Part III.—Bibliography and Epitome.*

ACTA PSYCHIAT., KBH.

VOL. XVIII. 1943.

Functional and Organic Concepts in Psychiatry. *Möller, E.* 1

AM. J. ORTHOPSYCHIAT.

VOL. XV. APRIL, 1945.

The Problem Child as an Evacuee. *Dukes, E.* 191
Play Therapy in Wartime. *Hay, M.* 201
Character Structure of Day Nursery Children in Wartime as seen through the Rorschach. *Schachtel, A. H., and Levi, M. B.* 213
Treatment by Group Work. *Papanek, E.* 223
First Sight of the Child by Prospective Parents as a Crucial Phase in Adoption. *Bernard, V. W.* 230
Observations on Temper Tantrums in Children. *Geleerd, E. R.* 238
Psychological Privation in Infancy and Subsequent Adjustment. *Goldfarb, W.* . . . 247
The Theoretical Basis of Psychotherapy. *Welch, L.* 256
Types of Relationship and their Application to Psychotherapy. *Slavson, S. R.* . . . 267
The Treatment of an Early Case of Schizophrenia by the Psychic Shock Method. *Fisher, V. E.* 278
The Acquisition of Sexual Knowledge in Children. *Montagu, M. F. A.* 290
Relationships Formed by a Sexually Delinquent Adolescent Girl. *Eisner, E. A.* . . . 301
Mystery Fans and the Problem of "Potential Murderers." *Bergler, E.* 309
Inventory of Themes in Adolescent Fantasy. *Symonds, P. M.* 318
Human Relations and Morale in Industry. Round Table, 1944 329
Psychiatric Disorders in Servicemen and Veterans. *Ackerman, N. A.* 352
Rorschach Test Difference in a Group of Spanish and English Refugee Children. *Tulchin, S. H., and Levy, D. M.* 361
The Man who would Educate His Son. *Teagarden, F. M.* 369

AM. J. PATH.

VOL. XXI. MAY, 1945.

Acute Diffuse Demyelinating Encephalopathy. *Friedman, M.* 519

AM. J. PHYSIOL.

VOL. CXLI. 1944.

The Statistical Analysis of the Knee-jerk. *Emery, F. E.* 64
Functional Alterations in Motor and Supranuclear Mechanisms in Experimental Concussion. *Grant, R. A., et al.* 117
The Effect of Some Internal Factors on Human Work Output and Recovery. *Foltz, E. E., et al.* 641

VOL. CXLII. 1945.

Palmar Skin Resistance (PSR) during a Standard Period of Controlled Muscular Activity as a Measure of Physical Fitness and Fatigue. *Ryan, A. H., and Ranseen, E. L.* . 68
The Sensitivity of the Respiratory Centre to Hydrogen Ion Concentration. *Banus, M. G., et al.* 121

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https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

AM. J. PSYCHIAT.

VOL. CI. MARCH, 1945.
Isaac Ray, Psychiatrist and Pioneer in Forensic Psychiatry. *Stearns, A. W.* . . 573
*General Paresis in Senility. *Arieti, S.* 585
Studies of the Corpus Callosum: IV. *Akelaitis, A. J.* 594
War Neuroses. *Minski, L.* 600
Psychiatric Problems on a South Pacific Island. *Burack, S.* 606
The Reconditioning and Rehabilitating Program in Mental Hospitals. *Barton, W. E.* . 608
A Mental Hygiene Program for the Military Hospital. *Lipschutz, L. S., and Rosen, R.* . 614
War Neuroses in Flying Personnel Overseas and after Return to the U.S.A. *Grinker, R. R., and Spiegel, J. P.* 619
Psychiatric Casualties in the Royal Canadian Navy. *Wellman, M., and Simpson, J. F.* . 625
A Course in Psychological First-aid and Prevention. *Blain, D., et al.* 629
An Integrated Medico-Psychological Program at the United States Coast Guard Academy. *Felix, R. H., et al.* 635
Neuropsychiatry in the U.S. Marine Corps, Women's Reserve. *Solomon, P., et al.* . . 643
Review of Cases at Merchant Marine Rest Centers. *Powdermaker, F.* 650
The Psychiatric Aspects of Office Selection. *Hawk, W. A.* 655
Selective Service Violators. *Southard, C. G., and Hurley, J. R.* 661
Hypnotic Techniques for the Therapy of Acute Psychiatric Disturbances in War. *Erickson, M. H.* 668
Tattooed Psychotic Patients. *Pollak, O. J., and McKenna, E. C.* 673
Color Blindness in the Psychoses. *Kaplan, H. M., and Lynch, R. J.* 675
Psychiatric Aspects of Prostitution Control. *Thompson, G. N.* 677
The Homosexual as a Personality Type. *Greenspan, H., and Campbell, J. D.* . . 682
The Psychiatric Facilities of Chicago and Surroundings. *Bassoe, P.* 690

General Paresis in Senility.

General paresis occurs in senility with considerable frequency. In the State of New York, about 10 per cent. of paretics admitted for the first time to state hospitals are 60 years old or more.

The incubation of the senile type of paresis is generally either extremely long (40–50 years), or rather short (5–7 years). The diagnosis is often made difficult by the fact that the blood serology is negative, in spite of the progress of the histologic inflammatory process.

Pathologic investigations revealed that these cases may be divided into two groups: the first group, by far less common, characterized by intense inflammatory changes, presence of alterations typical of senility, and absence of arteriosclerotic lesions; the second group characterized by milder inflammatory changes, absence of alterations typical of senility, and the almost constant presence of arteriosclerotic lesions.

Study of the interrelations between the paretic process, cerebral arteriosclerosis, and senility, seems to indicate that (1) the neuroluetic inflammatory process may have an inhibitory influence upon the neuropathologic changes of senility. On the other hand the senile process may have a stimulating influence upon the neuroluetic inflammation. (2) Neurolues may accelerate the arteriosclerotic process of the brain. Cerebral arteriosclerotic changes in turn may tend to diminish the intensity of the inflammatory process. (Author's abstr.)

AM. J. PSYCHOL.

VOL. LVII. 1944.
Effect of Random Presentation on the Psychometric Function: Implications for a Quantal Theory of Discrimination. *Miller, G. A., and Garner, W. R.* 451
Perception and Bodily Adjustment under Changing Rotary Acceleration. *Travis, R. C.* . 468
Clinical Significance of Motor Defect, with Military Implications. *Heath, S. R., jun.* . 482
The Treatment of Multiple Entries in Analysis of Variance with Three Criteria of Classification. *Schoenfeld, W. N.* 500
Criteria of Historical Development. *Feldman, S.* 509
An Empirical Study of the Influence of Errors of Measurement upon Correlation. *Johnson, H. G.* 521
Evidence from Literate Tastes and Preferences upon the Interests of Men Employed in Industry. *Uhrbrock, R. S.* 537
Time Errors in Successive Comparison of Simple Visual Objects. *Tresselt, M. E.* . . 555
Alleged Binocular Color Mixing. *Dunlap, K.* 559
Illusion and Error in Personalistic Act Psychology. *English, H. B.* 563
Varieties of Fatigue. *Ryan, T. A.* 565
Fatigue Defined as Reduced Efficiency. *Bitterman, M. E.* 569

APPL. PSYCHOL. MONO.

1944.
Supplementary Guide for the Revised Stanford-Binet Scale (Form L). *Pintner, R., Dragositz, A., and Kushner, R.* . . . . . No. 3

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

ARCH. GES. PSYCHOL.

VOL. CXI. 1942-43.

Psychological Investigations on the Binaural Effect. *Johannesson, J.* 225
The Psycho-physical Bases of the Immanence Problem. *Schultze, F. E. O.* . . . 288

ARCH. INT. MED.

VOL. LXXV. MAY, 1945.

Brain Abscess Associated with Heart Disease. *Robbins, S. L.* 279

ARCH. NEUROL. PSYCHIAT.

VOL. LIII. MARCH, 1945.

Visual Disturbances Produced by Bilateral Lesions of the Occipital Lobes with Central Scotomas. *Bender, M. B., and Furlow, L. T.* 165
Vasothrombosis of the Central Nervous System. *Scheinker, I. M.* 171
Polyradiculoneuritis with Albuminocytologic Dissociation. *Lowenberg, K., and Foster, D. B.* 185
Lesions in the Brain Associated with Malaria. *Rigdon, R. H., and Fletcher, D. E.* . . . 191
Characteristic Roentgenographic Changes Associated with Tuberous Sclerosis. *Dickerson, W. W.* 199
Hemifacial Spasm. *Ehni, G., and Woltman, H. W.* 205
*Metrazol and Electric Convulsive Therapy of the Affective Psychoses. *Ziskind, E., et al.* 212
Carcinoma of the Uterine Fundus with Metastasis to the Brain. *Hodge, G. B., and Steelman, H. F.* 218
Causalgia. *Lidz, T., and Payne, R. L., jun.* 222
Erotomania (Nymphomania) as an Expression of Cortical Epileptiform Discharge. *Erickson, T. C.* 226

New York Neurological Society and New York Academy of Medicine, Section of Neurology and Psychiatry.

Biochemical and EEG Changes Associated with Delirium Tremens. *Kennard, M. A., et al.* 240
Prognostic Significance of Certain Factors in Schizophrenia. *Lewis, N. D. C.* . . . 241

Philadelphia Neurological Society.

Intelligence Following Prefrontal Lobotomy in Obsessive Tension States. *Watts, J. W., and Freeman, W.* 244
EEG and Pneumoencephalographic Studies of Multiple Sclerosis. *Freeman, W., and Cohn, W.* 246
Neonatal Toxoplasmosis. *Winkelman, N. W., and Moore, M. T.* 247

American Association of Neuropathologists.

Porencephaly. *Marburg, O.* 248
Influence of Gonads and Adrenal Glands on the Chemical Composition of the Brain. *Weil, A., and Groat, R. A.* 248
Acute Fatal Experimental Toxoplasmosis in a Young Monkey. *Cowen, D., and Wolf, A.* 249
Histopathology of Cerebral Aneurysms. *Forster, F. M., and Alpers, B. J.* 249
Giant Cells in Neuro-ectodermal Tumors of the Brain. *Globus, J. H., and Kuhlenbock, H.* 250
Periarteritis Nodosa with Decerebrate Rigidity and Extensive Encephalomalacia in a Five Year Old Child. *Malamud, N.* 251
Neurogenic Polycythemia. *Walker, E. A.* 251
Coagulation Necrosis in the Brain. *Neuberger, K. T.* 253
Lipoma in the Quadrigeminal Plate with Hydrocephalus. *Davison, C.* 253
Encephalitis Affecting the Basal Ganglia in Monkeys. *Richter, R.* 254
Histologic Changes in a Case of Paramyoclonus Multiplex. *Hassin, G. B., and Kepner, R.* 255

Metrazol and Electric Convulsive Therapy of the Affective Psychoses: A Controlled Series of Observations Covering a Period of Five Years.

1. The benefits of convulsive therapy of the affective psychoses are to be gaged by the reduced period of illness and the greater number of recoveries. The latter effect is due to the decreased number of deaths rather than to any inherent greater therapeutic effect. The treatment in itself is not responsible for any greater incidence of recovery than that which occurs spontaneously if the patient is shielded from death by suicide or exhaustion.

2. The known hazards of treatment for treated patients are less than the hazards for untreated patients. In this study 13 died as a result either of suicide or of exhaustion.

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3. Subconvulsive doses, incomplete therapy and old age are unfavorable factors. Subconvulsive reactions should be avoided.

4. The tendency to recurrences or to new attacks is apparently not influenced by treatment.

5. The possibility of damage to the brain still calls for quantitative evaluation. A margin of safety may be found.

6. This study presents an equal number of control (untreated) and treated patients. More such studies are needed in order to solve adequately the problem of the effect of convulsive therapy of the affective psychoses. (Authors' abstr.)

APRIL.

Studies on Pain. *Ray, B. S., and Wolff, H. G.* 257
*Edema and Trophic Disturbances of the Lower Extremities Complicating Prefrontal Lobotomy. *Ziegler, L. H., and Osgood, C. W.* 262
Organic Psychotic Syndromes Occurring during Electric Convulsive Therapy. *Kalinowsky, L. B.* 269
*Origin of the Spike and Wave Pattern of *Petit Mal* Epilepsy. *Hursh, J. B.* 274
*EEG Study of Prefrontal Lobotomy. *Cohn, R.* 283
Transtentorial Herniation of the Brain-stem. *Scheinker, I. M.* 289
Lipoma of the Brain. *Ehni, G. J., and Adson, A. W.* 299
*Bromine Content of the Blood in Mental Diseases. I. Dementia Praecox. *Wikoff, H. L., et al.* 305
Skull Defect and Herniation of Cerebrum with Absence of Dura Following Head Injury in Adolescence. *McCune, W. S., and Woodhall, B.* 307
Myelitis Complicating Measles. *Senseman, L. A.* 309

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY.

Psychiatric Problems in Conservative Treatment of Ulcerative Colitis. *Lindemann, E.* . 322
Frontal Lobotomy. *Poppen, J. L.* 324
Effects of Lesions of the Periaqueductal Gray Matter in Cats and Monkeys. *Bailey, P., and Davis, E. W.* 325

Edema and Trophic Disturbances of the Lower Extremities Complicating Prefrontal Lobotomy.

Of the authors' series of 19 prefrontal lobotomies, 2 died, and of the remaining 17, 8 have presented complications referable to both legs and feet. Six had bilateral oedema, in 4 of whom the oedema was associated with tenderness. The authors are unable to offer an explanation for a phenomenon which Freeman does not mention in his book on Psychosurgery. They think there may be areas in the brain lesions of which produce oedema and vascular and trophic disturbances. G. W. T. H. FLEMING.

Origin of the Spike and Wave Pattern of Petit Mal *Epilepsy: An Electroencephalographic Study.*

The post-operative records of 2 patients with nearly complete section of the corpus callosum show "*petit mal*" sequences displaying a simultaneous onset in bilaterally symmetric leads. Since conduction between the two hemispheres *via* axon paths in the corpus callosum has been destroyed, the existence of a cortical focus cannot be assumed in these particular patients. It is most likely that in the records of patients without section of the corpus callosum in which a similar simultaneous onset was displayed, conduction of the signal did not occur through the corpus callosum, and that the source of this signal was subcortical in these patients, as well as in the patients subjected to operation.

The thalamus or the hypothalamus is considered as a tentative site for the pacemaker of the spike and wave complex. (Author's abstr.)

Electroencephalographic Study of Prefrontal Lobotomy: A Study of Focal Brain Injury.

1. The primary electroencephalographic response of the human brain to localized injury (prefrontal lobotomy) is the production of focal slow waves. These may or may not persist.

2. With lobotomized patients the return of the electroencephalic pattern to a relatively normal pattern usually requires one to three months.

3. Certain persons show no demonstrable response to cerebral injury under the conditions of these experiments.

4. A representative group of subjects show apparent normal early recovery, and then again exhibit grossly abnormal variations in potential in the region of the original injury. At times the abnormality may be general.

5. Hyperventilation after cerebral injury induces pronounced slow wave activity in brains that before injury were uninfluenced by a similar procedure.

6. Of the present group of 30 patients, 1 had clinically recognized convulsions.

7. The aforementioned phenomena are general and thus apply to injury to the brain from other traumatic agents. (Author's abstr.)

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Bromine Content of the Blood in Mental Diseases. I. *Dementia Precox.*

The average bromine content of the blood of 172 patients with dementia precox was found to be 0·555 mg. of bromine per hundred cubic centimeters of blood. It is significant that the values for 80·2 per cent. of the patients examined varied from the average (0·555 mg.) by less than 0·2 mgm. The average value for the patients with dementia precox was lower than the average obtained by the same method for normal persons residing in the same city.

(Authors' abstr.)

ARCH. PATH.

VOL. XXXIV. APRIL, 1945.

Morphologic Alterations of the Neuron due to Tumor Invasion. *Stern, K., and Odom, G. L.* 221

MAY.

Diffuse Meningeal Fibroblastoma of the Brain and Spinal Cord. *Haythorn, S. R., Shapera, W., and Stewart, H. C.* 287
Neoplastic Diseases of the Human Hypophysis. *Kraus, J. E.* 338

BRAIN.

VOL. LXVII. DECEMBER, 1944.

Denervation and Re-innervation of Human Voluntary Muscle. *Bowden, R. E. M., and Gutmann, E.* 273
The Electrical Diagnosis of Peripheral Nerve Injury. *Ritchie, A. E.* 314
Disorders of Visual Space Perception Associated with Lesions of the Right Cerebral Hemisphere. *Paterson, A., and Zangwill, O. L.* 331

BRIT. J. EDUC. PSYCHOL.

VOL. XV. JUNE, 1945.

Fallacious Arguments from Experiments on Methods of Teaching. *Philpott, S. J. F.* .. 57
Some Surprising Beliefs Concerning Human Nature among Pre-medical Psychology Students. *Ralya, L. L.* 70
The Distribution of Intelligence among University and College Students. *Thomson, G. H.* 76
The Reliability of Teachers' Assessments of their Pupils. *Burt, C.* 80

BRIT. J. PSYCHOL.

VOL. XXXV. MAY, 1945.

The Influence of Scoring Methods upon Score in Motor Perseveration Tests. *Walker, K. F., Staines, R. G., and Kenna, J. C.* 51
On Identifying Aesthetic Types. *Peel, E. A.* 61
*Graphological Analysis and Psychiatry. *Eysenck, H. J.* 70
The Environment and the Child. *Banister, H., and Ravden, M.* 82

Graphological Analysis and Psychiatry: An Experimental Study.

The handwritings of fifty neurotic male Service patients at Mill Hill Emergency Hospital were analyzed by a graphologist, and checked in a variety of ways against various personality indices. These included a personality analysis and diagnosis by the psychiatrist in charge of the case, a history of the neurotic illness of the patient, the patient's answers on a personality inventory administered personally, and the results of an intelligence test. The following results were arrived at, and the following conclusions drawn:

1. Out of 1,350 judgments by the graphologist, concerning certain points of the patients' temperament and personality, 62 per cent. ± 1·4 per cent. S.E. were correct, as checked against the patients' own answers. (Chance expectation = 50 per cent.)

2. Out of 152 judgments by the graphologist on which she felt particularly confident, 68 per cent. ± 3·5 per cent. S.E. were correct. (Chance expectation = 50 per cent.)

3. The graphologist did not succeed in predicting the intelligence gradings of the patients, with the exception of those with very superior intelligence.

4. Persons tend to differ consistently with regard to the ease with which their handwriting can be diagnosed.

5. Traits differ with regard to the ease with which their presence or absence may be detected from handwritings.

6. The graphologist succeeded in matching character sketches of the patients, and other material, against their handwritings, the average coefficient of contingency being 0·46 for ten five-by-five matchings.

7. Psychiatrists did not match character sketches written by the graphologist on the basis of the patients' handwriting with the actual personalities of the patients with better-than-chance success.

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8. Ten psychologists and psychiatrists with no, or very little, knowledge of graphology matched character sketches and handwritings with rather less-than-chance success.

9. Taken together, these results seem to show fairly conclusively that it is possible for a skilled graphologist to diagnose personality traits from handwriting with better-than-chance success.

