so-called eyestrain; serious cases should have psychiatric treatment. F. C. SUMNER (Psychol. Abstr.).

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The Two Phases of the Hypertension Produced by Acetylcholine after Atropine. Danielopolu, D. [*C. R. Soc. Biol.*, **140**, 298 (1946).]

ACh (I) provokes a parasympathomimetic cellular response, causing liberation of sympathin, which produces a sympathomimetic effect. These two phenomena together produce an amphomimetic effect on the terminal organ, atropine has a parasympathetic-inhibiting action and prevents the parasympathomimetic response. After atropine I produces vasoconstriction. This is the first phase of the production of hypertension. The atropine inhibits the action of cholinesterase, and since the I is not immediately destroyed, it stimulates the adrenal medulla to liberate adrenaline, thus producing a further increase in blood pressure. This is the second phase and is abolished by adrenalectomy.

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

Cardiac Action and Psychiatric Uses of Chinese Schisandra. Siversev, I. I. (*Kazakh Med. Inst. V. M. Molotov, Alma-Ata*). [*Farmakol. i Toksikol.*, **9**, *No.* 4, 10–12 (1946).]

Extracts (0·02 and 0·04 per cent.) of Schisandra leaf (I) mildly intensify systole in healthy isolated frog heart in some but not all tests. In the most active cases (I) increases the minimum volume of relaxed, hypodynamic frog heart. Thus, after perfusion with papaverine-HCl solution (1 : 20,000), then for two hours with Ringer solution and finally with 0·04 per cent. extract of (I), minimum volume rose 56 per cent. in a frog heart isolated by the Gramenitskii method. Extracts of (I) also have favourable effects on mental patients in depressive states, as indicated by clinical trials with 37 patients (15 exogenic and 22 endogenic), each receiving one tablespoon of 1 per cent. extract of (I) three or four times daily.

JULIAN F. SMITH (Chem. Abstr.).

The Lack of Cerebral Effects of d-Tubocurarine. Smith, Scott M., Brown, Hugh O., Toman, James E. P., and Goodman, Louis S. (*Univ. of Utah School of Med., Salt Lake City*). [*Anesthesiology*, **8**, 1–14 (1947).]

A dose of d-tubocurarine chloride (I) 2·5 times that necessary for complete respiratory paralysis and adequate for complete skeletal muscular paralysis was given intravenously over a period of 33 minutes to a healthy trained adult observer not undergoing operation. Inasmuch as no changes occurred in the electroencephalogram, consciousness, and sensorium, or in any aspect of higher central nervous system function, it is concluded that (I) has no significant central stimulant, depressant or analgesic action. Attention is called to the importance of this observation for the proper use of curare as an adjuvant in anesthesia.

RUTH BERRGREN (Chem. Abstr.).

Cell Pharmacodynamics. I. Mode of Action of Medicinal Substances. Variations in Cell Respiration in Certain Tissues Under the Influence of Some Drugs. Levy, Jeanne (*Univ. Paris*). [*Bull. soc. chim. biol.*, **28**, 328–32 (1946).]

Preliminary Discussion. II. Respiration of Cerebral Cortex Cells Under the Influence of Associated Hypnotic Drugs. Buchel-Olszycka, L. [*Ibid.*, 333–8.]

EtOH and chloral hydrate together exert a greater inhibiting influence on the O consumption of rat cerebral cortex slices than the calculated sum of their individual effects.

III. Respiration of Cerebral Cortex Cells Under the Influence of Caffeine, Eserine, Ephedrine and Benzedrine. Levy, Jeanne. [*Ibid.*, 338–41.]

Caffeine and eserine increase the O consumption of rat-brain slices. Ephedrine and benzedrine in any concentration have an inhibiting action. Na camphosulfonate slightly increases O consumption, although it is not supposed to act on the central nervous system.

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

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Curare—Procurement and Pharmacology of the Dimethyl Ether of Methyl Bebeerine. Brazil, Oswaldo V, Seba, Roched A., and Campos, Joao S. (Inst. Vital Brazil Niteroi). [*Bol. Inst. Vital Brazil*, **5**, 79–96 (1945) (*with English summary*).]