10. Further progress in this field seems to depend largely on the close collaboration of graphologists and psychologists. (Author's abstr.)

BULL. CANAD. PSYCHOL. ASSOC.

VOL. IV. 1944.

Proceedings of the Annual Meeting of the Canadian Psychological Association. *Bernhardt, K. S.* 33
Report of the Test Research Committee. *Humphrey, G.* 34
The Problem of Generalization. *Humphrey, G.* 37
A Study of Methods of Measuring and Factors Associated with the Social Relationships of Nursery School Children. *Frankl, E. B.* 56
A Study of the Social Relationships of Grade-School Children. *Potashin, R.* 57
The Effectiveness of a Combination of Several Measures of Flying Aptitude for the Selection of Pilots. *Signori, E. I.* 58
R.C.A.F. Classification Test. *Wilson, D. J.* 63
The Role of Intellect in Democratic Morale. *Wright, H. W.* 64

BULL. MENNINGER CLIN.

VOL. IX. JANUARY, 1945.

Hypnosis Research Project 1
Military Psychiatry. *Robbins, L. L.* 8
Chloroform Habituation. *Schneck, J. M.* 12
Psychiatric Aspects of Highway Traffic Law Enforcement. *Menninger, K.* 18

COMP. PSYCHOL. MONOGR.

VOL. XVIII. 1944.

The Effects of Cumulative Training upon Retroactive Inhibition and Training. *Marx, M. H.* . . . . . No. 2

CRIMIN., MEX.

VOL. X. 1944.

Juvenile Delinquency in U.S.A. *Garcia Cerda, O.* 650
Sociological Approach to the Problem of Mental Deficiency as a Factor in Classifying Delinquents. *Vold, G. B.* 734

DIS. NERV. SYST.

VOL. VI. APRIL, 1945.

Essentials of Veteran's Rehabilitation. *Braceland, F. J.* 101
Amimia or Emotional Paralysis of the Face. *Karnosh, L. J.* 106
The Mentally Unfit. *Menninger, W. C.* 109
Problems of the Rejected Man. *Rich, G. J.* 115

MAY.

A Symposium on the Problem of Rehabilitation of Neuropsychiatric War Casualties . 133

JUNE.

Civilian Mental Health in Wartime. *Stevenson, G. S.* 173
Narcolepsy in Negroes. *Solomon, P.* 179
Nervous Disorders in the Armed Forces. *Zabriskie, E. G.* 184
Involutional Psychoses Treated with Shock Therapy. *Taylor, J. H.* 189

EDUC. PSYCHOL. MEASMT.

VOL. IV. 1944.

An Inventory of Students' General Goals in Life. *Dunkel, H. B.* 87
How Teachers can Improve their Tests. *Engelhart, M. D.* 109
Prediction of College Success by Means of Thurstone's Primary Abilities Tests. *Goodman, C. H.* 125
Test Construction in Public Personnel Administration. *Adkins, D. C.* 141
Relationship between Kuhlmann-Anderson Intelligence Tests in Grade I and Academic Achievement in Grades 3 and 4. *Allen, M. M.* 161

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

GENET. PSYCHOL. MONOGR.

VOL. XXXI. 1945.

The Evolution of Intelligent Behavior in Rhesus Monkeys. *Weinstein, B.* 3
Perceptual Behavior of Brain-injured, Mentally Defective Children: An Experimental Study by Means of the Rorschach Technique. *Werner, H.* 51

INT. J. PSYCHOANAL.

VOL. XXV. 1944.

Notes on Metapsychology as Process Theory. *Brierley, M.* 97
Forty-four Juvenile Thieves. *Bowlby, J.* 107
On Appersonation. *Sperling, O.* 128
Notes on Traumatic Neuroses and Allied Conditions. *Hardcastle, D. N.* 132
The Nature and Treatment of Traumatic War Neuroses in Merchant Seamen. *Blain, D., and Heath, R. G.* 142
The Formative Activity of the Analyst. *Sterba, R.* 146
On Some Aspects of Masochism. *Lewinsky, H.* 150
Déjà vu in Proust and Tolstoy. *Pickford, R. W.* 155
Some Aspects of Political Ethics from the Psycho-Analytical Point of View. *Money-Kyrle, R. E.* 166

J. ABNORM. SOC. PSYCHOL.

VOL. XL. JANUARY, 1945.

Wartime Rumors of Waste and Special Privilege. *Allport, F. H., and Lepkin, M.* . . 3
The Health and Occupational Adequacy of the Mentally Deficient. *Kingsley, L. V., and Hyde, R. W.* 37
Professional Ethics and Problems of Therapy. *Sargent, H.* 47
An Evaluation of Prefrontal Lobotomy through Ward Behavior. *Schrader, P. J., and Robinson, M. F.* 61
Test Profiles as a Diagnostic Aid. The Bernreuter Inventory. *Schmidt, H. O., and Billingslea, F. Y.* 70

APRIL.

A Teacher-Therapist Deals with a Handicapped Child. *Axline, V. M., and Rogers, C. R.* 119
The Zoot Effect in Personality. *Clark, K. B., and Barker, J.* 143
M.S. at Fifteen and at Forty. *Green, G. H., and Alper, T. G.* 149
A Psychological Study of a Schizophrenic. *Shakow, D., Rodnick, E. H., and Lebeaux, T.* 154
The "Phantom Anesthetist" of Mattson. *Johnson, D.* 175
Pamela: A Case Study in Status Symbols. *Oppenheimer, F.* 187
The Personality of a Psychotic Ex-Soldier. *Rosenzweig, S., and Clark, R. A.* . . . 195
Mrs. Jones's Ethnic Attitudes. *Samelson, B.* 205
Three Diagnostic Methods Applied to Sally. *Munroe, R.* 215
The Realistic Synthesis. *White, R. W., et al.* 228
A Demonstration of Hypnotism. *Hampton, P. J.* 249

J. APP. PSYCHOL.

VOL. XXVIII. 1944.

The Tenth Nation-wide Social Experimental Survey. *Link, H. C.* 363
An Engineering and Physical Science Aptitude Test. *Griffin, H. C., and Baron, H.* . 376
A Study of the Reliability of the Minnesota Rate of Manipulation Test by the Split-half and Test-retest Methods. *Tuckman, J.* 388
A Preliminary Report on Some New Tests of Musical Ability. *Lundin, R. W.* . . . 393
Leadership as Related to the Bernreuter Personality Measures. *Hanawalt, N. W., and Richardson, H. M.* 397
Simplifying the Scoring Technique of the Bernreuter Personality Inventory. *Kempfer, H.* 412
Simplified Scoring of the Bernreuter Personality Inventory. *McClelland, D. C.* . . 412
An Empirical Evaluation of Study Habits in Elementary German. *Wittenborn, J. R., and Larsen, R. P.* 420
The Use of the Free Association Technique in the Investigation of the Stimulus Value of Trade Names. *Foley, J. P., jun.* 431

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

J. CLIN. PSYCHOL.

VOL. I. JANUARY, 1945.

The Field of Clinical Psychology. (Editorial) 1
Series of Tasks for Dearborn Form Board No. 3. *Kent, G. H.* 20
Clarification of Rorschach Responses by the Graphic Rorschach Method. *Paster, S., and Grassi, J. R.* 28
An Illustration of Non-directive Psychotherapy. *Madigan, V. E.* 36
Directive Psychotherapy. I. Reassurance. *Andrews, J. S.* 52
Methods for Rapid Personality Evaluation. *Curtis, V. B., and Thorne, F. C.* . . . 66
Conscious and Non-Conscious Mental Functions. *Chalfont, E. M.* 77

APRIL.

Symposium: Clinical Psychology in the Military Services 93
Follow-up of a Counselling Case Treated by the Non-directive Method. *Combs, A. W.* . 147
Directive Psychotherapy. II. The Theory of Self-consistency. *Thorne, F. C.* . . . 155

J. COMP. NEUR.

VOL. LXXXII. FEBRUARY, 1945.

The Vascularity of the Brain of the Hibernating Frog and its Relation to Function. *Drummond, S. P.* 1
Spinal Ganglion Hypoplasia after Limb Amputation in the Fetal Rat. *Hall, E. K., and Schneiderhan, M. A.* 19
Origin of the Mesencephalic V Root Cells in *Amblystoma*. *Piatt, J.* 35
Certain Nuclear Groups of the Avian Mesencephalon. *Jungherr, E.* 55
The Components of the Cervical Sympathetic Trunk with Special Reference to its Accessory Cells and Ganglia. *Foley, J. O.* 77
Further Observations on the Intramedullary Sensory Type Neurones Along the Hypoglossal Nerve. *Pearson, A. A.* 93
The Adendroglia. *Andrew, W., and Ashworth, C. T.* 101

APRIL.

Neurosecretion. VII. The Preoptico-hypophysial Pathways in Fishes. *Sanford, L. P.* . 129
Retinal Pigment Responses Following Hypophysectomy in Amphibia. *Detwiler, S. R.* . 145
The Intramedullary Course of Afferent Fibers of the Vagus Nerve in the Cat. *Ingram, W. R., and Dawkins, E. A.* 157
Fiber Connections of the Corpus Striatum of the Monkey and Baboon. *Mettler, F. A.* . 169
Distribution of Taste Buds in Fungiform Papillae on Tongue of the Opossum. *Elliott, R.* 205

JUNE.

The Nuclear Patterns and Fiber Connections of Certain Basal Telencephalic Centers in the Macaque. *Lauer, E. W.* 215
The Embryological Development of the Commissura Posterior in the Human Spinal Cord. *Hogg, I. D.* 255
The Differentiation of Embryonic Chick Medulla in Chorioallantoic Grafts. *Reddick, M. L.* 283
The Pyramidal Tract. *Lassek, A. M., and Wheatley, M. D.* 299
The Seventh Nerve Complex. *van Buskirk, C.* 303
The Influence of a Growing Limb on the Differentiation of Somatic Motor Neurones in Transplanted Avian Spinal Cord Segments. *Bueker, E. D.* 335

J. COMP. PSYCHOL.

VOL. XXXVIII. APRIL, 1945.

The Effect of Thiamine Hydrochloride on the Incidence of Audiogenic Seizures among Selectively Bred Albino Rats. *Griffiths, W. J., jun.* 65
Defective Color Vision and its Remedy. *Dunlap, K.* 69
An Exploratory Investigation of Primary Response Generalization. *Arnold, W. J.* . 87
The Effect of Coramine and the Facilitation of the Audiogenic Seizure. *Turchioe, R.* . 103
Emotional Behavior of Gray Norway and Wistar Albino Rats. *Farris, E. J., and Yeakel, E. H.* 109
Degree of Interpolated Learning and Retroactive Inhibition in Maze Learning. *Waters, R. H., and Vittall, A. G.* 119

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

J. CONSULT. PSYCHOL.

VOL. VIII. 1944.

Psychologists' Functions in a Hospital. *Wells, F. L.* 267
Work of the Psychologist in a Psychiatric Unit for Children. *Kinder, E. F.* . . . 273
The Psychologist in the Psychiatric Hospital. *Wechsler, D.* 281
Psychometric Methods in a Mental Hygiene Clinic of a Psychiatric Hospital. *Barten, M. B.* 286
Psychological Services in State Hospitals for the Mentally Ill. *Wittman, P.* . . . 291
The Psychologist in the Private Mental Hospital. *Rapaport, D.* 298
The Psychologist in the General Hospital. *Schott, E. L.* 302
The Psychologist in the Neurological Hospital. *Tallman, G.* 308
The Psychologist in the Tuberculosis Hospital. *Seidenfeld, M. A.* 312
The Station Hospital Psychologist. *Stevens, P.* 319

J. EDUC. PSYCHOL.

VOL. XXXV. 1944.

Evolution in Education through Army Experience. *Witty, P. A., and Goldberg, S.* . 338
The Relationship between the Centroid and Spearman's Methods. *Holzinger, K. J.* . 347
The Scoring of Continuity or Rearrangement Tests. *Odell, C. W.* 352
Relations between Ability and Social Status in a Midwestern Community. *Havighurst, R. J., and Janke, L. L.* 357
Difficulty of Vocabulary Learning as Affected by Parts of Speech. *Morgan, C. L., and Bonham, D. N.* 369
Criteria for Determining the Readability of Type Faces. *Tinker, M. A.* 385
A Multiple-factor Analysis of the Character Trait Intercorrelations Published by Sister M. McDonough. *Brogden, H. E.* 397
*The Relationship between Vocabulary Levels and Levels of General Intelligence in Psychotic and Non-Psychotic Individuals of a Wide Age-range. *Rabin, A. I.* 411
The Factor of Motivation in Learning as Applied to the Making of a Teaching Film. *Hamilton, J. L.* 423
An Experimental Study of the Generalizing Study of Grade II Pupils. *Dickinson, A. E., and Tyler, F. T.* 432
Rate of Comprehension of Reading. *Blommen, P., and Lindquist, E. F.* 449
Transfer in Children's Maze Learning. *Jones, H. E., and Batalla, M.* 474
On the Estimation of the Changes in Correlation and Regression Constants due to Selection on a Single Given Variable. *Brogden, H. E.* 484
The Relationship between Scores on a Clerical Test and Clerical Proficiency in Library Work. *Oberheim, G. M.* 493
A Note on Correcting Reliability Coefficients for Range. *Davis, F. B.* 500
Adolescent Performance in the Wechsler-Bellevue Intelligence Scales and the Revised Stanford-Binet Examination, Form L. *Goldfarb, W.* 503
Some Factors Associated with Popularity. *Young, L. L., and Cooper, D. H.* 513
Graphic Instruction in Relational Reasoning. *Morgan, J. J. B., and Carrington, D. H.* . 536
Selection of Female Engineering Trainees. *Bolanovich, D. J.* 545
Notes on the Original and Revised Kent Scales in the Examination of Naval Recruits. *Lewinski, R. J.* 554
Counselee's Ratings of Formative Influences upon Vocational Choice. *Abramson, L. S.* . 559
The Correction Formula for Matching Tests. *Chen, L.* 565

The Relationship between Vocabulary Levels and Levels of General Intelligence in Psychotic and Non-Psychotic Individuals of a Wide Age-range.

The Wechsler-Bellevue test scores and the Form L vocabulary of the 1937 Terman and Merrill Revision of the Binet test were given to 268 patients in a state hospital. The ages of the subjects ranged from 15 to 69. The IQ's indicated by the two tests gave a correlation of $r = .78$. Discrepancies between the two scores were studied. The vocabulary test over-estimates the intellectual level (*i.e.*, gives higher scores than the Bellevue test), the differences being smallest at the teen-age level and largest at the old-age level. All the psychopathological groups showed greater IQ discrepancies in favor of vocabulary scores than did the non-psychotic group, but little difference was noted between the several diagnostic groups, and the magnitude of the discrepancy was not clearly related to the severity of the type of mental condition.

E. B. MALLORY (Psychol. Abstr.).

J. EXP. PSYCHOL.

VOL. XXXV. FEBRUARY, 1945.

Utrocular or " Which Eye " Discrimination. *Smith, S.* 1
The Acquisition of a Trace Conditioned Response as a Function of the Magnitude of the Stimulus Trace. *Reynolds, B.* 15
Trial and Error Learning with Differential Cues. *Jones, H. E.* 31

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

Experimental Studies in Affective Processes. *Haggard, E. A.* 46
A Study of Individual Differences in Motion Acuity at Scotopic Levels of Illumination. *Warden, C. J., et al.* 57
Generalization in Memory. *Goodwin, J., et al.* 71
An Alternative Explanation of the Effect of Temperature upon Retention in the Goldfish. *Jones, F. N.* 76

APRIL.

Extinction of Trace Conditioned Responses as a Function of the Spacing of Trials during the Acquisition and Extinction Series. *Reynolds, B.* 81
Drive Interaction. I. Learning as a Function of the Simultaneous Presence of the Hunger and Thirst Drives. *Kendler, H. H.* 96
*Problem Solution by Monkeys following Bilateral Removal of the Prefrontal Areas. V. Spatial Delayed Reactions. *Campbell, R. J., and Harlow, H. F.* 110
Static Equilibrium and Vestibular Function. *Birren, J. E.* 127
The Relation of Speed of Learning to Amount Retained and to Reminiscence. *Leavitt, H. J.* 134
A Comparison of the Navy Adaptometer Test and the Columbia Motion Acuity Test. *Warden, C. J., and Ross, S.* 147
The Effect of Certain Variables on Visual and Auditory Reaction Times. *Forbes, G.* . 153
Identification of Post-hypnotic Signals and Responses. *Marcuse, F. J., Hill, A., and Keegan, M.* 163

Problem Solution by Monkeys following Bilateral Removal of the Prefrontal Areas. V. Spatial Delayed Reactions.

1. Twelve rhesus monkeys, six normal animals and six which had been subjected to bilateral prefrontal lobectomy, were tested on spatial delayed reactions, using a direct method.

2. Two of the operated monkeys solved 20 sec. (or longer) delayed reactions, performances comparable to the best of the normal animals. The other four operated monkeys adapted poorly to the delayed reaction tests.

3. The performance of monkeys following extensive bilateral lesions of the prefrontal association areas appears to be influenced by the length of the post-operative recovery period, previous test history, and extent of the lesion within the prefrontal areas.

4. It is suggested that monkeys, following destruction of the prefrontal association areas, suffer deficit in attending and fixating limited aspects of a test situation, and that this operates to reduce the effectiveness of the acquisition of complex problems such as the delayed reaction run by the direct method. (Authors' abstr.)

JUNE.

The Effect of Satiation on the Behavior Mediated by a Habit of Maximum Strength. *Koch, S., and Daniel, W. J.* 167
Drive Interaction. *Kendler, H. H.* 188
The Role of Absolute Initial Response Strength in Simple Trial-and-Error Learning. *Siegel, P. S.* 199
Affective Distance and the Factors Determining Reaction Time in Judgments of Color Preference. *Shipley, W. C., et al.* 206
An Experimental Analysis of Dynamic and Static Equilibrium. *Travis, R. C.* . . . 216
Apparent Whiteness in Relation to Albedo and Illumination. *Taubman, R. E.* . . . 235
Selective Forgetting when the Subject is not " Ego Involved." *Shaw, F. J., and Spooner, A.* 242
Autonomic Response in Posthypnotic Amnesia. *Bitterman, M. E., and Marcuse, F. L.* . 248

J. GEN. PSYCHOL.

VOL. XXXII. APRIL, 1945.

The Psychology of Alfred North Whitehead. *Johnson, A. H.* 175
Studies in Discrimination Learning by Monkeys. III. *Harlow, H. F.* 213
Mental Decline and its Retardation. *Lawton, G.* 229
A Critique on the Theory of Emergency Function of the Adrenal Glands. *Rogoff, J. M.* . 249
*EEG Recordings of Varying Aspects of Attention in Relation to Behavior. *Burrow, T., and Galt, W.* 269
An Interbehavioral Analysis of Several Aspects of Stuttering. *Hill, H.* 289
Studies in Discriminative Learning in Monkeys: IV. *Harlow, H. F.* 317

Electroencephalographic Recordings of Varying Aspects of Attention in Relation to Behavior.

There has been the attempt to correlate various phases of attention with brain-wave patterns through a spectral analysis of the EEG drawn off from the various brain-regions. In particular the authors have been occupied with the differences in brain-wave pattern where (*a*) an individual's attention is preoccupied with affective, socially disjunctive elements (ditention),

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and (*b*) where the attention is free of these impediments, and functions in alignment with the organism's basic motivation as a whole (cotention). Our data show that in cotention, as compared with ditention, there is a marked drop of energy-output in the 8–12 and 2–40 frequency-ranges, and that this drop is registered predominantly in the motor regions. Intense attention (mental work), on the other hand, did not bring about a consistent change of energy-output. Further series in which the subject read in the two attentive phases substantiated the difference in the two brain-wave patterns. There was a pronounced drop in energy-output for reading in cotention as compared with reading in attention.

The technique of cotention possesses clinical value in eliminating the bias of affect from the process of attention. In the cotentive constellation the organism's primary pattern of tension tends to promote a more balanced relationship between organism and environment. In particular, cotention insures the individual's healthier social interrelations in place of the muddled relationships too often existing in social groups due to the conditioning affects inseparable from man's ditentive behavior. (Authors' abstr.)

J. NERV. MENT. DIS.

VOL. C. NOVEMBER, 1944.

*The Endocrine Glands in Infantile Amaurotic Family Idiocy. *Marburg, O.* 450
Unusual Rapid Evolution in Guillain-Barré Syndrome with Bulbar Palsy. *Briskier, A. A.* 462
*The Panoramic Position of Psychiatry: 1. *Foxe, A. N.* 466
*Hebephrenic Fancies. *Karpman, B.* 480
*Green Ink. *Rottersman, W.* 507

Infantile Amaurotic Family Idiocy.

It is concluded that, as in Addison's disease and perhaps Graves' disease, in amaurotic idiocy the primary factor is a lack of adrenal medulla. This in its turn gives rise to prematurity of the gonads, degeneration of the interstitial cells (puberty gland), relative hyperplasia of the thymus and increase of colloid in the thyroid. The constellation of the endocrines is considered in relation to asthenia observed in this disease. S. M. COLEMAN.

The Panoramic Position of Psychiatry: 1 and 2.

Fifty years ago, in a civilization of fixed and stable values, hysterical reactions were a common defence mechanism. Investigating these states, Freud pointed the royal road to the unconscious by the interpretation of dreams. Now, in a changed *milieu*, in which the unconscious is overwhelming conscious values and the social order, emotional illness has changed from "la belle indifférence" of the hysteric to anxiety itself or even panic reactions. In facing new problems many have deflected from psychoanalysis proper, seeking aid from socio-anthropological psychology, religio-occult psychology, psychosomatic medicine, psychotherapy and shock therapy.
S. M. COLEMAN.

Hebephrenic Fancies.

A psychoanalytical interpretation of the fancies of two hebephrenic patients supports the view that delusional elaboration is often an attempt to create a defence against committing the two basic crimes of mankind, incest and parricide. S. M. COLEMAN.

Green Ink.

Males who chose to use green ink, taken as a group, appear to be unduly dependent on the mother or mother-substitute. Many marry a woman older than themselves. The use of green ink is an attempt at compensation—that is, an expression of individuality and independence.
S. M. COLEMAN.

DECEMBER.

*The Psychiatric Sequelae of Post-Measles Encephalitis. *Smith, E. C., and Trapp, C. E.* 555
*The Prognostic Value of Clinical Findings in Cases Treated with Electric Shock. *Gold, L., and Chiarello, C. J.* 577
*The Panoramic Position of Psychiatry: 2. *Foxe, A. N.* 584
*The Evaluation of Prognostic Criteria in Schizophrenia. *Kant, O.* 598
The Dilemma of the Aetiological Concepts of Mental and Organic Disease. *Perlson, J.* . 606

Sequelae of Post-Measles Encephalitis.

In a series of 21 cases of measles encephalitis at least 8 patients showed subsequent personality changes besides some form of neurological sequelae. Personality changes included irritability, emotionalism, disobedience, as well as a varying degree of intellectual retardation. They also complained of earache, headache, vertigo, and display such nervous traits as nail-biting, constant drumming of the feet and nightmares. S. M. COLEMAN.

Clinical Findings in Electric Shock Treatment.

In a series of 121 patients treated by electric shock it was found that the following features at the onset of illness are indicators of a good prognosis: "A symptom-complex of muteness, perplexity and confusion, the presence of the symptom of fear of an immediate personal threat

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or danger, as well as depression and suicidal intent, age group 51–60 years, or 11–20 years, a background of familial stability, a duration of illness of less than one year, still better if the duration is less than three months, a sudden onset of illness, an exogenic precipitating factor, a good school and work record, a satisfactory marital and sexual relationship, a friendly individual.

" Portending a poor prognosis are : a gradual onset, a duration of illness more than one year, previous shock therapy, gradual loss of interest, negativism, restlessness, ideas of reference, grandiose delusions and certain personality traits." S. M. COLEMAN.

Prognostic Criteria in Schizophrenia.

The following criteria are regarded as of bad prognostic significance : hereditary taint, introverted " queer " prepsychotic personality, leptosomic body build, gradual onset of illness, a persistence towards discordancy of behavior and psychotic symptomatology in a setting of clear consciousness. The writer does not find that disorganized home conditions during childhood have any bearing on the prognosis. It is noted that the work of Gildea and Man on serum lipoid determinations is still in the experimental stage. S. M. COLEMAN.

J. NEUROPATH. AND EXP. NEUROL.

VOL. IV. APRIL, 1945.

Effects of Bilateral Simultaneous Subcortical Lesions in the Primate. *Mettler, F. A.* . 99
Paramyoclonus Multiplex. *Hassin, G. B., and Kepner, R. D.* 123
Studies on Amoeboid Motion and Secretion of Motor End Plates. *Carey, E. J., et al.* . 134
Anatomical Defects and Pathological Changes in Congenital Cerebral Aneurysms. *Forster, F. M., and Alpers, B. J.* 146
Primary Degeneration of the Corpus Callosum. *Merritt, H. H., and Weisman, A. D.* . 155
Leucoencephalitis Associated with Purulent Leptomeningitis. *Scheinker, I. M.* . . 164
The Syndrome of the Posterior Inferior Cerebellar Artery Resulting from a Metastatic Neoplasm. *Davison, C., and Spiegel, L. A.* 172
Studies in Developmental Pathology : III. *Gruenwald, P.* 178

J. NEUROPHYSIOL.

VOL. VIII. MARCH, 1945.

*Electric Excitability of Nerve-muscle Fibre Preparations. *Kuffler, S. W.* . . . 77
*Choreiform Movements in a Dog Suffering from Cortico-striatal Disease. *Chang, H.-T.* 89
*EEG of Different Cortical Regions of Normal and Anaesthetized Cats. *Clark, S. L., and Ward, J. W.* 99
*Action of Veratrine on Nerve-muscle Preparations. *Kuffler, S. W.* 113
*Projection of the Retina on Superior Colliculus of Cats. *Apter, J. T.* 123

Electric Excitability of Nerve-muscle Fibre Preparations.

Electric excitability of single nerve-muscle fibre and whole sartorius preparations was determined under various experimental conditions :

1. Confirming other investigators a characteristic muscle and nerve-fibre excitability curve was obtained.

2. Voltage-capacity curves taken with micro-electrodes and larger electrodes at the motor endplate and at other parts of the normal muscle fibre did not show a difference in electric excitability. Various methods of passing current through the endplate region are described.

3. Curarine in paralytic or stronger concentrations does not influence the electric excitability of muscle.

4. Calcium reduction in the saline solution which did not produce spontaneous activity, or subthreshold concentrations of acetylcholine, had no appreciable effect on the voltage-capacity curves.

5. Potassium application can set up impulses along the whole length of muscle fibres, including endplate-free regions. The relation of chemical and electrical stimulation is discussed.

(Author's abstr.)

Choreiform Movements in a Dog Suffering from Cortico-striatal Disease.

In a case of encephalitis in a dog the conspicuous symptoms were choreiform movements confined to the left hind leg and an involuntary nodding of the head.

In the terminal experiment rhythmic movement of the left hind leg could be elicited by the stimulation of the right motor cortex.

Histopathological findings revealed focal encephalitic lesions in the putamens of both sides and in the deeper cortical layers of the medial part of the posterior sigmoid gyrus of the right side (the leg representation area).

The genesis of the choreiform movement and its relation to the cerebral motor cortex and the putamen are discussed. (Author's abstr.)

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Electroencephalogram of Different Cortical Regions of Normal and Anaesthetized Cats.

1. Concentric implanted leads with the stigmatic portion in contact with the brain allow the recording of patterns in the EEG of cats that are more specific than other methods tried. Such specificity indicates the need for attention to the method of obtaining the EEG when its interpretation is significant to an experimental procedure.

2. The greatest amplitude and the most specific detail was obtained from the concentric leads to the input of the amplifier. This tracing differed little from the pairing of the stigmatic lead to an indifferent source.

3. With the method used specific patterns were observable, especially in stages of sleep, from the frontal and occipital regions and vertex. Tracings from the temporal region and the pyramids displayed less characteristic differences.

4. The approach of sleep in cats is signalled in the EEG by the appearance of trains of 5–7 per second waves from the occipital leads. Deeper sleep is accompanied by spindles made of 12–14 per second waves from the frontal region, with random slow waves in all leads. These high amplitude trains and spindles do not usually show evidence of transmission to distant cortical regions.

5. Patterns obtained during nembutal sleep resembled those of normal sleep except that the stages were rapidly telescoped, and deeper stages appeared more readily.

6. Similar activation patterns may be produced by various stimuli in normal and in light nembutal sleep, but operative procedures carried out under deep nembutal anaesthesia do not result in visible changes in the EEG.

7. Temporary habituation to a standard stimulus in the normal resting animal may be demonstrated in the EEG by successively greater shortening and final obliteration of the period of activation when the stimulus is repeated a sufficient number of times at short intervals. The activation response immediately reappears when a new type of stimulus is applied.

(Authors' abstr.)

Action of Veratrine on Nerve-muscle Preparations.

The effect of veratrine has been studied in isolated sartorius muscles and single vener-muscle fibre preparations of the M. adductor longus in frogs (*Hyla aurea*).

1. The typical veratrine action consists in increasing the negative after-potential following a muscle spike. The negative after-potential is gradually built up, and resembles the potential changes produced by depolarizing drugs or by catelectrotonic current pulses. If the potential attains a critical height muscle impulses are initiated.

2. The negative after-potential momentarily " collapses " in that area of a muscle over which a 1 impulse passes.

3. Veratrine in concentrations of 10^{-5} to 10^{-7} does not change appreciably the resting potential of uninjured muscles, and does not alter the muscle spike or the time constant of the muscle membrane.

4. Veratrine does not affect the transmitter action in normal or curarized muscle, and shows no significant effect on the acetylcholine and potassium sensitivity.

5. It is suggested that the negative afterpotential is produced prior to, and is independent of, contraction. (Author's abstr.)

Projection of the Retina on Superior Colliculus of Cats.

1. A study of action potentials evoked on the surface of the superior colliculus of the cat was made by stimulating spots of known position on the retina with short flashes of light.

2. There is a systematic projection of the nasal field or temporal retina of the left eye on the left superior colliculus ; of the temporal field or nasal retina of the right eye on the right superior colliculus.

3. The nasal half of the area centralis of the left eye is projected only on the right superior colliculus ; the temporal half of the left area centralis is projected only on the left superior colliculus.

4. The upper field or lower retina is projected on the superior colliculus medial to the lower field or upper retina. Points along the vertical meridian are projected at the anterior end of the superior colliculus. Points 110° temporal to the vertical meridian of the visual field of the left eye are at the posterior end of the right superior colliculus. Points 90° nasal to this vertical meridian are at the posterior end of the left superior colliculus.

5. A comparison with findings by degeneration methods in the superior colliculus of the rat, the rabbit, and the opossum is made. (Author's abstr.)

MAY.

Cholinesterases in Sympathetic Fibers and Ganglia. *Sawyer, C. H., and Hollinshead, W. H.* 137
Changes in Brain Potentials during Convulsions Induced by Oxygen under Pressure. *Cohn, R., and Gersh, I.* 155
EEG Changes Following Head Injuries in Dogs. *Dow, R. S., Ulett, G., and Tunturi, A.* . . 161
Sensory-motor Nerve Crosses in the Rat. *Weiss, P., and Eads, MacV., jun.* 173
The Colon Receptors of the Mammalian Retina. *Granit, R.* 195
The Effect of Temperature on the Artificial Synapse Formed by the Cut End of the Mammalian Nerve. *Granit, R., and Skoglund, C. R.* 211

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J. NEUROSURG.

VOL. II. JANUARY, 1945.

Intracranial Fibrosarcomas of the Dura Mater in Childhood. *Bailey, O. T., and Ingraham, F. D.* 1
Giant Cell Tumor of the Sphenoidal Bone. *Echols, D. H.* 16
The Technique of Tantalum Plating of Skull Defects. *Hemberger, A. J., Whitcomb, B. B., and Woodhall, B.* 21
Functional and Structural Changes in the Monkey's Brain during and After Concussion. *Groat, R. A., et al.* 26
Post-traumatic Vertigo and Dizziness. *Friedman, A. P., et al.* 36
Exanopic Central Scotoma, a Pitfall in Diagnosis. *Ecker, A. W., and Anthony, E. W.* . 47
Nerve Grafts: The Importance of an Adequate Blood Supply. *Tarlov, I. M., and Epstein, J. A.* 49
Radiographic Visualization of an Intracerebral Dermoid Cyst. *Gross, S. W.* 72

MARCH.

The Failure of Whole Fresh Homogeneous Nerve Grafts in Man. *Spurling, R. G., et al.* . 79
The Combined Use of Fibrin Film and Clot in End-to-End Union of Nerves. *Singer, M.* 102
Unusual Size and Extension of a Pituitary Adenoma. *White, J. C., and Warren, S.* . 126
Depressed Fractures of the Skull. *Glaser, M. A., and Shafer, F. P.* 140
EEG Studies in Head Injuries. *Dow, R. S., et al.* 154
"Delayed Recovery" in Peripheral Nerve Lesions Caused by High Velocity Projectile Wounding. *Livingstone, W. K., et al.* 170

MAY.

Ventriculographic Diagnosis of Cysticercosis of the Posterior Fossa. *Arana, R., and Asenjo, A.* 181
Cyst of the Sixth Ventricle (Cavum Verga). *Scott, M.* 191
Peripheral Nerve Injury in Fractures and Dislocations of Long Bones. *Gurdjian, E. S., and Smathers, H. M.* 202
Pantopaque Myelography. *Peacher, W. G., and Robertson, R. C. L.* 220
Subependymoma. *Scheinker, I. M.* 232
A Method for Control of Carotid Cerebral Circulation during Operation. *Hamby, W. B.* . 241
Arnold-Chiari Deformity in an Adult without Obvious Cause. *Bucy, P. C., and Lichtenstein, B. W.* 245
The Phantom Limb Syndrome. *Livingston, K. E.* 251

J. PHYSIOL.

VOL. CIII. 1944.

*The Nature of Synaptic Transmission in a Sympathetic Ganglion. *Eccles, J. C.* . . 27
The Action of Adrenaline on Transmission in the Superior Cervical Ganglion. *Bülbring, E.* 54
Action of Acetylcholine, Atropine and Eserine on the Central Nervous System of the Decerebrate Cat. *Colman, L., and Wright, S.* 93
A Simple Apparatus for Remote Nerve Stimulation in the Unanaesthetized Animal. *Greig, J., and Ritchie, A.* . . . . . Suppl.

The Nature of Synaptic Transmission in a Sympathetic Ganglion.

Eccles investigated synaptic potential in the normal and curarized stellate ganglion of the cat with single and repetitive stimulation (particularly the effect of eserine) to throw light on the role of acetylcholine. Eserine changes synaptic potentials only by the addition of a prolonged potential build-up during stimulation and long outlasting the decaying phase of the normal potential. The fact that eserine does not modify the normal peak and tail is evidence against the acetylcholine hypothesis of synaptic transmission. The author's explanation is that a preganglionic impulse exerts a brief depolarizing action on the ganglion cell (peak) by the direct effect of its action current, while the tail effect is due to liberated acetylcholine, which is removed by cholinesterase. The eserine prolongation is caused by acetylcholine liberated by preganglionic stimulation, but not removed by cholinesterase.

M. E. Morse (Psychol. Abstr.).

J. PSYCHOL.

VOL. XIX. APRIL, 1945.

Studies of Abnormal Behavior in the Rat. XVII. Guidance *versus* Trial and Error in the Alteration of Habits and Fixations. *Maier, N. R. F., and Klee, J. B.* . . 133
The Psychology of the Artist. *Feibleman, J. K.* 165
War Themes in Children's Stories. *Rautman, A. L., and Brower, E.* 191
The Multiple Choice Group Rorschach Test as a Means of Screening Applicants for Jobs. *Balinsky, B.* 203

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

Public Opinion towards Conscientious Objectors. II. *Crespi, L. P.* 209
III. *Crespi, L. P.* 251
IV. *Crespi, L. P.* 277
A Study of 500 Consecutive Enrollees in the U.S. Maritime Service Training Station at Avalon. *Page, J. D., and Zbranek, L. J.* 311
Motion and Motion Perception. *Werner, H.* 317
The Concept of Attitude in Social Psychology. *Strauss, A.* 329
A Preliminary Outline for a Fantasy Projection Technique as a Clinical Instrument. *Wekstein, L.* 341

J. SOC. PSYCHOL.

VOL. XXI. MAY, 1945.

Level of Aspiration as a Method of Studying Personality. *Rotter, J. B.* 159
Have the Neurotic Tendencies of the Students at the University of Hawaii Increased since the War began? *Smith, M. E.* 179
Group Conflict and Social Reform. *Schrickel, H. G.* 187
The "Insight Interview" Approach to Race Relations. *Hill, M. C., and Ackiss, T. D.* . 197
Comparisons of Attitudes towards Japanese Language Schools Expressed by Young Americans of Japanese Ancestry, 1937 and 1942. *Onishi, K., and Smith, M. E.* . 209
Attitude of Students towards the Japanese. *Morgan, J. J. B.* 219
An Experimentally Created Conflict Expressed by Means of a Projective Technique. *Wright, B. A.* 229
Personality Changes from Acting in a Play. *Timmons, W. M.* 247
Social Influences on Perception of Complex Drawings. *Luchins, A. S.* 257

J. SPEECH DISORDERS.

VOL. IX. DEC., 1944.