Bebeerine dimethyl ether methyl chloride has a physiological action similar to that of curare. It was prepared by the methylation of purified extracts from the root of *Chondrodendron platyphyllum*. Crystal bebeerine (50 gm.) m. 213–14° from the root of *C. platyphyllum* was heated three hours over a water bath with 500 c.c. of CH_3OH, 15 gm. of Na methylate, and 130 gm. of MeI. The material was cooled till the following day, at which time a cream-coloured substance, which was the iodide of the monomethyl and dimethyl ethers of bebeerine precipitated. Pb chloride (30 gm.) was added, and the material was filtered and twice recrystallized from methanol. The iodide crystals of the dimethyl ether of methylbebeerine thus obtained were prismatic m. 257°. The iodide was converted to the chloride by treatment with an excess of AgCl. The chloride crystallized in bundles of fine needles. The authors conclude that the Me derivations of bebeerine and tubocurarine are isomers. The chloride of the methyl ether of methylbebeerine had greater biological activity than the simple chloride of the bebeerine, the fatal dose of the former when injected intravenously being 0·01 mgm. per mouse (*Drymomys musculos* Natt.) weighing 18–20 gm. and the fatal dose of the latter being 2 mgm. The dose of the methyl ether of methylbebeerine necessary to paralyse the forefeet of the mice was 0·0025 mgm., and to paralyze both pairs of feet required 0·005 mgm. The dose of the chloride of bebeerine needed to paralyze the forefeet was 1 mgm. and that necessary to paralyze both pairs of feet was 2 mgm.; this amount was also the fatal dose. Both drugs caused exophthalmos. Death was preceded by paralysis of the diaphragm. Similar results were obtained on rats, rabbits, dogs, pigeons and frogs (*Leptodactylus ocellatus*). Bebeerine derivations given orally were inactive. They were excreted unchanged in the urine when injected. They did not lower blood pressure in dogs and by implication would not in other species. Dogs receiving 2·5 times the fatal dose could be kept alive by artificial respiration. These experiments show that the fatal effects of bebeerine derivations were due to paralysis of the diaphragm. Bebeerine derivations showed antagonism to prostigmine in the pigeon. Tetanus produced from tetanus toxin in rabbits could be removed by bebeerine derivations. Frogs were unusually resistant to bebeerine, but its action can be demonstrated by injection into the ventral lymphatic sac. Sensitivity to bebeerine derivations differed with different species.

NELLIE M. PAYNE (Chem. Abstr.).

Effect of Cyanide on the Concentration of Lactate and Phosphates in Brain. Olsen, Norman S., and Klein, J. Raymond (Univ. of Illinois, Coll. Med. Chicago). [*J. Biol. Chem.*, **167**, 739–46 (1947); *cf. Albaum et al., C. A.*, **40**, 6164[2].]

The concentration of lactic acid in brain increases after intravenous administration of subconvulsant, convulsant and fatal doses of cyanide. After administration of the two latter doses, the concentration of phosphocreatine decreases. The changes evoked by the convulsant dose and presumably the subconvulsant, are reversible. The changes are attributable to direct action of cyanide upon brain.

LEONARD KRAEL (Chem. Abstr.).

Effect of Insulin Hypoglucemia and Glucose on Various Amino Acids in Blood of Mental Patients. Harris, Meyer M., and Harris, Ruth S. (New York State Psychiatric Inst. and Hosp., New York, N.Y.) [*Proc. Soc. Exptl. Biol. Med.*, **64**, 471–6 (1947); *cf. C. A.*, **37**, 6725[4].]

The level in the blood of all the amino acids investigated decreased to a variable extent during insulin hypoglucemia and also after glucose administration. Differences in the behaviour of the individual amino acids under such conditions are discussed.

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

Antiacetylcholine and Antihistamine Action of Cocaine, Procaine and Percaine. Studies with Aerosols and with Isolated Guinea-pig Intestine. Frommel, E., Favre, M., and Vallette, F. (Faculty of Med. of Geneva, Switz.). [*Arch. intern. pharmacodynamie*, **73**, 355–66 (1947).]

The local anesthetics protect guinea-pigs exposed to aerosols of histamine or acetylcholine, and *in vitro* inhibit their action on the ileum.

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

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Pharmacodynamics of Cerebral Vessels. I. Action of Adrenaline. Popesco, Marin (Univ. Bucharest, Roumania). [*Bull. acad. med. Roumanie*, **17**, 10–20 (1945) (*in French*).]