The Relation between Speech Sound Discrimination and Percentage of Hearing Loss. *Utley, J.* 103
The Pure Tone Screen Test of Hearing. *Peterson, G. E.* 114
The Relation of Ear Preference to other Laterality Characteristics. *Mounsey, C., and Peterson, G. E.* 121
The Relation between Ear Preference and Hearing Acuity. *Billo, E. W., and Peterson, G. E.* 123
Auditory Acuity and its Relation to Defective Speech. *Sullivan, E. M.* 127
Hearing Aids. Recent Developments. *Test, T. B.* 135
A Personality Study of Stutterers and Non-Stutterers. *Richardson, L. H.* 152
Studies in the Psychology of Stuttering: XIX. *Bloodstein, O. N.* 161
War Aphonia. *Sokolowsky, R. R., and Junkerman, E. B.* 193
Aphasia from the Viewpoint of a Speech Pathologist. *Anderson, J. O.* 209
A Phonetic Approach to the Problem of Perception in a Case of Wernicke's Aphasia. *Huber, M.* 227
Rythmokinesis in Stutterers and Non-Stutterers. *Strother, C. R., and Kriegman, L. S.* . 239
Stuttering. I. A Critical Review and Evaluation of Biochemical Investigations. *Hill, H.* 245
Auditory Memory Span for Meaningless Syllables. *Beebe, H. H.* 273
Stuttering. II. A Review and Integration of Physiological Data. *Hill, H.* 289
The Application of Sound Discrimination Tests to Functional Articulatory Defectives with Normal Hearing. *Hansen, B. F.* 347
The Role of the College and University Hearing Clinic. *Pauls, M. D.* 357

VOL. X. MARCH, 1945.

Eighteen Cases of Aphasia Studied from the Viewpoint of a Speech Pathologist. *Anderson, J. O.* 9
The Relation between Frequency and Duration of Moments of Stuttering. *Johnson, W., and Colley, W. H.* 35

JUNE.

Speech Training for the Child with a Cleft Palate. *Eckelmann, D., and Baldridge, P.* . 137
Speech Disorders in World War II. *Peacher, W. G.* 155
Improving the Speech of the Cleft Palate Child. *Wells, C. G.* 162
A Semantic Study of Identification of Speech Defects. *Henrikson, E. H.* 169

MED. J. AUSTRALIA.

VOL. XXXII. 1945.

Suicides Amongst Returned Soldiers of the 1914–18 War. *Minogue, S. J.* 195

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

MENT. HYG., N.Y.

VOL. XXVIII. 1944.

The Moral Outlook of the Adolescent in Wartime. *Bertocci, P. A.* 353
Officers and their Relation to a Mental-hygiene Program for Trainees. *Cohen, R. R.* . 367
Public Relationships of the Mental Hospital. *Klapman, J. W.* 381
The Psychologist Working with Crippled Children. *Hubbard, R. M.* 397
The Mental Hygiene of Owning a Dog. *Bossard, J. H. S.* 408
Group Therapy at the Jewish Board of Guardians. *Slavson, S. R.* 414
An Adventure in Group Therapy in a Family-Agency Setting. *White, H. C.* 422
Boys' House—the Use of a Group for Observation and Treatment. *Gula, M.* 430
Treatment of Mothers in Groups as a Supplement to Child Psychotherapy. *Kolodney, E.* 437
The Rorschach Test as an Aid in Selecting Clients for Group Therapy and Evaluating Progress. *Siegel, M. G.* 444
An Experiment in " Preventive Testing " in the Kindergarten. *Brown, F.* 450
Prediction of Behavior of Civilian Delinquents in the Armed Forces. *Schneider, A. J. N., et al.* 456
Psychological Training and Orientation of Soldiers. *Schreiber, J.* 537
Problems found in an Army Mental-Hygiene Unit that could not Reasonably have been Predicted by Pre-induction History and Examination. *Beck, B. M.* 568
The Psychiatric Social Worker in an Army Station Hospital. *Feldberg, F. M., and Rosenberg, S. J.* 586
Delinquency in Adolescent Girls. *Harris, D. B.* 596
Family Care as the Focus for Social Case-work in a State Mental Hospital. *De Witt, H. B.* 602
Some Features of the Emotional Resistance against the Psychoanalytic Approach in Schools. *Spranger, O.* 639

MIND.

VOL. LIV. APRIL, 1945.

Studies in the Logic of Confirmation. *Hemphel, C. G.* 97
The Problem of Unreasoned Beliefs. *Stace, W. T.* 122

JULY.

A Positivist Metaphysics of Consciousness. *Bergmann, G.* 193
Obedience to Conscience. *Lewis, H. D.* 227
The Doctrine of Connotation and Denotation. *Barnes, W. H. F.* 254
Remarks on Spinoza's *Ethics*. *Bosanquet, R. G.* 264

MSCHR. PSYCHIAT. NEUROL.

VOL. CVI. 1942.

Failure to Recognize One's Own Mirror Image. *Steur, E. I.* 294

VOL. CVIII. 1943.

Concerning the Optic Motor Pathway. *Juba, A.* 103

NERV. CHILD.

VOL. IV. OCTOBER, 1944.

Resistance to Change in the Adolescent Girl. *Despert, J. L.* 8
Severe Reactive States and Schizophrenia in Adolescent Girls. *Keiser, S.* 17
Psychodynamics of Unmarried Motherhood in Early Adolescence. *Bernard, V. W.* . . 26
Insecurity Feelings in Adolescent Girls. *Rose, A. A.* 46
Girlhood Problems of the Only Child. *de Saussure, R.* 60
The Mentally Superior Girl and Marriage. *Yates, D. H.* 70
From Girlhood to Womanhood in Wartime. *Morris, E. H.* 78
Camp Fire Girls' Group Behavior. *Lippitt, R.* 86
Development and Use of Relationship with a Delinquent Adolescent Girl. *Mitchell, M.* . 95

NEVROPATH. IPSIKHIAT.

VOL. XII. 1943.

The Problem of the Sleep Centre. *Propper-Grashchenkow, N. I.* 8

NEW YORK ACADEMY OF SCIENCES.

VOL. VII. JANUARY, 1945.

The Biodynamics of Experimental Neuroses and Alcoholism. *Wasserman, J. H.* . . . 61

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

OCCUP. PSYCHOL.

VOL. XVIII. 1944.

The Training of Occupational Psychologists. *Frisby, C. B.* 157
A Technique for Surveying Employees' Opinions and Attitudes. *Raphael, W.* . . 165
Some Reflections on Record Keeping. *Smith, M.* 177
A Note on the Training of the Adolescent through Leisure Pursuits. *Frisby, C. B.* . . 182
Some Aspects of Organized Training. *Hewitt, A. I. G.* 185
An Experiment on Change of Work. *Miles, G. H., and Skilbeck, O.* 192

PARAPSYCHOL.

VOL. VIII. 1944.

The Subject-Experimenter Relation in the PK Test. *Price, M. M., and Rhine, J. B.* . 177
Position Effects in the Soal and Goldney Experiment. *Humphrey, B. M., and Rhine, J. B.* 187
Paranormal Occurrences Among Preliterate Peoples. *Humphrey, B. M.* . . . 214

PROC. ROY. SOC. MED.

VOL. XXXVIII. JUNE, 1945.

Discussion on Diagnosis and Treatment of Cerebral Abscess 431

PSYCHIAT. QUART.

VOL. XIX. APRIL, 1945.

Psychiatric Manifestations of Chronic Subdural Hematomas. *Fleiss, A. N.* . . . 187
A Somnambulistic Act, with its Probable Meaning. *Tarachow, S.* 195
Myotonic Reaction To-day. *Quadfasel, F. A.* 198
Review of the Research Work of the New York State Psychiatric Institute and Hospital for the Year 1944. *Lewis, N. D. C.* 219
Childhood Schizophrenia and Childhood Hysteria. *Harms, E.* 242
The Evaluation of the Schizophrenic Process in a Young Boy. *Bosselman, B.* . . 258
Recent Advances and Progressive Trend of Neuropathology in Psychiatry. *Ferraro, A.* . 267
*Organic Deterioration. *Johnson, H. K., and Lassner, R.* 283
The Problem of "Magic Gestures." *Bergler, E.* 295
A Non-Surgical Treatment of Thyrotoxicosis. *McIntosh, D. J.* 311
Psychogenesis in Delirium Tremens. *Rosenberg, R.* 316
*Electric Shock Treatment. *Reynolds, W. W.* 322

Organic Deterioration.

1. The question of organic deterioration arising where there is a diffuse loss of functioning brain cells is a problem frequently presented to the clinical psychologist, and the question has been raised as to whether the traditional battery of procedures might not be developed into a more critical series of carefully standardized tests for organicity.

2. The Worcester-Wells Memory Test, providing a variety of procedures for memory testing, has been described, and has been shown to be unique among memory tests in that it is standardized for adult age-groups. This is enormously important, since memory testing should allow for the fact that there is a normal loss of memory with age.

3. Organic deterioration, usually known as the organic mental syndrome, has been shown experimentally to involve a number of functions. Of these, memory, which is always involved, is also the function most amenable to exact testing.

4. In the elderly diagnostic groups it has been found that on the average, memory, although impaired, is not greatly below the normal expected for corresponding ages (Shakow). In fact, a large number of elderly psychotics are found to have normal memories. This indicates that in the advanced age-groups, as in all age-groups, emotional and personality difficulties are paramount in deciding whether an individual can live outside an institution.

5. In applying the Worcester-Wells Memory Test, a subnormal score may be the result of low intelligence, of schizophrenic or allied preoccupations of various kinds, of melancholic retardation, of dreamy and clouded states and, in short, of a variety of widely diverse psychiatric conditions, all of which interfere with maximal and sustained attention.

6. Therefore, caution should be exercised with this test as with all so-called "deterioration" tests in interpreting subnormal results, as a low score may result from global configurations of a nature quite different from organic deterioration.

7. However, assuming proper test conditions with sustained and maximal attention, normal or better than normal scores can definitely be interpreted as ruling out deterioration, whereas subnormal scores provide a rough quantitative index of the degree of impairment.

(Authors' abstr.)

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Electric Shock Treatment.

The therapeutic benefits of electric shock treatment as well as all forms of "shock" treatment are indeed a moot point. The factors that enter into the proper evaluation of the results are legion, and are so indefinite and nebulous that only general estimations are valid. In an effort to adopt one definite indication of improvement or cure, the fact of parole or convalescent status has been used as a criterion. In State hospitals this is admittedly a factor highly dependent on numerous varying circumstances, but must be used because nothing better is available. Patients leave State hospitals for various and sundry reasons. Even assuming that the ward physicians are ever alert to the advisability of convalescent care, many eligible patients are not brought to the attention of the clinical directors. Perhaps they have no places to go, no interested friends or relatives, and family care placement is not available or advisable. Perhaps they have physical problems that are better cared for in the institution. At the present time, relatives are less able to supervise convalescents because of almost universal employment or other occupation. Disinterested families are rather a common situation, and they produce a marked effect on convalescent care rates in general.

The attitude of the clinical director toward convalescence also reflects in the convalescent rate to a considerable extent. One clinical director might be quite sanguine about the adjustability of a certain patient, whereas another might not share his enthusiasm in the least. The entire subject is open to individual interpretation, and has significant bearing on convalescent status rates. Elopements, transfers, deaths, readmissions, discharges, poor adjustments on convalescent care, spontaneous recovery estimations are a few of the many operative factors. Probably no valid conclusions can be drawn in any case without the lapse of a considerable time interval. Previous treatment, either with insulin or metrazol, may be significant, although to what extent is problematical. The duration of the psychosis, presumed genetic factors if any, type and severity of psychosis, physical concomitants, reattainment of prepsychotic levels plus increments of normal growth and many other factors complicate the picture considerably.

The type of certification has a definite bearing on hospital releases. Voluntary patients are obviously more likely to exercise their prerogatives than those regularly certified are to leave. The latter are more dependent on the attitude of the clinical director and the medical staff.

In addition to this, the almost total lack of suitable controls is certainly operative. To select exactly parallel cases for non-treatment controls is obviously impossible, and to deprive any suitable case of the possible benefits of shock treatment seems inadvisable. In an effort to make a comparison of some sort, the author recorded total time spent in the hospital by members of a control group, and compared this with the hospitalization period of treated cases. This comparison is given in months in the table. These control cases were taken as received, beginning in September of 1931 and ending in December of 1936. None of these patients received shock treatments of any sort. They were classified according to diagnosis; and equal numbers of controls and treated patients were selected. Average time spent in the hospital was then figured for each diagnostic category. This included the time prior to death in some cases and the total time to the present for those remaining in the institution. The resultant differences are obviously marked; but, again, many factors enter into the picture, and the figures can only be regarded as approximate.

Psychotherapy in conjunction with "shock" treatment also has considerable influence on improvement and recovery. Nevertheless, in spite of the vast sum of unknown factors in connection with the treatment, electric shock seems to be of some benefit to the mentally ill.

(Author's abstr.)

PSYCHIATRY.

VOL. VIII. FEBRUARY, 1945.

Re-employment of the Psychoneurotic Ex-soldier. *Pratt, D.* 3
Escape. *Moloney, J. C.* 9
Religion and Personal Adjustment. *Casey, R. P.* 13
The Role of Sex in Modern Society. *Frankenthal, K.* 19
On the Phrase "Ethnic Group" in Anthropology. *Montagu, N. F. A.* 27
The Making of Soviet Citizens. *Berman, N.* 35
Public Opinion in Relation to Culture. *Lee, A. McC.* 49
Psychotherapy. *Crowley, R. M.* 63
Motivation and Rehabilitation. *Kubie, L. S.* 69
The Problem of Controlled Institutional Change. *Parsons, T.* 79

PSYCHOANAL. QUART.

VOL. XIV. APRIL, 1945.

The Integration of Social Behavior. *French, T. M.* 149
A Bio-analytical Contribution to the Problem of Sleep and Wakefulness. *Jekels, L.* . 169
Psychoanalytic Therapy in the Borderline Neuroses. *Stern. A.* 190
Contribution to the Study of Amnesia and Allied Conditions. *Geleerd, E., et al.* . . 199
Laughter in Dreams. *Grotjahn, M.* 221
A Philological Note on Sex Organ Nomenclature. *Kanner, L.* 228

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

PSYCHOL. BULL.

VOL. XLII. APRIL, 1945.

A Systematic Treatment of Judgment. *Johnson, D. M.* 193

MAY.

Projective Methods: Their Origin, Theory and Application in Personality Research. *Sargent, H.* 257

JUNE.

Age Differences in Personality during Adult Years. *Kuhlen, R. G.* 333
A Comparison of the Performance of Freshmen and Sophomores in General Psychology. *Roy, H. L.* 371
Human Nature and the Peace. *Allport, G. W.* 376

PSYCHOL. MONOGR.

VOL. LVI. 1944.

Distal Focussing of Perception: Size-Constancy in a Representative Sample of Situations. *Brunswik, E.* . . . . . No. 1

VOL. LVI. 1944.

The Social and Emotional Development of Pre-school Children under Two Types of Educational Program. *Thompson, G. G.* . . . . . No. 5
The Effect of Special Construction of Test Items on their Factor Composition. *Lovell, C.* No. 6
The Personality of Stutterers. *Richardson, L. H.* . . . . . No. 7
Studies in Language Behavior. I. Program of Research. *Johnson, W.* . No. 2, p. 1
Ibid. II. The Quantitative Differentiation of Samples of Spoken Language. *Fairbanks, H.* . . . . . ,, 19
Ibid. III. The Quantitative Differentiation of Samples of Written Language. *Mann, M. B.* . . . . . ,, 41
Ibid. IV. A Statistical and Comparative Analysis of Individual Written Language Samples. *Chablos, J. W.* . . . . . ,, 77

VOL. LVII. 1945.

An Experimental Investigation of the Creative Process in Music. *Willmann, R. R.* No. 1
An Experimental Study of Punishment. *Estes, W. K.* . . . . . No. 3
*Case Lanuti: Extreme Concretization of Behavior due to Damage of the Brain Cortex. *Hanfmann, F., Rickers-Ovsiankina, M., and Goldstein, K.* . . . . . No. 4

Case Lanuti: Extreme Concretization of Behavior Due to Damage of the Brain Cortex.

F. Lanuti (pseudonym), following severe brain injury, is the subject of this 9-year psychodynamic study, which catalogues data from experimental and clinical approaches and provides a descriptive-theoretical report of the effects of brain pathology, *via* de-differentiation processes, upon the personality structure. The report yields information on Lanuti's "perception and recognition of objects, his use of symbols, memory, emotion, and imagination, as well as on his general adjustment to his defect," including reactions to success and failure both in the laboratory tests and about the hospital. In all these spheres Lanuti is "limited to momentary action . . . is incapable of forming and maintaining stable frames of reference." Hence, "he presents in an extreme degree the picture of concreteness of behavior which Goldstein considers characteristic of organic deterioration." Little, if any, improvement in performance is apparent during the 9-year period. L. A. PENNINGTON (Psychol. Abst.).

PSYCHOL. REC.

VOL. LI. 1944.

An Interbehavioral Analysis of Propositions. *Kantor, J. R.* 309

PSYCHOL. REV.

VOL. LII. JANUARY, 1945.

Toward a Dynamic Psychology of Cognition. *Heidbreder, E.* 1
The Obsolete Dogmas of Heredity. *Howells, T. H.* 23
*Physiological Differentiation of Emotional States. *Arnold, M. A.* 35
What Fixes the Correct Response? *Voeks, V.* 49
A Reply to Wyatt and Teuber. *Lerner, E.* 52

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Physiological Differentiation of Emotional States.

The authors believe that there are at least three different physiological states corresponding to three different emotions: *fear*, with predominantly sympathetic excitation; *anger*, with strong parasympathetic excitation; and *excitement* or elation, with moderate parasympathetic activity. It would depend on the autonomic reactivity of the individual and the intensity of his emotional experience whether the reaction to the emotional effects will be noticeable during emotional stimulation or after it.

The authors also distinguish two excitatory states which they hesitate to call emotions (startle and explosive or epileptoid reactions), for both seem to represent a short circuit—what has been called a "functional decortication" (6)—*via* the cholinergic mechanism of the parasympathetic and central nervous systems. In both cases a "conscious" evaluation of the stimulus situation seems to be missing.

The authors suggest further that the most favorable conditions for activity are found in a moderate stimulation of the cholinergic mechanism, resulting in facilitation of action by "excitement" without untoward secondary adrenalin effects (at least for the duration of the activity). Neither anger nor fear can be shown to have an emergency function. Rather they represent obstacles to efficient action, the former by short-circuiting too large an amount of excitation into the parasympathetic system the latter by inundating the sympathetic system.

Amending Cannon's theory of homeostasis the authors would suggest, therefore, that during overactivity of the sympathetic division of the autonomic nervous system (in fear or cold) the balance of the organism is restored by a cholinergic *reaction* in the form of activity; and during parasympathetic overactivity (in anger or during heat) by a secondary sympathetic *reaction* with its adrenergic effects. If such a reaction is delayed or insufficient, or if the original stimulus is protracted too long, the primary effects of overstimulation may become irreversible.

(Author's abstr.)

MARCH, 1945.

The Place of Innate Individual and Species Differences in a Natural Science Theory of Behavior. *Hull, C. L.* 55
Time as a Determinant in Integrative Learning. *Mowrer, O. H., and Ullman, A. D.* . 61
The Psychological Self, the Ego and Personality. *Bertocci, P.* 91
The Psychology of the Corporate Act. *Smith, M.* 100
The Reproductive Beginnings of Altruism. *Holmes, S. J.* 109

MAY.

The Psychology of Participation. *Allport, G. W.* 117
The Discrimination of Stimulus Configurations and the Hypothesis of Afferent Neural Interaction. *Hull, C. L.* 133
The Association of Certain Sounds with Pleasant and Unpleasant Meanings. *Thorndike, E. L.* 143
Primary and Secondary Behavior. *Bawden, H. H.* 150
Psychology and Heisenberg's Principle of Indeterminacy. *London, I. D.* 162
A Preliminary Clarification of the Concept of Fatigue. *Bartley, S. H., and Chute, E.* . 169
The Logic of Prediction. *Chein, I.* 175

PSYCHOMETRIKA.

VOL. IX. 1944.

Second-order Factors. *Thurstone, L. L.* 71
Technique for Weighting of Choices and Items on I.B.M. Scoring Machines. *Grossman, D.* 101
Factorial Design in the Determination of Differential Limen Values. *Johnson, P. O., and Tsao, F.* 107
The Determination of Successive Principal Components without Computation of Residual Correlation Coefficients. *Tucker, L. R.* 149
Factoring Test Scores and Implications for the Method of Averages. *Holzinger, F. J.* . 155
A Note on Correlation Clusters and Cluster Search Methods. *Cattell, R.* 169
Fundamental Factors of Comprehension in Reading. *Davis, F. B.* 185
A Variance-ratio Test of the Uniqueness of Principal-axis Components as they Exist at any Stage of the Kelley Iterative Process for their Determination. *Kelley, T. L.* . . . 199
Contributions to the Mathematical Theory of Human Relations: VIII. *Rashevshy, N.* . 201
Statistical Problems in the Evaluation of Army Tests. *Burt, C.* 219
Factor Pattern of Test Items and Tests as a Function of the Correlation Coefficient. *Wherry, R. J., and Gaylord, R. H.* 237
The Interpretation of a Test Validity Coefficient in Terms of Increased Efficiency of a Selected Group of Personnel. *Richardson, M. W.* 245
Mathematical Analysis in Psychology of Education. *Sadowsky, M. A.* 249
A Simple Method of Factor Analysis. *Holzinger, K. J.* 257
Maximal Weighting of Qualitative Data. *Wherry, R. J.* 263
"Parallel Proportional Profiles" and other Principles for Determining the Choice of Factors by Rotation. *Cattell, R. B.* 267

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PSYCHOSOM. MED.

VOL. VI. OCTOBER, 1944.

Criteria for Therapy in Psychosomatic Disorders. *Dunbar, F., and Arlow, J.* . . 283
Some Psychological Aspects of Sexual Promiscuity. *Wittkower, E. D., and Cowan, J.* . 287
Urinary Control and Enuresis. *Despert, J. L.* 294
The Genetic Factor in Autonomic System Function. *Jost, H., and Sontag, L. W.* . . 308
*The Carbohydrate Tolerance in Mentally Disturbed Soldiers. *Freeman, H., et al.* . . 311
Personality Organization and Anoxia Tolerance. *Hertzman, M., Orlansky, J., and Seitz, C. P.* 317

The Carbohydrate Tolerance of Mentally Disturbed Soldiers.

The Exton-Rose glucose tolerance test was performed on 20 normal soldiers and 91 military patients discharged because of psychiatric disorders. The patients showed a higher incidence of abnormal sugar tolerances (70 per cent.) than the normal subjects (30 per cent.). Excessive secretion of adrenalin did not seem to be a major factor in the causation of such trends. A relationship between high blood-sugar level and psychological condition is suggested by certain Rorschach findings, and by the alteration of the blood-sugar level of subjects with normal trends by the introduction of a state of psychological stress. (Authors' abstr.)

VOL. VII. JANUARY, 1945.

Studies of Syncope. III. Differentiation between Vasodepressor and Hysterical Fainting. *Romano, J., and Engel, G. L.* 3
Psychic Concomitants in Wartime Injuries. *Kupper, H. I.* 15
The Problem of Chronic Disease. *Perrott, G. St J.* 21
Psychosomatic Disorders as Revealed by Thirteen Million Examinations of Selective Service Registrants. *Rowntree, L. G.* 27
*Brain Waves and Clinical Features in Arteriosclerotic and Senile Mental Patients. *Liberson, W. T., and Seguin, C. A.* 30
*Brain Waves and Heredity in Mental Diseases. *Liberson, W. T., and Seguin, C. A.* . 35
The Difference in the Mental Reaction between Children Suffering from Cerebral and Cerebellar Tumors. *Davidoff, L. M.* 38
The Relationship of Anti-social Traits to the EEG in Children with Behavior Disorders. *Michaels, J. J.* 41

Brain Waves and Clinical Features in Arteriosclerotic and Senile Mental Patients.

1. Fifty-three arteriosclerotic and senile patients were studied from both the EEG and the clinical points of view. The EEGs were classified according to previously defined criteria. The following clinical symptoms proved to be particularly important in relation to this study: confusion, irritability, agitation, anxiety, delusions, depression, and hallucinations. Memory disorders had to be disregarded, being obscured by confusion. However, they have been taken into consideration in making the diagnosis of these patients.

2. About a third of these patients show a markedly abnormal pattern (slow), whereas another third do not present any definite abnormality.

3. In the group of patients with marked slow abnormality, the clinical complex confusion—irritability overshadows the complex anxiety—agitation—delusions. The opposite finding is observed in the group of patients with normal or only borderline tracings.

4. The doctrinal significance of the existence of definite organic lesions which do not produce a marked EEG abnormality when associated with anxiety, agitation, and delusion, is stressed. The relationship of this group of patients with those suffering from involutional psychosis is suggested. (Authors' abstr.)

Brain Waves and Heredity in Mental Diseases.

Electroencephalographic examinations were performed on 118 patients aged between 13 and 23 years, suffering from all types of mental disease. Thirteen of these patients had a personal history of a neurological disorder. These patients were classified in different groups according to the presence and importance of the abnormal hereditary factors.

There are relatively more patients with normal EEG's in the population with a negative family history than in the population with mental conditions in the family.

Both the theoretical and practical significance of these findings is stressed.

(Authors' abstr.)

MARCH.

Objective Personality Studies in Migraine by Means of the Rorschach Method. *Ross, W. D., and McNaughton, F. L.* 73
The Rorschach Performance with Neuro-circulatory Asthenia. *Ross, W. D.* 80
Rorschach Method and Psychosomatic Diagnosis. *Kemple, C.* 85
The Role of the Autonomic Nervous System in Cutaneous Disorders. *Rothman, S.* . . 90
*An Experimental Study of the Functions of the Frontal Lobes in Man. *Yacorzynski, G. K., and Davis, L.* 97

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An Experimental Study of the Functions of the Frontal Lobes in Man.

The results on a number of experiments of five patients with unilateral lesions of the frontal lobes (one with a lesion of the left lobe and four with lesions of the right lobes) were compared with those of eight normal controls of approximately the same age range and educational status.

On five experiments the following differences were found between the two groups: (1) The subjects with frontal lobe lesions required a longer time and more illumination to perceive geometrical figures and words than the controls. (2) They were unable to perceive as many meaningful objects in ambiguous figures as the controls. (3) The illusory effect of the Muller-Lyer illusion measured quantitatively was exaggerated, and the illusory effects of many other visual illusions were not perceived. (4) The patients were unable to recall as many objects exposed visually as the controls. (5) They were unable to perceive reversals on many of the figures with reversible perspectives, and if reversals occurred their frequency was below average.

The differences between the patients and the controls can be accounted for by postulating that following frontal lobectomies, (1) a longer time is required to perceive a stimulus, (2) the number of situations which are perceived in a stimulus field is decreased, (3) there is an inability to shift readily from one stimulus to another, and (4) there is a distortion of normal perceptions. The results on the visual illusions suggest that when a normal reaction is affected by frontal lobectomy, a response which appeared earlier in the behavior of the individual replaces the mature adult response.

Other forms of atypical behavior were noted as follows: Euphoria was present in two of the experimental subjects. The patient with a lesion of the left frontal lobe showed unmistakable symptoms of aphasia. Many of the reactions of the four patients with lesions of the right lobes were, however, similar to the symptoms which have been described as constituting part of the syndrome of aphasia. It is suggested that symptoms which have often been ascribed as belonging to the fields of emotion and aphasia are due largely to the disturbed perceptual processes.

Immediate memory, as far as could be determined, was not affected in the subjects with frontal lobe lesions. It is, therefore, suggested that association, if uncomplicated by perceptual processes, is not primarily a function of the frontal lobes.

One of the subjects with a lesion of the right lobe showed some restitution of behavior with the lapse of time. There is some evidence to show that a recovery of the function which was affected did not occur, but that substitute behavior produced the same end-results as would have been produced by the affected function. (Authors' abstr.)

MAY.

The Incidence of Psychosomatic Affections in Britain. *Halliday, J. L.* 135
The Therapeutic Role of Drugs in the Process of Repression, Dissociation and Synthesis. *Kubie, L. S., and Margolin, S.* 147
On the Effects of Suggestion in the Treatment of Vasospastic Disorders of the Extremities. *Lipkin, M., et al.* 152
*Psychophysiological Relations in Cases with Head Injuries. *Ruesch, J.* 158

Psychophysiological Relations in Cases with Head Injuries.

1. Respiratory functions under basal conditions and during work, muscular tension and heart rate during endurance to pain and fatigue have been correlated with tests of intelligence and personality in five groups of patients. These consisted of 16 cases with brain disease, 29 cases with recent head injuries, 29 cases of post-traumatic syndromes and signs of brain damage, 28 cases of post-traumatic syndromes without signs of brain damage, and 30 cases with psychoneuroses. In addition, 15 normal controls were subjected to some of these tests.

2. The post-traumatic syndromes without signs of brain damage resembled the psychoneuroses more than the post-traumatic cases with evidence of brain lesions. The cases with recent head injuries were in many respects the most normal of all the patients studied.

3. Basal ventilation volume and tidal air increased proportionately with rising neurotic scores in the Minnesota Multiphasic Personality Inventory. The higher the basal ventilation volume, the smaller was the subsequent increase during work. Irregularity of breathing was measured by a new scoring method, which revealed that individuals with neurotic tendencies breathe irregularly, especially during work.

4. Metabolism under basal conditions and during work was higher in cases with signs of brain damage than in cases without evidence of a lesion. The more intelligent subjects were apt to use less oxygen than patients with average or sub-average intelligence.

5. During examination of endurance to strain (work of the hand during complete ischemia), all the cases with head injuries showed a smaller rise in heart rate than either cases with brain disease, psychoneuroses, or normal controls. Return of the heart rate to the initial level following exercise was delayed in the acute head injuries. Muscular tension was greatest in cases with brain disease and smallest in the normal controls. Endurance to strain was smallest in the psychoneuroses.

6. In conclusion it can be said that there exists an antagonism between presence of brain damage and psychoneuroses. The more marked one component, the less obvious the other becomes. Cases with post-traumatic syndromes usually show presence of both components, but with marked prevalence of the neurotic aspects. (Author's abstr.)

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QUART. J. STUD. ALCOHOL.

VOL. V. 1944.

The Treatment of Alcohol Addiction in Relation to the Prevention of Inebriety. *Myerson, A.* 189
Theoretical and Practical Aspects of Psychoanalytic Therapy of Problem Drinkers. *Weijl, S.* 200
The Conditioned-Reflex Therapy of Alcohol Addiction. *Carlson, A. J.* 212
Aversion Treatment of Alcohol Addiction. *Shadel, C. A.* 216
The Problem of the Alcoholic Personality. *Frank, L. K.* 242
The Place of the Lay Therapist in the Treatment of Alcoholics. *Anderson, D.* . . 257
The Therapeutic Role of Alcoholics Anonymous as seen by a Sociologist. *Bates, R. F.* . 267
Notes on the First Half Year's Experiences at the Yale Plan Clinics. *Jellinek, E. M.* . 279
The Relation of National Prohibition to the Incidence of Mental Disease. *Landis, C., and Cushman, J. F.* 527
The Syndrome of Alcoholic Addiction. *Tiebout, H. M.* 535
Psychotherapy of Alcohol Addiction in a Private Mental Hospital *Wall, J. H.* . . 547
Group Psychotherapy of Alcohol Addiction. *Heath, R. G.* 555
Alcoholic Hallucinatory States. *Norman, J. P.* 563
Drinking in an Indian-White Community. *Honigmann, J. J., and I.* 575
A Study of the Wives of Twenty Alcoholics. *Price, G. M.* 620
Science and the Legal Responsibility of the Drunkard. *Baird, E. G.* 628

VOL. VI. JUNE.

*Some Biochemical and EEG Changes in Delirium Tremens. *Kennard, M. A., Bueding, S., and Wortis, S. B.* 4
Alcoholic Deaths in the Canal Zone, 1904–44. *Hoekenga, M. T., and Kean, B. H.* . . 15
The Relation of the Pituitary Gland to Some Symptoms of Alcoholic Intoxication and Chronic Alcoholism. *Gross, M.* 25
Ecological and Familial Factors Associated with Inebriety. *Mowrer, H. R., and E. R.* . 36

Some Biochemical and Electroencephalographic Changes in Delirium Tremens.

Studies were made on sodium and chloride excretion and on electroencephalograms of 71 patients with delirium tremens. Significant changes were found in both instances.

1. The excretion of sodium and chloride of these individuals was abnormal in 11 of 19 cases, the Na/Cl ratio, which is 1 : 1 in normal individuals, being disturbed in the alcoholics. In 7 cases the indication was that there had been chloride loss preceding the onset of delirium tremens.

2. The electroencephalograms showed a relatively high incidence of fast 16–30/sec. low-voltage activity as compared with the normal. The percentage decreased with the recovery of the patient.

3. The patients who showed most fast activity and lowest amplitude at the onset of the disorder were those who recovered slowest and who, from their history, were the least stable socially in the intervals between their alcoholic episodes.

4. Psychological tests on 12 patients with delirium tremens revealed a common pattern of emotional and social instability in all. Organic deterioration was present in patients whose electroencephalograms demonstrated greatest deviation from the normal.

5. Records of 12 alcoholics, either in the acute stage of alcoholic intoxication, markedly deteriorated, or with polyneuropathy, but without delirium tremens, did not show the increased fast activity and low alpha index seen in the patients who had delirium tremens.

(Authors' abstr.)

REV. MEX. NEUROL. PSIQUIAT.

VOL. XI. 1944.

Essay on Biotypology and Psychoanalysis. *Capó Balle, G.* 9

REV. NEURO-PSIQUIATR., LIMA.

VOL. VII. 1944.

Cervante's Contribution to Psychology and Psychiatry. *Gutiérrez Noriega, C.* . . 149

REV. PSIQUIAT. Y. DISC. CON., CHILE.

1943.

Mimicry in Schizophrenia. *Rodriguez, S.* . . . . . No. 1

https://doi.org/10.1192/bjp.91.385.528 Published online by Cambridge University Press

RORSCHACH RES. EXCH.

VOL. IX. MARCH, 1945.

Physiognomic Phenomena in Rorschach Responses. *Goldstein, K., and Rothman, E.* . 1
The Animal Symbol in the Rorschach Test and an Animal Association Test. *Goldfarb, W.* 8
A Survey of Psychologists' Opinions Concerning the Rorschach Method. *Faberson, H. F., and Klupfer, B.* 23
Considerations on the Place of the Rorschach in the Field of General Psychology. *Munroe, R. L.* 30

SPEECH MONOGR.

VOL. XI. 1944.

Studies in Personal and Social Integration. *Murray, E.* 9
Speech Factors as Related to Teaching Efficiency. *McCoard, R. B.* 53
An Experimental Study of the Accuracy of Typical Speech Rating Techniques. *Thompson, W. N.* 65

STUD. PSYCHOL. PSYCHIAT. CATHOL. UNIV. AM.

VOL. VI. 1944.

Defective Moral Reasoning in Delinquency. *Belke, M. A.* . . . . . No. 4

TRANS. NEW YORK ACAD. SCI.

VOL. VII. MARCH, 1945.

The Logical Foundations of Culture and Personality Studies. *Devereux, G.* 110

Z. KINDERPSYCHIAT.

VOL. X. 1943.

Pathology of Instinct. *Brantway, H.* . . . . . No. 4
The Education of Instincts. *Bovet, P.* . . . . . No. 4

1. Psychiatry.

Impairment in Emotional Control Produced Both by Lowering and Raising the Oxygen Pressure in the Atmosphere: a Fundamental Relation Between Psychic and Somatic Processes. Barach, A. L. [*Med. Clin. N. Amer.*, **28**, 704–18 (1944).]

This study is based on simulated altitude tests and on observations of patients with chronic anoxemia. Capacity to inhibit impulse (emotion) depends on maintenance of an accustomed oxygen tension in the brain, and decreased control is the outstanding sign of alteration and is the best tolerance test. In acute anoxia it is evidenced, according to the personality and environment, by boisterousness, overconfidence and pugnacity, or by irritability and dullness. If a special effort is made, performance of intellectual tests may be normal until a challenging incident brings out the latent emotional control, at which time performance declines sharply. Psychoneurotics are especially sensitive to acute anoxemia. In patients with chronic anoxemia, an abrupt rise in oxygen pressure may cause profound temporary impairment of emotional control, judgment, and memory. The relation between psychic and somatic processes, with respect to the effects of variable oxygen tension in the organism, offers a fruitful field for psychosomatic medicine and the study of the ageing process. M. E. Morse (Psychol. Abstr.).

Cerebral Circulation—Intrinsic Control and Clinical Phenomena. Cobb, S., and Lennox, W. G. [*Fed. Proc. Amer. Soc. exp. Biol.*, **3**, 151–8 (1944).]

The authors discuss cerebral circulation and its relation to the electroencephalograph, syncope, epilepsy, migraine, and trauma. They also discuss vasoconstriction, vasodilatation, and local blood flow due to nervous function. C. G. Mueller (Psychol. Abstr.).

Catelectrotonic Potentials in the Dorsal Roots of the Spinal Cord. Eccles, J. C. [*Nature, Lond.*, **154**, 395 (1944).]

Experiments on the isolated oxygenated spinal cord of the frog suggest that the dorsal root potential is a catelectrotonic potential set up in the central terminals of the dorsal root fibers by the actively depolarizing action of potential produced in nerve cells in close proximity, particularly in synaptic contact. This would explain the extensive distribution up and down the cord of the dorsal root potential produced by a volley in one dorsal root.

E. B. Brody (Psychol. Abstr.).

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Electroencephalographic Response to Overventilation and Its Relation to Age. Gibbs, F. A., Gibbs, E. L., and Lennox, W. G. [*J. Pediat.*, **23**, 497–505 (1943).]

The EEGs of 2,281 non-epileptic and 1,107 epileptic subjects were studied with reference to the increase in amplitude and decrease in frequency (build-up) occurring with 100 deep breaths. A big (maximum) build-up is most common in persons whose EEGs are abnormal. In both normal and epileptic subjects the incidence of big build-ups falls abruptly with increasing age until the 35th year, after which the decline is negligible. The incidence is greater at all ages in epileptics than in normals, but this difference is greatest during adolescence. The decreasing frequency with increasing age agrees with observations that other abnormalities of the EEG as well as the seizures themselves tend to improve as the person reaches maturity.

M. E. Morse (Psychol. Abstr.).

Characteristics of the Normal Electroencephalogram. (I) A Study of the Occipital Cortical Potentials in 500 Normal Adults. Brazier, M. A. B., and Finesinger, J. E. [*J. clin. Invest.*, **23**, 303–11 (1944).]