Simultaneous records of systemic and cerebral (central end of internal carotid) pressures (Huerthle's method) in dogs indicated that cerebral vessels are more sensitive than systemic to vasoconstrictor action of adrenaline. Atropine reinforces this action of adrenaline on the cerebral circulation.

II. Action of Acetylcholine. [*Ibid.*, 21–27.]

Acetylcholine dilates the cerebral blood vessels, and its effect is stronger and of greater duration in cerebral vessels than on the rest of the body. This fact presumably explains the occurrence of fatal cerebral hemorrhages in the course of treatments with acetylcholine preparations. H. H. SZMANT (Chem. Abstr.).

The "Shock Therapies" at the Ontario Hospital, London. Geoghegan, D. J. [*Canad. med. Ass. J.*, **56**, 15–24 (1947).]

Based on the observation of 469 patients treated by diverse shock therapies at the Ontario Hospital since 1944 the following conclusions are drawn: (1) Shock therapy is an indispensable part of a well-organized psychiatric hospital; (2) the duration of certain illnesses is notably shortened by the shocks; (3) several mental states of long duration are clinically ameliorated by this therapy; (4) the danger of this mode of treatment is minimal and it is possible to apply it to cardiorenal cases if the cases are well chosen; (5) electro-shock is the shock treatment of choice, insulin shock being reserved for patients resistant to electro-shock or for certain psychoses where this therapy is more particularly indicated as, for example, schizophrenia; (6) psychotic reactions due to certain infections or intoxications benefit from shocks; (7) curare should only be utilized in rare cases as an adjuvant of shock therapy; and (8) study should be continued as to the value of shock treatment as a prophylactic for certain mental states.

F. C. SUMNER (Psychol. Abstr.).

Effect of Convulsive Activity on the Concentration of Brain Glucose, Glycogen, Lactate and Phosphates. Klein, J. Raymond, and Olsen, Norman S. (Univ. of Illinois Coll. of Med. Chicago). [*J. Biol. Chem.*, **167**, 747–56 (1947); *cf. Stone, et al., C. A.*[3] **39**, 5309[8]; *Albaum et al., C. A.*, **40**, 6164[2]; *Kerr and Antaki, C. A.*, **32**, 996[6].]

Induced convulsive activity is accompanied by decreased concentration of brain glycogen, glucose, phosphocreatine, and adenosinetriphosphate, and increased concentration of lactate, adenosinediphosphate, and inorganic phosphate. The cerebral metabolism of glucose is markedly increased during convulsive activity.

LEONARD KAREL (Chem. Abstr.).

Effects of Some Old and Proposed Anticonvulsants on the Threshold for Electrical Convulsions. Chu, W. C., and Driver, R. L. [*Proc. Soc. exp. Biol., N.Y.*, **64**, 245–48 (1947).]

The possible therapeutic effectiveness of selected anticonvulsant drugs is tested initially by analysis of the effects of each upon the electrical threshold at which epileptiform convulsions are artificially induced in laboratory rats and rabbits. Four hundred tests were made on 210 animals, and 23 drugs were studied. One of the three hydantoins studied appeared "promising," although no more so than the form currently in use. Four drugs of the curare group and 5 vital dyes, including hematoxylin and vital red, were ineffective.

L. A. PENNINGTON (Psychol. Abstr.).

Isopropyl Alcohol, Other Ketogens, and Miscellaneous Agents on Thresholds for Electrical Convulsions and Diphenylhydantoin. Driver, L. [*Proc. Soc. exp. Biol., N.Y.*, **64**, 248–51 (1947).]

The difficulties inherent in administering ketogenic therapy in epileptic states led to the present testing of the effect of products of fat and carbohydrate metabolism upon thresholds at which electrically induced convulsions in laboratory

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animals appear. Results indicate that several chemical compounds exceed the effectiveness of dilantin as an anticonvulsant. The most promising were those chemicals related to acetone, of which group isopropyl alcohol exhibited a "tremendous anticonvulsant effect without ataxia or narcosis." It is hazarded that the effectiveness of the ketogenic diet rests upon the production of acetone in the body. Isopropanol in combination with dilantin raised the electrical threshold far in excess of the latter's anticonvulsant level.