The subjects, 17–47 years old, were studied under controlled conditions of blood sugar and quiet breathing with respect to dominant frequency; percentage times of alpha, intermediate, beta, and slow activities; and voltage. The following characteristics were found: An individual's dominant frequency is comparatively stable over long periods (two years), but becomes less so with increasing age. There is an inverse relation between percentage time alpha and the dominant frequency of that alpha. Intermediate waves are rarely found in any quantity. The percentage time beta remains nearly constant for the individual. Waves below 8 occurred in 25 per cent. of the subjects. No delta waves were found. Maximum voltages were higher in records containing the most alpha, with dominant frequencies in lower alpha. None of these characteristics correlated with sex, height, or weight. Differentiation into alpha, beta, and delta rhythms is arbitrary. It is more accurate to describe rhythms in terms of actually measured frequencies until some physiological or statistical reason is found for grouping frequencies into rhythms.

M. E. Morse (Psychol. Abstr.).

Characteristics of the Normal Electroencephalogram. (II) The Effect of Varying Blood-Sugar Levels on the Occipital Cortical Potentials in Adults During Quiet Breathing. Brazier, M. A. B., Finesinger, J. E., and Schwab, R. S. [*J. clin. Invest.*, **23**, 313–17 (1944).]

Studies of 45 normal subjects showed that levels below 70 mgm., but insufficiently low to impair consciousness, slow the dominant frequency and favor the development of activity slower than alpha. No changes occurred in percentage times of alpha, beta, and intermediate rhythms. Levels above 130 mgm., induced by ingestion of glucose, do not affect the EEG. In assessment of the EEG for normality, the subject should take 50–100 gm. glucose 30 minutes before the test in order to assure a blood-sugar level above 70 mgm.

M. E. Morse (Psychol. Abstr.).

Characteristics of the Normal Electroencephalogram. (III) The Effect of Varying Blood-Sugar Levels on the Occipital Cortical Potentials in Adults during Hyperventilation. Brazier, M. A. B., Finesinger, J. E., and Schwab, R. S. [*J. clin. Invest.*, **23**, 319–23 (1944).]

Forty-five normal subjects, 17–38 years old, were studied. Great variation was found as to the blood-sugar level at which delta waves appeared during hyperventilation. In 13 per cent. they did not occur even with blood sugar at 40, whereas in 4 per cent. they occurred at all levels. Delta activity in the third minute of hyperventilation is not diagnostic of abnormality, since it occurs in 38 per cent. of normals at non-fasting blood-sugar levels. The second minute gives better differentiation, as only 7 per cent. of normals give delta activity at non-fasting levels, and none above 130 mgm. The percentage time delta varies inversely with the blood-sugar level. The tendency to produce delta activity on hyperventilation is not related to the dominant frequency of the individual's resting record. At constant blood-sugar levels the depth of hyperventilation is the decisive factor in determining the amount of delta activity. Apparently, at lower adult age levels the EEG is less stable to changes in blood-sugar and ventilation levels.

M. E. Morse (Psychol. Abstr.).

Variations in the Electroencephalogram During the Menstrual Cycle. Dusser de Barenne, D., and Gibbs, F. A. [*Amer. J. Obstet. Gynec.*, **44**, 687–90 (1942).]

Successive-day comparisons of the electrical activity of the cortex in 11 healthy young women revealed no simple rigid relation between the EEG and the menstrual cycle; but in the majority, electrical activity became slower after the beginning of the menstrual flow, and in some a disturbance of frequency regulation occurred at the midmenstrual period.

M. E. Morse (Psychol. Abstr.).

An Experimental Study of Monopolar and Bipolar Derivations in the Human Electroencephalogram. Cohn, R. [*Proc. Soc. exp. Biol., N.Y.*, **55**, 240–2 (1944).]

Experiments carried out on cadavers have demonstrated that the important characteristic amplitude properties of the alpha component of the normal human EEG, in the usual monopolar derivations, primarily depend on the attenuating properties of the tissue through which the potential difference is transmitted. Moreover, the correspondence between wave forms seen in

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the normal EEG and those produced by an artificial occipital electric dipole in the cadaver indicates that the spread of an occipital electric disturbance is an excellent model for the production of the amplitude characteristics of the basic alpha component of the normal EEG.
H. PEAK (Psychol. Abstr.).

The Electroencephalogram in Pregnancy. Gibbs, F. A., and Reid, D. E. [*Amer. J. Obstet. Gynec.*, **44**, 672–5 (1942).]
The EEGs of 28 women, 8 of whom had toxemias, indicate that the electrical activity of the cortex is slowed in pregnancy and that, as a group, patients with toxemias show more high-voltage fast activity and less normal activity than patients without toxemia. Most of the records were taken in the last two weeks of pregnancy. In the cases in which both pre- and post-partum records were obtained, cortical activity was usually slower during pregnancy.
M. E. MORSE (Psychol. Abstr.).

Effects of Morphine on Cortical Electrical Activity of the Rat. Cahen, R. L., and Wikler, A. [*Yale J. Biol. Med.*, **16**, 239–43 (1944).]
" 1. Small sedative doses of morphine (less than 20 mg. per kg.) have little or no effect on the cortical electrical activity of the unanesthetized rat. After injection of relatively large doses of morphine (20 to 50 mg. per kg.) increase in amplitude and decrease in frequency appear early. Somewhat later, periodic ' bursts ' of 10 to 12 per second waves of high amplitude appear and persist for several hours. 2. These effects are similar to those produced by moderate doses of barbiturates in man and in animals, and the EEG pattern resembles that seen during natural sleep in man. 3. Large doses of morphine (200 mg. per kg.) or smaller doses (40 to 100 mg. per kg.) combined with moderate doses of a barbiturate (9 to 30 mg. ker kg.) decrease the amplitude and finally abolish the cortical electrical activity because of marked respiratory depression with resulting anoxia. If anoxia is prevented by artificial respiration, cortical electrical activity returns. 4. The changes produced by morphine in the electrical activity of the cortex of the rat are not specific for this drug, and appear to be produced by mechanisms similar to those operating during light or moderate barbiturate narcosis." A. WEIDER (Psychol. Abstr.).

Physiological Aspects of Convalescence and Rehabilitation Following Central Nervous System Injuries. Goldstein, K. [*Fed. Proc. Amer. Soc. exp. Biol.*, **3**, 255–65 (1944).]
The questions to be kept in the foreground in considering problems of rehabilitation are whether, and in what degree, the disturbance of performance can be reversed; what can be done to promote spontaneous restoration; and, if a full restitution is not to be expected, how should one proceed with retraining. The author considers the origin and classification of symptoms in brain damage and then discusses the procedure of rehabilitation in relation to the various forms of symptoms, including under this discussion the rehabilitation in impairment of general performance capacity, special performance capacity, and capacity for abstractions.
C. G. MUELLER (Psychol. Abstr.).

Prefrontal Lobotomy in Schizophrenia. Freeman, W. J. [*Inst. of Living, No.* 12, 495–502 (1944).]
The author, using 170 psychopathological cases from five diagnostic groupings, describes and favorably evaluates one modification of the Moniz psychosurgical procedure. More than half of the schizophrenics are usefully occupied, with only one in seven institutionalized. The salient characteristic of post-operative patients is the marked loss in self-consciousness; seven abbreviated case-histories are illustrative. Brief reference is made to histological study of necropsic tissue with emphasis placed upon the disruption of thalamo-frontal-cortical tracts. This operative technique is recommended only as a last resort in therapeutic effort.
L. A. PENNINGTON (Psychol. Abstr.).

2. Biochemistry, Physiology, Anatomy, Pathology, etc.

Muscular Excitability in Experimental Polyneuritis. Chauchard, P., and Mazoué, H. [*Compt. rend. soc. biol.*, **137**, 19–20 (1943).]
In rats deprived of vitamin B_1 muscle chronaxia remained normal for a time, then later increased when muscle degeneration began. L. E. GILSON (Chem. Abstr.).

Chlorination of Human, Monkey-adapted, and Mouse Strains of Poliomyelitis Virus. Trask, James D., Melnick, Joseph L., Wenner, Herbert A., and Joiner, Robert. [*Am. J. Hyg.*, **41**, 30–40 (1945).]
This study is concerned with the effect of Cl on poliomyelitis virus as present in stools of paralytic patients, and in suspensions of monkey spinal cords after 5 to 16 successive transfers after the original isolations from human stools, and with the effect of NaOCl, chloramine and azochloramide (N, N-dichloroazodicarboxamidine) on the FA strain of Theiler's mouse poliomyelitis virus. *Macaca mulatta* were the experimental animals in all cases but one, where *Cercopithecus aethiops sabeus*, the green African monkey, was used. Inoculations were made intracerebrally or by peripheral routes. A residual Cl level of 0·4 and 0·5 p.p.m. after 10-minute contact was insufficient to inactivate a 10^{-2} CR- and 10^{-3} SK-strain concentration of

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cord respectively. The WA strain of virus present in a 10 per cent. centrifuged suspension of stools withstood a 120-p.p.m. Cl dose, leaving a residual value of 15 p.p.m. after a 10-minute contact. For the FA (mouse) strain a residual Cl (chloramine) level of 0·57 p.p.m. after 30-minute exposure was needed to reduce the infectivity of a 10^{-5} infected brain concentration to one ID_{50} (= the amount of virus which produces the disease after intracerebral inoculation in 50 per cent. of the mice inoculated). For each 10- or 100-fold increase in virus concentration a proportional increase in Cl concentration was required. Similarly, 0·35- and 12·1-p.p.m. Cl levels were needed for NaOCl and azochloramide respectively to reduce 10^{-5} brain concentrations to one ID_{50}. In the case of NaOCl, for each 10-fold increase in virus concentration a 5-fold increase in residual Cl was needed. When extraneous organic matter was added to a 10^{-5} concentration of infected brain, the Cl residual values, after sufficient additional Cl had been added to meet the additional demand, had to be increased as much as 10 to 18 times to inactivate the same amount of virus as in the original suspension. This last observation must be taken into consideration when applying laboratory results to the *chlorination of natural wastes*.

BRUNO VASSEL (Chem. Abstr.).

The Involuntary Nervous System during Hypothermia in the Rabbit. Vallery-Radot, Pasteur, Mauric, G., Holtzer, Mme. A., Domart, A., and Lemant, J. [*Compt. rend. soc. biol.*, **137**, 78–9 (1943); *cf. C.A.*, **37**, 3161⁷.]

Hypothermia decreased the pressor activity of adrenaline, but did not modify the action of acetylcholine.

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

Lactic Acid Oxidation Quotient in Minced Brain of Normal and Avitaminotic Chicken. Galvão, P. E., Pereira, J., and Limongi, J. Papaterra. [*J. Biol. Chem.*, **157**, 667–71 (1945).]

Determinations were made of O_2 uptake with and without added lactate, lactate decline, and oxidation quotient of lactic acid in finely minced cerebrum and brain stem of normal and B_1-avitaminotic chickens. In the avitaminotic brain stem there was an average decrease from the normal of about 74 per cent. in the increased O_2 uptake with added lactate, while the lactate loss decreased on the average about 37 per cent.; consequently the oxidation quotient tended to rise. In one instance the added lactate inhibited the residual respiration. Added vitamin B_1 aided both the increased O_2 uptake and the lactate decline; this observation differs from those previously reported (*cf. C.A.*, **35**, 7010⁵) on ground tissue. No differences were found between normal and B_1-avitaminotic cerebrum.

J. M. LITTLE (Chem. Abstr.).

Convulsions Experimentally Produced in Dogs. Keith, H. M., Essex, H. E., and Schlotthauer, C. F. [*Amer. J. Dis. Child.*, **68**, 265–8 (1944).]

The purpose of this experiment was to discover a satisfactory method for producing in animals a series of spontaneous convulsive seizures such as occur in patients suffering from epilepsy. The main method of attack was that of freezing certain areas of the cerebral cortex. Convulsions were produced by this method in 82 per cent. of the animals who were operated on twice (freezing agent applied to both left and right hemispheres) and in 52 per cent. of those operated on only once (left hemisphere). The results obtained when other substances were applied to the brain are also given.

L. LONG (Psychol. Abstr.).

The Functional Organization of the Cerebral Cortex. McCulloch, E. S. [*Physiol. Rev.*, **24**, 390–407 (1944).]

Functional organization depends both on the physico-chemical reactions of constituents and on their anatomical relations. Since the reactions of all neurons are similar, it is often possible to deduce anatomy from activity and to predict activity from anatomy. The subject is reviewed under the following headings: General organization from the developmental standpoint; common functional properties of the cortex; cortical sectors as defined by thalamocortical connections, and regions as distinguished by differing density of these projections; description of these sectors and regions; and intracortical, inter-regional and interhemispherical connections. The primary sensory areas do not give rise to inter-regional associational fibers. This emphasizes the importance of associational areas. Certain tenets of the psychology of perception can be deduced from the physiology of the primary sensory areas. It is to be expected that ultimately knowledge of associational areas and inter-regional connections will lead to a physiological interpretation of the more complex psychological problems.

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

Studies on the Effect of Anoxic Anoxia on the Central Nervous System. Kessler, M., Hailman, H., and Gellhorn, E. [*Am. J. Psychol.*, **140**, 291 (1943).]

"Studies on the effect of lowered barometric pressure on unanesthetized rats have shown that when the ascent is carried out rapidly a period of temporary silence of the cortex occurs at a level of 190 mm. Hg from which the animals recover spontaneously in spite of continued lowered barometric pressure. . . . Rats injected with benzedrine show similar changes in EEG as far as the period of cortical silence is concerned, but they show during the subsequent recovery a normal EEG without spindles and without any further signs of depression of activity. . . . If the pressure is lowered to 110 to 140 mm. Hg, a period of electrical silence occurs from which no recovery at that barometric pressure is possible. As the gasping and slowing of pulse show, the

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medulla is involved in these conditions. Benzedrine, which increases the resistance of rats to anoxia as indicated by the EEG at moderate degrees of anoxia, does not increase the resistance or the survival time of rats under conditions of extreme anoxia. Conversely, rats fed with carrots, although showing an increased survival time under lethal conditions, do not show any improvement in performance or in EEG under conditions of more moderate anoxia."

T. G. ANDREWS (Psychol. Abstr.).

Action of K and Narcotics on Rectification in Nerve and Muscle. Guttman, Rita. [*J. Gen. Physiol.*, **28**, 43–51 (1944).]

Electrical rectification, or the ability to let the electric current pass more easily outward than inward, is probably a property of the plasma membrane. The rectification studied on the frog sciatic nerve and sartorius muscle has been shown to be reversibly decreased by increasing K+ concentration, $CHCl_3$, veratrine sulfate or isoamyl carbonate. Neither $CaCl_2$ nor $BaCl_2$ had any effect.

S. MORGULIS (Chem. Abstr.).

Influence of Acute Intracranial Pressure on the Circulation and Blood Sugar. Osterchrist, Walter. [*Deut. Z. Chir.*, **258**, 222–35 (1943).]

Development of intracranial pressures is a means of explaining acute clinical syndromes. In selected patients heightened pressures, studied by lumbar encephalography, influence pulse, blood pressure and fasting blood sugar, pointing to stimulation of a medullary center. The diagnostic significance for evaluation of cranial injuries is proved by blood-glucose tolerance tests.

LUCIEN Y. DYRENFORTH (Chem. Abstr.).

Steroids as Structurating Agents on Social Behavior in Castrated Benzedrinized Mice. Chance, M. R. A. [*J. Physiol.*, **103**, 13P (1944).]

Normal mice of either sex treated with 20 mgm. of benzedrine per kgm. body weight show an activity slightly more marked than, but similar in behavior to, the untreated animal. On the other hand, such animals in groups show aggressive and defence attitudes alternating with escape reactions during excitation with the drug. Unlike normal animals, castrates show the same behavior in groups as when alone; there is rapid random alternation between activities of different types. Male castrates receiving DCA or other steroid hormones prior to the benzedrine behave similarly to normal animals receiving benzedrine; female castrates show only a slight tendency to return to the normal behavior of intact animals receiving benzedrine alone.

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

Utilization of O by the Brain in Traumatic Shock. Blalock, Alfred. [*Arch. Surg.*, **49**, 167–9 (1944).]

The arteriovenous O difference in cerebral blood is considerably increased in the early stages of traumatic shock. It appears that the brain can maintain its O consumption, at least partially by extracting O from the arterial flow, under conditions of decreased blood flow.

JOHN T. MYERS (Chem. Abstr.).

Enzymic Oxidation of Mescaline in the Rabbit Liver. Blaschko, H. [*J. Physiol.*, **103**, 13–14P (1944).]

Differences between the oxidation of mescaline and of 1-p-synephrine, a typical substrate of amine oxidase, make it unlikely that the enzyme amine oxidase takes part in the oxidation of mescaline. Sec-octyl alcohol, a strong inhibitor of amine oxidase, did not interfere with the oxidation of mescaline. Also methylene blue had only a very slight inhibitory effect on the oxidation of mescaline in concentrations in which the oxidation of synephrine was completely abolished. Adding mescaline to synephrine in saturation concentration caused an increased rate of O uptake.

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

Oxygen in the Blood Emerging from the Brains of Post-mature Fetal Rabbits. Barcroft, J., and Young, I. Maureen. [*J. Physiol.*, **102**, 25–6P (1943).]

Gestation was prolonged by the daily intravenous injection of 100 units of human pregnancy urine extract and subcutaneous injection of 9 mgm. of progesterone, and an estimation of the O atm. to which the fetus was exposed was made by sampling the blood from the venous sinuses by intracranial puncture. During the period of post-maturity the O content of the blood falls progressively, leading from a condition of mild anoxemia to one of profound anoxemia and death. The placental mechanism for the supply of O appears unable to keep up with fetal growth.

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

The Higher Centers and the Blood-sugar Curve. Reid, C. [*J. Physiol.*, **102**, 20P (1943).]

The sniffing and tasting of meat by a female dog weighing 12·5 kgm. receiving 2·5 gm. glucose/kgm. (by stomach tube) or 1 gm./kgm. (intravenously) after a 24-hour fast was followed by a more rapid lowering of the blood-sugar curve than in the corresponding experiments without the exhibition of meat. In addition, sniffing and tasting meat without sugar administration caused a fall in blood sugar. These data suggest that the output of insulin is increased after activation of the higher centers through the olfactory and gustatory mechanisms.

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

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Concentration of the Virus of Poliomyelitis by Differential Centrifugation. McKinstry, D. W., Terrill, H. M., Reading, E. H., and Huffman, K. V. [*J. Franklin Inst.*, **238**, 310–16 (1944.]

Experiments directed toward the preparation of pure, active virus for the determination of the chemical nature and physical properties of the parasite showed that the SK murine strain of the virus of poliomyelitis can be completely sedimented, without inactivation, from mouse brain tissue homogenized in 0·1 per cent. glycine, by a centrifugal force 61,000 times that of gravity. Preliminary centrifugal treatment at 1,500, 3,000, 12,000 and 20,000 r.p.m. for varying periods of time eliminated a large percentage of the normal protoplasmic constituents without loss of virus activity. The purest preparations contained a small but constant amount of tissue proteinaceous material. Electrophoretic analysis (curves not given) revealed the presence of three components in the final preparations. E. B. SANIGAR (Chem. Abstr.).