L. A. PENNINGTON (Psychol. Abstr.).

Measurements of the Electrical Activity of Cholinergic, Adrenergic and Anticonvulsant Drugs. Barnes, T. C., and Mauer, I. (Hahnemann Med. Coll., Philadelphia, Pa.). [*Arch. intern. pharmacodynamie*, **73**, 386–91 (1947).]

Prostigmine has a phase-boundary potential greater than any drug thus far studied. Phenobarbital and dilantin generate positive potentials, which counteract the negative acetylcholine potential. Benzedrine gives three times the value of paredrine.

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

Effect of Metrazole on the Electrical Excitability of the Respiratory Centre when Depressed by Phenobarbital. Arellano, Maria I. Robert de Ramirez de (Northwestern Univ. Med. School, Chicago). [*J. Pharmacol.*, **90**, 95–103 (1947).]

Intact cats, anesthetized with Na phenobarbital (I), and decerebrate cats, were given large intravenous doses of metrazole after the respiratory activity had been depressed with (I). These cats showed considerable recovery of respiratory activity. Decerebrate cats not given (I) showed no consistent stimulation of respiratory activity by metrazole.

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

Effects of Some Old and Proposed Anticonvulsants on the Threshold for Electrically Induced Convulsions. Chu, Wei-Chang, and Driver, Robert L. (Stanford Univ. Med. School, San Francisco, California). [*Proc. Soc. Exptl. Biol. Med.*, **64**, 245–8 (1947).

Rats were protected more or less against electrically induced convulsions by isonipecaine, propazone (5,5-dipropyl-2,4-oxazolidinedione), diphenylhydantoin, methylhexylhydantoin, methylamylhydantoin, and di-isobutylhydantoin. The following were ineffective: 3-indolylmethylenehydantoin, curare, β-erythroidine, dihydro-β-erythroidine, quinine ethochloride, theophylline-NaOAc, hematoxylin, Congo red, neutral red, phenol red, methyl red, NH_4SCN, $MgSO_4$ and glutamic acid. A decrease of about 30 per cent. in the threshold was obtained by depriving rats of food or water or both for six days.

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

Isopropyl Alcohol, Other Ketogens, and Miscellaneous Agents on Thresholds for Electrical Convulsions and Diphenylhydantoin. Driver, Robert L. (Stanford Univ. Med. School, San Francisco, Calif.). [*Proc. Soc. Exptl. Biol. Med.*, **64**, 248–51 (1947).]

Isopropyl alcohol, 1.25 gm./kgm. by stomach tube, had a marked protective action against electrically induced convulsions in rats, without producing ataxia or narcosis. It also increased the cortical depressant effectiveness of diphenylhydantoin. 4-Hydroxy-4-methylpentan-2-one (diacetone alcohol), 2,4-dihydroxy-4-methylpentane, Et acetoacetate, PrOH, iso-PrBr, and EtOH afforded some protection (all given by stomach tube). Acetophenone was highly protective but quite toxic. The following were ineffective (given gastrically); the common sugars; lactic, pyruvic, acetic, propionic, butyric, palmitic, citric, malic, succinic, malonic and fumaric acids: BuOH, iso-BuOH, iso-AmOH, iso-Pr ether, and EtOAc. Insulin and Na iodoacetate given hypodermically were ineffective.

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

Studies on Sleep. I. Increasing the Action of Barbiturates by Anticholinesterase Medication. Frommel, Ed., Bischler, A., Gold, P., Favre, M., and Vallette, F. (Univ. Geneve). [*Helv. Physiol. Pharmacol. Acta*, **5**, 64–77 (1947) (*in French*).]

During barbital anesthesia in guinea-pigs there is a decrease in serum cholinesterase activity. The hypnotic action of barbiturates in guinea-pigs and rabbits is

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augmented by drugs that inhibit the action of cholinesterase, especially prostigmine and the Me_2-NCOOH esters of p-hydroxyphenyldimethylamine-HCl and p-hydroxyphenyltrimethylammonium iodide and methylsulfate.

II. Increasing the Action of Barbiturates by Drugs which Act on the Vagus, and the Action of Morphine and Scopolamine on Barbiturate Narcosis. [*Ibid.*, 78–84.

Acetylcholine salts, carbaminoylcholine pilocarpine-HCl and morphine-HCl sensitized guinea-pigs so that sleep was produced by doses of barbiturates ordinarily insufficient to produce an effect. Scopolamine-HBr had no such sensitizing action. One effect of morphine is to block cholinesterase. Pilocarpine acts as an excitant of the parasympathetic system; hence vagal activity appears to be concerned in sleep production.

III. Sympathomimetic, Sympatholytic and Parasympatholytic Drugs and Barbiturate Narcosis. Frommel, Ed., Favre, M., and Vallette, F. [*Ibid.*, 85–90.]

Ergotamine and the common sympathomimetic and parasympatholytic drugs do not increase the action of barbiturates. L. E. GILSON (Chem. Abstr.).

Barbiturate Poisoning and Treatment with Picrotoxin. Nunez, A. Ortega, and Ventura, A. Estades (Inst. J. C. Mutis, farmacognosia, Madrid). [*Farmacoterap. actual (Madrid)*, **4**, No. 31, 38–62 (1947).]

The action of barbiturates and the chemistry and pharmacology of picrotoxin are discussed. Dogs and cats were poisoned with lethal doses of phenobarbital orally or intravenously. Picrotoxin produces a temporary increase in respiration. The action is most rapid by suboccipital application. An intensive increase in depth and rate of respiration is complicated by convulsions. The effect of picrotoxin lasts for one to two hours, that of the barbiturate five to six days. Solutions in oil seem to have a longer action; in one dog, life seemed to be prolonged by picrotoxin in oil. In cases of circulatory failure the additional treatment with circulatory stimulants becomes necessary. A. E. MEYER (Chem. Abstr.).

Comparative Central Depressant Actions of Some 5-phenyl-5-alkylbarbituric Acids. Alles, Gordon A., Ellis, Charles H., Feigen, George A., and Redemann, Mildred A. (Univ. California Med. School, San Francisco). [*J. Pharmacol.*, **89**, 356–67 (1947).]

Additional evidence, from studies of the comparative central actions of dialkyl-, phenylalkyl-, and diphenylbarbituric acids, is presented to show that the mechanism which raises the convulsant threshold is different from the mechanism producing hypnosis as evidenced by ataxia and drowsiness. Anticonvulsant activity is intensified by the presence of one 5-phenyl group, diminished by presence of a second 5-phenyl group, and maximum with the phenylbutyl compound in the series of phenylalkyl (ethyl to hexyl) barbituric acids. Of the 10 compounds studied, 5-phenyl-5-butyl-barbituric acid showed the widest range between anticonvulsant and hypnotic activities. It showed marked anticonvulsant activity at dose levels below the hypnotic dose range. The hypnotic activities of the phenylalkylbarbituric acids are greatest with the compounds containing the smallest 5-alkyl groups, and this type of central depressant activity decreases with increase in the size of the alkyl group. L. E. GILSON (Chem. Abstr.).

Anticonvulsant Activity of Various Nitrogen Heterocycles. I. (Alkylthioether) Barbiturates. II. Phenyl (Alkylthiomethyl) Hydantoins. Cahen, Raymond L. (Maltbie Chem. Co., Newark, N.J.). [*J. Pharmacol.*, **88**, 343–52 (1946).

Most (alkylthioether) barbiturates are effective in the cat only in doses sufficient to produce ataxia. A few compounds of higher molecule weight exhibit the greater anticonvulsant activity independent of any depressant activity; however, the margin between effective dose and ataxic dose remains small. With the exception of the ethyl (tert-butylthioethyl) barbiturate, no compound has as great a duration of action as phenobarbital. Among phenyl (alkylthiomethyl) hydantoins studied in the cat, the Et derivative is the most active; however, it is only 25 per cent. as anticonvulsant as diphenylhydantoin and of shorter duration of action. The margin

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between effective and ataxic dose remains about the same for all these derivatives. (Alkylsufonylmethyl) hydantoins are much less active. (Alkylthiomethyl) hydantoins have a slowly developing anticonvulsant activity following oral administration in rat; they prevent metrazole convulsions over a period of 4·5 days repeated administration. C. J. WEST (Chem. Abstr.).

Experiments in Electrical Anesthesia and Barbiturate Basal Narcosis. Holmes, F. (Univ. Edinburgh). [*Brit. J. Anaesthesia*, **20**, 45–54 (1946).].