The Pattern of Distribution of Carbonic Anhydrase in the Cerebrum of Man Compared with that of Certain of the Lower Animals. Ashby, Winifred, and Chan, Dorothea V. [*J. Biol. Chem.*, **156**, 323–9 (1944); *cf. C.A.*, **39**, 95[1]; **38**, 2097[2].]

In hog, dog and cat brain a greater amount of carbonic anhydrase was found in the cortex than in the white matter immediately below it, an average ratio of 34·9/22·5 occurring in 20 series tested. In human brain the reverse was true in 81 series from 18 brains, except in the motor area, where the relationship was that found in animal brains.

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

The Distribution of Carbonic Anhydrase in the Cerebrum. Ashby, Winifred, and Chan, Dorothea V. [*J. Biol. Chem.*, **156**, 331–41 (1944); *cf. CA.*, **39**, 95[1]; **38**, 2097[2].]

Analysis of human brains obtained at autopsy showed that the temporal pole contained the least amount of carbonic anhydrase (25 units/gm.); the frontal pole and lateral temporal areas had about equal activity, 30–35 units/gm.; the parietal area had a greater activity, 35–40 units; and the areas in the occipital lobe had the highest content, 40–50 units/gm., with area 17 having a slightly higher content than area 18. In the frontal pole the difference between the greatest and least amount of carbonic anhydrase found was 18 units/gm., while for the parietal and occipital areas the values were 14 and 13 units/gm., respectively. The average difference between the carbonic anhydrase content of the outer half of the cortex and that of the white matter immediately below the cortex in the frontal pole was 12·5 units/gm.; that for the occipital pole was only 4·8 units/gm. There seemed to be slightly more carbonic anhydrase in the left frontal pole than in the right, up to 4·8 units/gm. more (average 2·6 units/gm.). However, with the occipital lobe, the right and left differed by 9·9 units/gm. on the average, with either side being the higher. The differences between the carbonic anhydrase content of various parts of the right and left hemispheres of one brain progressing from the frontal to the occipital poles showed a rather smooth change, beginning with a slight preponderance in favor of the left frontal lobe and ending with a large difference in favor of the right occipital pole, though the actual enzyme levels in the brain showed considerable variation. In all the preponderance was in favor of the right side of the human brain. The high content of carbonic anhydrase of the occipital region of the human brain, 30 per cent. greater than in the frontal region, is suggested to be due to sight being man's dominant sense. In dogs, on the other hand, sight is not so dominant and the carbonic anhydrase of both regions is approximately the same, frontal 24·1 units/gm., temporal 19·7, parietal 21·2 and occipital 22·1. The carbonic anhydrase content of the rostral half of the guinea-pig brain was 25·6 units/gm. on the average, that of the caudal half, 33·8 units/gm., a 30 per cent. increase of the latter over the former. These data are discussed in relation to normal electroencephalograms. H. L. WILLIAMS (Chem. Abstr.).

The Artificial Phospholipide Membrane, Semipermeability and the Blood-brain Barrier. Weatherby, J. H. [*J. Lab. Clin. Med.*, **28**, 1817–20 (1943); *cf. C.A.*, **38**, 4492[1].]

The collodion membrane containing lecithin and cephalin is permeable to molecules but not to ions. The rate of permeation of such membranes is affected by changes in pH, esterification and salt formation which tend to change the degree of ionization. There is a striking parallelism between penetration or non-penetration of many substances into the brain from the blood stream, and the permeation or non-permeation of these same substances with respect to the artificial membrane. This fact suggests that cell membranes which contain phospholipides constitute the so-called blood-brain barrier. HOWARD W. ROBINSON (Chem. Abstr.).

Neurosecretion. Scharrer, Ernst, and Scharrer, Berta. [*Physiol. Rev.*, **25**, 171–81 (1945).]

In the central nervous sytem of both invertebrates and vertebrates groups of nerve cells are found which manifest cycles of secretory activity similar to those observed in gland cells. In fishes and amphibians the secretory granules appear in the nerve cells in association with chromatin, basophil cytoplasm or Nissl bodies, while in insects and fishes the neurosecretory products follow pathways along the axons to the endocrine glands. In invertebrates, in two instances, physiologically active substances were traced to neurosecretory cells in the central nervous system. S. MORGULIS (Chem. Abstr.).

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Glycolysis in the Parts of the Central Nervous System of Cats and Dogs during Growth. Chesler, Annette, and Himwich, Harold E. [*Am. J. Physiol.*, **142**, 544–9 (1944); *cf. C.A.*, **37**, 5466[5].]

In the newborn, glycolysis is most rapid in the medulla and is slower in both cephalad and caudad regions. In the adult, the highest rates are in the caudate nucleus and cerebral cortex, with lower rates in each succeeding caudad portion of the neuraxis. Glycolysis of the medulla and cord decreases progressively with age. In all cerebral portions studied, lactic acid formation rises to a maximum at some time during development and then recedes in later life. The part of the brain exhibiting the highest glycolytic rate advances in a rostral direction as growth proceeds. E. D. WALTER (Chem. Abstr.).

Glycolysis in the Brain. Mazza, V. F. P., and Lenti, C. [*Arch. sci. biol. (Italy)*, **28**, 245–54 (1942); *cf. C.A.*, **32**, 9212[7]; **34**, 5903[3].]

Anaerobic glycolysis of brain suspension after removal of the enzyme which forms lactic acid showed no triose phosphate either with bisulfite or NH_2–NH_2 after action on glucose or glucose 6-phosphate. From fructose diphosphate PO_4 was liberated however. Electrodialysis after digestion likewise failed to give triose phosphates. Lactic acid was produced in quantity, however. These brain broth suspensions were unable to reduce methylene blue. These observations support the previous conclusions that both a phosphorylative and a non-phosphorylative glycolysis occur in the brain, the latter proceeding through keto acids to pyruvic and lactic acids. WILLIAM F. BRUCE (Chem. Abstr.).

Anaerobic Glycolysis of the Brain in Experimental Poliomyelitis. Wood, Harland G., Rusoff, Irving I., and Reiner, John M. [*J. Exptl. Med.*, **81**, 151–9 (1945).]

The rates of anaerobic glycolysis of brain tissue were compared for normal animals and for those with experimentally induced poliomyelitis, with two different strains of mice and two different procedures. The report of interference of poliomyelitis with anaerobic glycolysis of brain was not confirmed. In one series there was a small increase and in the other series a small decrease in the brain Q $\frac{N_2}{CO_2}$ calculated for infected animals as compared with normal animals. When the calculations were made on the basis of wet weight of brain there was no difference in glycolysis. It is considered that the methods thus far used for study of the enzymes may be inadequate, and that no decision is as yet possible on the effect of poliomyelitis on anaerobic glycolysis. C. J. WEST (Chem. Abstr.).

Alterations in the Central Nervous System Associated with Chronic Motor Disabilities Induced by O_2 at High Pressure. Bean, John W. [*Proc. Soc. Exptl. Biol. Med.*, **58**, 20–1 (1945).]

Preliminary. Repeated exposure of animals for short periods to O_2 at 65 lb. gauge pressure produced degenerative changes in the central nervous system after a prolonged series of such treatments. Animals that died after a relatively few treatments showed no such damage. L. E. GILSON (Chem. Abstr.).

A Note on the Blood Guanidine Level in Migraine Subjects. Palmer, Harold D., Scott, D. B. McNair, and Elliott, K. A. C. [*J. Lab. Clin. Med.*, **28**, 735–7 (1943).]

The level of guanidine derivatives in the blood of migraine patients did not change before or during attacks. The basal level of guanidine-like substances in a number of epileptics was not higher than the normal level (*cf.* Murray and Hoffmann, *C.A.*, **34**, 6354[3]). HOWARD W. ROBINSON (Chem. Abstr.).

The Hypophysis and Carbohydrate Metabolism. Implantation of Hypophysis and the Hyperglucemic Curve. del Castillo, Enrique B., Membrives, Juan Reforzo, and Luchetti, Santos E. [*Medicina (Buenos Aires)*, **3**, 166–78 (1943).]

The implantation of bovine pituitaries in 12 patients, 11 of them with a low hypoglucemic curve, caused in every case an elevation of the level, moderate in some, intense in others. In some patients the maximal elevation was obtained a certain time after the implantation. A. E. MEYER (Chem. Abstr.).

The Effect of $MgSO_4$ on the Superior Cervical Ganglion. Huidobro, F., and Luco, J. V. [*Anales acad. biol., Univ. catolica Chile*, **2**, 133–45 (1939).]

The nictitating membrane of cats under dial anesthesia is depressed by $MgSO_4$ both when the postganglionic fibers are stimulated electrically and when the smooth muscle is stimulated by adrenaline or acetylcholine. $MgSO_4$ produces a depression of the superior cervical ganglion followed by an increase when the ganglion is stimulated electrically or by acetylcholine. The depression of the nictitating membrane produced by prostigmine is partially neutralized by $MgSO_4$, and the administration of $MgSO_4$ during the paralyzing effect of curare produces a partial decurarization. The drugs were usually administered into the common carotid artery after ligation of the external carotid. Occasionally the intravenous route was used. WM. M. GOVIER (Chem. Abstr.).

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Metabolism in Mental Disease. Hardwick, S. W. [*Med. Press and Circ.*, **210**, 347–50 (1943).]
A review covering such aspects as hypoglycemia, anoxia, vitamins, bio-chemical changes, periodic catatonia, autonomic enzymes, epilepsy, mechanism of shock therapy, and the endocrine approach. H. L. WILLIAMS (Chem. Abstr.).

Modern Views on the Role of the Hypothalamus. Biggart, J. Henry. [*Med. Press and Circ.*, **212**, 166–9 (1944).]
A review of the role of the hypothalamus in water, fat and carbohydrate metabolism, in sex disorders, in temperature regulation and in sleep. H. L. WILLIAMS (Chem. Abstr.).

Effect of Methyltestosterone Treatment on Muscular Performance and the Central Nervous System of Older Men. Simonson, Ernst, Kearns, Wolter M., and Enzer, Norbert. [*J. Clin. Endocrinol.*, **4**, 528–34 (1944).]
In 6 men 48 to 67 years old, suffering from fatigability, oral treatment with 30 to 40 mgm. methyltestosterone daily increased back-muscle strength and fusion frequency of flicker above the levels observed when placebos were given. Dynamic and static work performances were increased in 4 of 5 subjects. These effects were maintained up to 8 months. Other muscle groups, heart rate recovery, etc., were unaffected. Conclusion: Increase in male sex hormone level can influence the decrease of working capacity with age.
KATHRYN KNOWLTON (Chem. Abstr.).

Inhibitory Processes of the Cerebral Cortex. Obrador Alcalde, S. [*Ciencia, Mex.*, **4**, 289–95 (1944).]
In line with Sherrington's formulations are investigations by the author demonstrating various patterns of cortical inhibition (transcortical, interhemispheric, etc.) obtained in motor areas. Polygraph records support the view that inhibition is an active process (samples are reproduced), " and perhaps suggest a variety and diversity of causal factors." The basic nature of inhibition is still unknown. H. D. SPOERL (Pyschol. Abstr.).

The Effects of Retrograde Degeneration upon Reflex Activity of Ventral Horn Neurons. Campbell, B. [*Anat. Rec.*, **88**, 25–38 (1944).]
Cats and rhesus monkeys were used in the experiments; dial anesthesia was used during observations. Data were obtained by stimulation and recording with the cathode ray oscillograph. The author concludes: (1) Section of peripheral nerves or of ventral roots in cats and monkeys leads to the loss of the proprioceptive component of the spinal reflex during the period of chromatolysis. (2) This is directly correlated with the alteration of the ventral horn cell, and does not stem from degeneration in the sensory system. (3) Conduction occurs from the peripheral to central fibers of the dorsal root ganglion cells after retrograde degeneration induced by nerve section. S. R. HATHAWAY (Psychol. Abstr.).

Biochemical Problems of the Determination of the Nervous System in the Vertebrate Embryo. Nowinski, W. W. [*Medicina (Buenos Aires)*, **3**, 235–49 (1943).]
The substances which may play a role as stimulator in the embryonic development of the nervous system are discussed. A. E. MEYER (Chem. Abstr.).

Influence of Histamine on the Actions of Acetylcholine and Cholinesterase. Frommel, E., Aron, E., Herschberg, A. D., Piquet, J., and Goldféder, A. [*Helv. Physiol. Pharmacol. Acta*, **2**, 111–20 (1944) (*in French*).]
Histamine, 40γ/c.c., sensitizes leech muscle, snail heart, and frog rectus abdominis muscle to acetylcholine much in the same manner as does eserine. *In vitro*, the cholinesterase of guinea-pig and human serums, but not of horse serum, is partially inhibited by histamine, 10–100γ/c.c. During histamine-induced shock in guinea-pigs the cholinesterase activity of the serum is not significantly altered. L. E. GILSON (Chem. Abstr.).

Effect of Blood Serum from Patients with Myasthenia Gravis on the Synthesis of Acetylcholine in vitro. Torda, Clara, and Wolff, Harold G. [*J. Clin. Investigation*, **23**, 649–56 (1944); *cf. C.A.*, **38**, 5954[3].]
Acetylcholine synthesis in frog brain-Ringer solution mixtures was greater at 23° than at 38°, while the reverse was true of frog brain-serum mixtures. In frog brain-control serum mixtures or in frog brain-dialyzate of control-serum mixtures, acetylcholine synthesis exceeded that from frog brain-Ringer solution mixtures. The synthesis was significantly less when mixtures of serum from patients with myasthenia gravis were used. These results suggest that there is a defect in acetylcholine synthesis in patients with this disease which can explain the fatigability and weakness of these patients. J. B. BROWN (Chem. Abstr.).

Action of Acetylcholine on Erythropoiesis in Aplastic Anemia. Cremer, J. [*Z. klin. Med.*, **143**, 300–6 (1943).]
In three patients the repeated injection of increasing doses of acetylcholine caused the appearance of more reticulocytes in the blood, but did not significantly increase the total red cell count or the hemoglobin content. L. E. GILSON (Chem. Abstr.).

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2-Methyl-1, 4-Naphthoquinone and Its Relation to Choline. René Honorato, C., and Davidovich, A. [*Rev. med. y alimentación* (*Santiago, Chile*), **5**, 78–83 (1942–43).]

A study of the mechanism of the action of 2-methyl-1, 4-naphthoquinone showed the importance of the 2-methyl group. Acetylcholine, β-methylnaphthalene and vitamin K in 150-γ doses given daily to chicks (on a vitamin K-free diet) altered the mortality and prothrombin time (Quick), acetylcholine, and vitamin K reducing the mortality from the "normal" of 70 per cent. (30 days on diet) to 26·6 and 35 per cent., respectively, and the prothrombin time from 130 minutes (23 days on diet) to 40 minutes and 23 minutes respectively, and from 45 minutes (29 days on diet) to 22 and 20 minutes respectively. Acetylcholine also lowered the prothrombin time in human subjects with an elevated value. In chicks β-methylnaphthalene increased the mortality to 85 per cent. and increased the prothrombin time above the control at first. *In vitro*, under conditions in which vitamin K did not coagulate the plasma, acetylcholine brought this about, particularly at 37°, and after incubation for 5–15 minutes with the thromboplastin and plasma. The possibility that this incubation period arising from decomposition of the acetylcholine by cholinesterase was indicated by the absence of the incubation effect with choline, although incubation favoured its action. H. L. Williams (Chem. Abstr.).

2-Methyl-1, 4-Naphthoquinone, Choline and β-Methylnaphthalene in Experimental K-Avitaminosis-preventative and Curative Levels. René Honorato, C., and Merino, V. García. [*Ibid.*, 220–1.]

In avitaminosis K in chicks the curative doses of 2-methyl-1, 4-naphthoquinone, choline and β-methylnaphthalene are about ten times the preventive doses. The favourable effect of the three compounds in bringing the prothrombin times of vitamin K-deficient chicks toward normal was confirmed. H. L. Williams (Chem. Abstr.).

Action of Thyroxine and Choline in vitro *on the Prothrombin Time. René Honorato, C., and Aravena, M.* [*Ibid.*, 221–3.]

In normal plasma diluted 1/3 with physiol. saline there is no change in prothrombin time with choline, thyroxine or mixtures of the two. When these substances, and particularly the mixture, are activated by heating at 70° before using in the test the prothrombin time is decreased. The mechanism of the action is not known. H. L. Williams (Chem. Abstr.).

Effects of Choline and Acetylcholine Chloride upon Peripheral Nerve Fibers. Lorente de No, Rafael [*J. Cellular Comp. Physiol.*, **24**, 85–97 (1944).]

By the use of the sciatic nerve of the bullfrog, an analysis has been made of the action of large concentrations of choline and acetylcholine chlorides upon the resting membrane potential and upon the ability of the nerve to conduct impulses. These substances, even at concentrations of about 0·1 M, do not depolarize the nerve fibers, nor do they prevent the conduction of nerve impulses. Their action upon the membrane potential of nerve during anoxia and the subsequent period of recovery resembles that of Mg ions. And insofar as choline and acetylcholine chlorides in a concentration of about 0·1 M maintain the osmotic equilibrium of the nerve fibers, their action resembles that of glucose. A. D. Hasler (Chem. Abstr.).

Determination of Free Choline in Animal Tissues. Luecke, R. W., and Pearson, P. B. [*J. Biol. Chem.*, **155**, 507–12 (1944).]

The microbiological method for measuring free choline in plasma and urine (*cf. C.A.*, **38**, 3685[6]) has been adapted to the determination of this compound in animal tissues. Values for free choline in fresh beef liver range from 0·08 to 0·20 mgm. per gm., and this represents approximately 2 per cent. of the total choline in the liver. Incorporation of 1 per cent. choline in the diet of the rat is accompanied by a rather large increase in the free choline content of the kidney. No corresponding increase is seen in liver or brain tissue. A. E. Teeri (Chem. Abstr.).

Strain Differences in the Choline Requirement of Rats. Copeland, D. H. [*Proc. Soc. Exptl. Biol. Med.*, **57**, 33–5 (1944).]

The minimum choline requirement of a selected Wisconsin strain of hooded rats was approximately 4–6 mgm. per rat per day, and that of a Wistar albino strain on the same diet was above 10 mgm. per rat per day. Tests on the progeny of each strain showed that this difference continued through the F_3 generation. L. E. Gilson (Chem. Abstr.).

The Effects of K on the Synthesis of Acetylcholine in Brain. Welsh, John H., and Hyde, Jane E. [*Am. J. Physiol.*, **142**, 512–18 (1944).]

The findings of Mann *et al.* (*C.A.*, **33**, 8271[4]) were confirmed, namely, that at 7 to 8 times the K of normal Locke's solution the synthesis of acetylcholine (I) by brain slices in O was maximal; at about 12 times K+ the release of (I) was maximal; further increase in K+ resulted in a decrease in (I) formation. Slices of infant brain behaved essentially as adult except that the yields of (I) were not as great. Under anaerobic conditions very little (I) is synthesized at 0·004 M K+ and increasing the K+ to 0·05 M causes a possibly significant slight decline in total (I). More than one action of K+ is probably responsible for its observed effects on (I) formation and release. E. D. Walter (Chem. Abstr.).