A comparative study was made of the effect of some common short-acting barbiturates on the strength of d.c. necessary to anesthetize minnows of varying sizes. Injection of pentothal-Na (Abbott) (I) was followed by an immediate and marked fall in current dose necessary to produce anesthesia; this effect lasted about one hour. Cyclonal-Na (May and Baker) (II) tended distinctly to raise the current-threshold above the pre-injection level, in some cases considerably so, during the period when the effect of the drug was wearing off. The duration of action was shorter and definitely more variable than that of (I). Evipan-Na (Bayer) (III) produced a distinctly irregular action and a sudden falling-off of the current-threshold at varying times after injection. In no case was there a return to the pre-injection level after an hour or more. (II) and (III) have the same chemical formula, yet tend to produce exactly opposite shapes of the curve towards the end of the experiment. No satisfactory explanation can be given at present for this phenomenon. Somnifen (Roche) showed a somewhat irregular action, lasting approximately one hour. Narconumal (Roche) (IV) appeared to have a constant and smooth action which also lasted about one hour. Narconumal in paraldehyde (Roche) caused the fish to become somewhat inco-ordinated some time after the injection and exhibited an action lasting approximately half the time of that produced by (IV). This is contrary to the generally accepted view that if two narcotic drugs are given simultaneously, not only summation but increase of their actions occurs. When used clinically in a few cases, this mixture either failed to produce anesthesia or did so for only a few minutes. Of the drugs tested (I) and (IV) were the most reliable and most constant. A second series of experiments with three fish of different sizes, also indicated that paraldehyde in some way counteracts (IV), shortening its duration of action to approximately half its normal time. RUTH BERGGREN (Chem. Abstr.).

Action of Curare on Temperature Changes in the Brain in Combination with Pentobarbital Narcosis. Feitelberg, Sergei, and Pick, Ernest P. (Mt. Sinai Hosp., New York, N.Y.). [*Proc. Soc. Exptl. Biol. Med.*, **64**, 345–8 (1947).]

In rabbits under light pentobarbital narcosis the intravenous injection of 2 mgm. of curare increased oxidation processes in the brain, causing a rise of 0·3° in brain temperature. Under deep pentobarbital narcosis it had the opposite effect. L. E. GILSON (Chem. Abstr.).

Effect of Narcosis on the Carbohydrate Metabolism of the Brain as Studied by the Analysis of Afferent Blood. Ivanenko, E. F., and Voĭnar, A. O. [*Byull. Eksptl. Biol. Med.*, **14**, *No.* 10, 25–7 (1942).]

Results from experiments with 35 dogs in which the longitudinal sinus was exposed according to London show that anesthesia decreases the utilization of sugar by the brain, increases the utilization of lactic and pyruvic acids, and increases the output of glycogen. Hexanel or a combination of morphine, ether and chloroform was used for anesthesia. EUGENE ROBERTS (Chem. Abstr.).

Effect of Narcosis on the Glycogen Content of the Brain. Ivanenko, E. F., and Voĭnar, A. O. [*Byull. Eksptl. Biol. Med.*, **14**, *No.* 11/12, 56–7 (1942).]

Experiments with 15 rabbits and 50 albino mice revealed that ether anesthesia significantly increased the glycogen content (I) of the brain. In fed rabbits, the increase was from 130·9 ± 8·2 to 223·6 ± 7·6 mgm. of (I) per 100 gm. of fresh tissue weight. In fasted mice, the (I) increased from 103·4 ± 6·2 to 128·8 ± 4·8 mgm., while in fed mice the increase was from 160·0 ± 5·7 to 201·3 ± 4·1. The anesthetic may act both by decreasing glycolysis and increasing the synthesis of (I) in the brain. EUGENE ROBERTS (Chem. Abstr.).

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Action of Narcotics on the Activity of Cholinesterase. III. Concentrations of Substrate and Enzyme in the Manifestations of Inhibitory Action of Narcotics on Enzyme Activity. Mikhel'son, M. Ya. [*J. Physiol.* (*U.S.S.R.*), **32**, 635 (1946).]

The reduction of cholinesterase activity by narcotics was storage at low initial concentrations of acetylcholine and with high values of cholinesterase concentration in the experimental solutions. The study was made in defibrinated dog blood, with EtOH as the narcotic. The above inhibition is strongest when the rate of acetylcholine hydrolysis is highest. G. M. KOSOLAPOFF (Chem. Abstr.).

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