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The Cholinesterases in the Light of Recent Findings. Mendel, Bruno, and Rudney, Harry. [*Science*, **100**, 499–500 (1944); *cf. C.A.*, **38**, 984[6].]

Chiefly a review and discussion emphasizing the existence of two distinct cholinesterases in the animal body; a specific or true cholinesterase, hydrolyzing choline esters exclusively, and a nonspecific or pseudocholinesterase capable of hydrolyzing a variety of esters, including those of choline. E. D. WALTER (Chem. Abstr.).

Specificity of Cholinesterase in Nervous Tissue. Nachmansohn, David, and Rothenberg, Mortimer A. [*Science*, **100**, 454–5 (1944); *cf. C.A.*, **37**, 5473[3].]

Evidence is presented that the enzyme present in various nerve tissues, on which the role of acetylcholine in the mechanism of nervous action was studied, is a specific enzyme. The results provide further support for the new concept of the role of acetylcholine in the mechanism of nervous action. E. D. WALTER (Chem. Abstr.).

Role of Acetylcholine and Vitamin B_1 in Nervous Excitation. Muralt, A. v. [*Nature*, **154**, 767–8 (1944); *cf. C.A.*, **37**, 6311[9].]

Stimulation of the branch of the vago-sympathicus supplying the heart of the frog leads to the liberation of aneurine or an aneurine compound tentatively called "*2. Vagusstoff*," in addition to acetylcholine, which Lowi originally called "*Vagusstoff*." The experiments confirm the conception that acetylcholine formation is essential for the excitation or recovery process, and that aneurine is a reservoir substance closely connected with the formation and disappearance of acetylcholine. E. D. WALTER (Chem. Abstr.).

An Analysis of the Mode of Action of Acetylcholine as Chemical Agent of Nervous Excitation. Koshtoyants, Kh. S. [*Doklady Akad. Nauk S.S.S.R.*, **43**, 376–9; *Compt. rend. acad. sci. U.R.S.S.*, **43**, 357–9 (1944) (*in English*).]

The action of acetylcholine (I) on the rectus abdominis muscle of the frog was suppressed by treating the muscle with Na oxalate solution. Normal response was restored by transferring the muscle back to Ringer solution. This indicates that (I) stimulates muscle by releasing Ca ions which are known (*cf. C.A.*, **36**, 6178[2]) to activate adenosinetrophosphatase (II). The paradoxical effect of (I) on heart muscle is attributed to action of (I) on such muscle to release Mg and K ions, known (*cf. C.A.*, **37**, 1728[6]) to inhibit (II) strongly.

J. W. P. (Chem. Abstr.).

Decomposition Products of Nucleoproteins and Related Substances and Muscle Sensitivity to Acetylcholine and to K. Torda, Clara, and Wolff, Harold G. [*Proc. Soc. Exptl. Biol. Med.*, **58**, 29–31 (1945).]

The effect on the contraction of frog rectus abdominis muscle induced by acetylcholine (I) or KCl was studied. Adenosine, adenine, adenylic acid and uric acid did not modify the effect of (I). Xanthine, methylxanthines, uracil, thiouracil, pyridine, 2-methyl-5-ethoxymethyl-6-aminopyrimidine, 4-methyl-5-β-hydroxyethylthiazole, methylguanidine, and "pyrol" did not modify the effect of (I) when used in low concentrations, but in higher concentrations increased its effect. Nucleic acid, alloxan and piperidine decreased the effect of KCl in inducing muscle contraction; the other compounds mentioned above increased its effect.

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

Acetylcholine Formation in Cell-free Extracts from Brain. Feldberg, W., and Mann, T. [*J. Physiol.*, **103**, 28–9P (1944).]

The enzyme system which catalyzes the formation of acetylcholine in the presence of adenosine triphosphate (ATP) has been obtained in the form of cell-free solutions, prepared by extraction of acetone-dried and powdered rat brain. In one hour at 37°, 140–400γ/gm. acetylcholine was formed, corresponding to 500–1,430γ/gm. dry material in the extract. About half of this acetylcholine was formed aerobically, but reduced glutathione or cysteine brought the aerobic synthesis to almost the same level observed anaerobically. Oxidized glutathione or cystine inhibited acetylcholine formation in air or N. The extracts only very slowly liberated orthophosphate from ATP, and the rate was the same in the presence or absence of O_2 and was unaffected by the presence of choline. ATP could not be replaced by adenosine diphosphate, inosine triphosphate or adenylate. Glucose, fructose and certain phosphorylated sugar derivatives inhibited the formation of acetylcholine—a fact explained by esterification of the labile phosphate groups of ATP. The formation of acetylcholine was enhanced by K+, diminished by Ca++. Ca++ inhibited, but K+ did not affect, the liberation of inorganic phosphate from ATP. H. L. WILLIAMS (Chem. Abstr.).

The Choline-containing and Non-choline-containing Phospholipides of Plasma. Taurog, Alvin, Entenman, C., and Chaikoff, I. L. [*J. Biol. Chem.*, **156**, 385–91 (1944); *cf. C.A.*, **38**, 6316[6].]

A study was made of the choline and P contents of plasma phospholipides of man and dog in the post-absorptive state. Choline was extracted by two methods and the phospholipides calculated from the P analysis. From the choline to P ratios, 95 per cent. or more of the plasma phospholipide of man and dog was found to contain choline. A. DIETZ (Chem. Abstr.).

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Effect of Vitamin K (Menadione) on Cholinesterase Activity, Acetylcholine Synthesis and Striated Muscle. Torda, Clara, and Wolff, Harold G. [*Proc. Soc. Exptl. Biol. Med.*, **57**, 236–9 (1944).]

The synthesis of acetylcholine by frog brain *in vitro* is retarded by 2-methyl-1, 4-naphthoquinone in concentrations of $2/10^6$ M or higher. The activity of cholinesterase is not affected by concentrations up to 0·001 M, but is decreased by higher concentrations. Menadione increased the effect of KCl in inducing muscle contraction. The effect was not easily reversed. In high concentration (0·0025 M) menadione alone caused contraction of striated frog muscle *in vitro*. The effect of methylene blue is similar except that cholinesterase activity is more completely inhibited. The possible mechanism of the above actions is discussed.

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

Effect of Steroid Substances on Synthesis of Acetylcholine. Torda, Clara, and Wolff, Harold G. [*Proc. Soc. Exptl. Biol. Med.*, **57**, 327–30 (1944); *cf. C.A.*, **38**, 4966[6]; **39**, 738[1].]

Cholesterol did not affect the rate of synthesis of acetylcholine by minced frog brain at pH 7·4 and 37°. Bile salts and vitamin D had no effect in low concentrations; higher concentrations depressed the rate. Hormones of the mammalian adrenal cortex, male sex hormones and corpus luteum hormones, except pregnenolone, depressed the rate, while estrogenic hormones and pregnenolone had an accelerating action. L. E. Gilson (Chem. Abstr.).

Reineckate Method for the Determination of Choline. Glick, David. [*J. Biol. Chem.*, **156**, 643–51 (1944).]

The method depends on photo-electric measurement of the color intensity of the acetone solution of choline reineckate. MeOH is the best extractant, and it has been determined that it is not necessary to employ reduced pressure for removal of this solvent before liberating the choline by $Ba(OH)_2$ hydrolysis. The interference due to many compounds which form insoluble reineckates is circumvented by precipitating in an alkaline medium. It was determined that propanol is the most suitable wash solution, since Reinecke salt is quite insoluble in it. The maximum light absorption for choline reineckate is near 526mμ, as determined spectrophotometrically. A. E. Teeri (Chem. Abstr.).

Rapid Biological Method for the Approximate Determination of Acetylcholine and K in Body Fluids. Torda, Clara. [*J. Lab. Clin. Med.*, **28**, 1609–14 (1943).]

The method is based on the antagonism between Ca and K on the contraction of the rectus abdominis muscle of the frog. A large excess of Ca influences only slightly the contracting effect of acetylcholine on the muscle, while it prevents almost entirely the contraction caused by K. Acetylcholine, K or both, were added to urine and the added amount was determined by the test. The difference between the amount added and that estimated was ± 15 per cent.

H. W. Robinson (Chem. Abstr.).

Inhibition of Choline Acetylase by α-Keto Acids. Nachmansohn, David, and John, Hedda M. [*Proc. Soc. Exptl. Biol. Med.*, **57**, 361–2 (1944).]

From brain tissue an enzyme, *choline acetylase*, can be extracted which in presence of adenosine triphosphate under strictly anaerobic conditions synthesizes acetylcholine in cell-free solution. Presence of eserine and fluoride is necessary to inhibit the action of accompanying cholinesterase and adenosinetriphosphatase. Pyruvic, α-ketoglutaric, phenylpyruvic and hydroxyphenylpyruvic acids inhibit its action more or less in concentrations above 0·0001 M. α-Keto acids occur in living cells in concentrations close to those found to have an inhibiting action on choline acetylase; this may be of considerable physiological importance.

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

The Cerebrospinal Fluid in Metastatic Tumors. Shannon, Edward W., and Morgan, Clinton W., jun. [*New Engl. J. Med.*, **231**, 874–5 (1944).]

Metastatic neoplasms cannot be differentiated from primary brain tumours on the basis of the protein content of the cerebrospinal fluid alone. The average protein content of lumbar cerebrospinal fluid in 43 cases of metastatic brain tumors was 99 mgm. per cent., and in 91 per cent. of the cases the content was greater than 40 mgm. per cent. The highest content was found in cases with superficial cerebral metastases. Patients with supratentorial metastases had a higher cerebrospinal fluid protein content than those with subtentorial lesions.

E. R. Main (Chem. Abstr.).

The Effects of Intracisternal Injection of NaBr upon the Blood-spinal Fluid Barrier. Weir, Everett G. [*Am. J. Physiol.*, **143**, 83–8 (1945); *cf. C.A.*, **36**, 6619[9].]

Intracisternal injections of NaBr, in amounts too small to alter the serum bromide level, lower the barrier to the passage of bromide ion into the spinal fluid. The distribution ratio of K and chloride ion is affected also by this procedure. Analysis of the spinal fluid after intracisternal injection shows that the fluid more closely resembles an ultrafiltrate of serum than before the injection. E. D. Walter (Chem. Abstr.).

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The Composition of the Spinal Fluid in Alcoholic Korsakow Psychosis as an Example of Spinal-fluid Findings in Organic Psychosyndromes. Reinhart, Walter. [*Schweiz. Arch. Neurol. Psychiat.*, **53**, 326–38 (1944).]

Total protein, globulin, protein quotient, cells, and Nonne, Pandy, normomastic and gold sol reactions were determined in the spinal fluid from 20 patients with alcohol Korsakow psychosis and from 95 patients with chronic alcoholism alone. In 11 of the Korsakow and 79 of the alcoholic patients the findings were normal throughout. In the others one or more of the tests were abnormal. Most of these could be explained by complications, but about 8 per cent. of the total number in each group showed spinal fluid abnormalities apparently resulting directly from the disease. Since the percentage was the same in both groups, it is concluded that no specific spinal fluid changes are associated with the Korsakow syndrome.

WARREN M. SPERRY (Chem. Abstr.).

Nonprotein N and Protein Concentration of Serum and Cerebrospinal Fluid in Shock. Duncan, Geo. W., Irvin, J. Logan, and Sarnoff, Stanley J. [*Bull. Johns Hopkins Hosp.*, **75**, 135–43 (1944).]

Mean concentrations of both non-protein N and protein in serum and cerebrospinal fluid were significantly greater in animals in which shock had been produced by a crushing injury. The mean ratios of the concentration of non-protein N in serum to the corresponding values in spinal fluid were 1·58 for control animals and 2·02 for the animals subjected to shock. The mean ratios of the concentration of protein in serum to that in spinal fluid were essentially the same for both groups.

ZELMA B. MILLER (Chem. Abstr.).

Considerations about our Latest Examinations of the Cerebrospinal Fluid in (Cases of) Heine-Medin's Disease. Macome, Alberto M., and Guidice, Carlos R. [*Rev. asoc. bioquim. argentina*, **11**, *No.* 38, 173–90 (1944).]

Positive globulin reactions were found in 37 per cent. of the fluids taken in the paralytic period of the disease, while the reaction was negative in the initial stage. Total proteins were increased to 50–200 mgm. per cent. in the paralytic period. Glucose was slightly higher, but within the normal limits. The chloride content remained unchanged. Lange's reaction with colloidal Au was positive, but atypical in 62 per cent. of the cases. The Wassermann reaction was always negative.

F. FROMM (Chem. Abstr.).

A Method for Exact Protein Determination in Small Quantities of Spinal Fluid. Rappaport, F., and Lasowski, E. [*J. Lab. Clin. Med.*, **28**, 1640–2 (1943).]

This method employs very small quantities of spinal fluid, 0·5 c.c. to 1 c.c. being sufficient for a determination. The total proteins of the spinal fluid are precipitated with phosphomolybdic acid. The sediment, after centrifugation, is dissolved in dilute NaOH and transferred quantitatively to a micro Kjeldahl flask for digestion. The digested contents are treated as in non-protein N determinations (*cf. C.A.*, **31**, 8560[6]).

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

The Clinical Estimation of Protein in the Cerebrospinal Fluid. Campbell, Walter R., and Hanna, M. I. [*Can. Med. Assoc. J.*, **51**, 347–50 (1944).]

A rapid clinical test for protein in the cerebrospinal fluid has been devised by preparing standard protein solutions from lyophilized serum. The protein solutions may be kept two weeks in an ice chest if a small crystal of thymol is added to the solutions and the solutions are tightly corked. A biuret reagent, stable for some months, is prepared by adding 100 c.c. of a 1 per cent. $CuSO_4.5H_2O$ solution dropwise with constant shaking to 100 c.c. of a 50 per cent. (wt./vol.) NaOH solution. (The NaOH solution is freshly prepared by dilution from a concentrated solution which has been left standing until the carbonates and iron settle out.) Dilute standard protein solutions are made from water and standard protein solution up to 2 c.c. in volume. To this is added 0·3 c.c. biuret reagent. The solutions are mixed, allowed to stand three minutes and compared in a colorimeter with the cerebrospinal fluid treated with biuret reagent. The colors are stable for several hours. A photoelectric colorimeter may be used, a graph for comparison having been prepared from standard protein solutions.

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

Vitamin B_2 and the Nervous System. Chauchard, Mme. B., Chauchard, P., and Raffy, A. [*Compt. rend. soc. biol.*, **137**, 45–6 (1943).]

See *C.A.*, **38**, 1003[8].

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

Distribution of Free and Combined Nicotinic Acid. Marenzi, A. D., and Moglia, J. L. [*Anales farm. bioquim. (Buenos Aires)*, **15**, 8–25 (1944); *cf. C.A.*, **38**, 2364[2].]

Rats were given 25 mgm. nicotinic acid (I) intraperitoneally and free and combined (I) were determined in the tissues 15, 30, 60, 120 and 180 minutes later. The (I) was absorbed and distributed throughout the tissues in less than 15 minutes. The liver, heart and kidneys showed a large and prolonged increase in free (I). Skeletal muscles showed a smaller increase. Com-

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bined (I) increased most in the heart and almost as much in the liver; perhaps free (I) was converted into trigonelline in these organs. Later, the muscles showed an increase in combined (I), possibly transferred there from the liver. In the kidneys the increase was slight.
L. E. GILSON (Chem. Abstr.).

Comparative Effects of Vitamin B_1 Deficiency and Restriction of Food Intake on the Response of Mice to the Lansing Strain of Poliomyelitis Virus, as Determined by the Paired Feeding Technique. Foster, Claire, Jones, James H. Henle, Werner, Dorfman, Frieda, Quinby, Mabel E., and Alexander, Dorothy L. [*J. Exptl. Med.*, **80**, 257–64 (1944); *cf. C.A.*, **38**, 1548[1].]

In a paired feeding experiment the effects of vitamin B_1 deficiency and of restriction of food intake have been compared. In both groups of animals the number of cases of paralysis and the number of deaths were less than in a control group on an unrestricted amount of the complete diet. The maximum difference occurred on the 15th day after inoculation. The incidence of paralysis and death in the vitamin-deficient group was also less than in the paired restricted group. The maximum difference occurred on the 17th day after inoculation, after which the difference gradually became less. At the end of the experiment (28 days) there was a slightly greater number of deaths in the restricted group than in the vitamin-deficient group. Apparently the effect of vitamin B_1 deficiency on the action of the virus of poliomyelitis in the mouse is not due solely to the resulting anorexia. C. J. WEST (Chem. Abstr.).

Brain Lesions Following Prolonged Overdosage with Desoxycorticosterone Acetate. Selye, Hans, Beland, Eleanor, and Sylvester, Octavia. [*Exptl. Med. Surg.*, **2**, 224–8 (1944); *cf. C.A.*, **37**, 5143[3].]

In rats sensitized to desoxycorticosterone acetate (I) by unilateral nephrectomy and a high salt intake (1 per cent. saline instead of drinking water), subcutaneous injection of 2 mgm. (I) in 0·1 c.c. water twice a day for 38 days or absorption of slightly less than 1 mgm. (I) daily from a subcutaneously implanted 15-mgm. pellet caused motor disturbances, cerebral periarteritis nodosa, and malignant nephrosclerosis. MARION HORN PESKIN (Chem. Abstr.).

Relationship of Vitamins to Nervous and Mental Changes in Chronic Alcoholics with Special Reference to Vitamin C. Wortis, Herman. [*Proc. Pacific Sci. Congr., Pacific Sci. Assoc.*, **6**, 475–80 (1943).]

The part played by vitamin deficiency in the production of nervous and mental changes in chronic alcoholics is discussed. Vitamin C appears to be involved in nerve-tissue metabolism, although its role is probably a subordinate one. L. E. GILSON (Chem. Abstr.).

The Influence of Sex Hormones upon the Chemical Growth of the Brain of White Rats. Weil, Arthur. [*Growth*, **8**, 107–15 (1944); *cf. C.A.*, **37**, 6315[8].]

In immature white rats the P content of the cephalin fraction of the brain is somewhat higher in males than in females; after puberty the opposite is the case. Injections of α-estradiol benzoate (I) into immature males reduced the P content of this fraction, and injections of testosterone propionate (II) into immature females raised it. The P content was not affected by administration of (I) to females nor by administration of (II) to males. Effects similar to those described above were exhibited by (I) and (II) in rats gonadectomized before or after puberty.
MARION HORN PESKIN (Chem. Abstr.).

The Pyruvic Acid Content of Human Blood in Pellagra. Tsatsakos, Demetrius. [*Klin. Wochschr.*, **22**, 442–4 (1943); *Chem. Zentr.*, **2**, 1475 (1943).]

Increased amounts of pyruvic acid in the blood (1–1·6 mgm. per 100 c.c.) were found in 20 cases of pellagra. This increase is attributed to the incomplete cleavage or dismutation of pyruvic acid in the organism (decrease of the cozymase content because of the deficient supply of nicotinic acid). RUTH BERGGREN (Chem. Abstr.).

Ascorbic Acid Excretion and Insomnia. Burton, Helen B., and Miller, Laura A. [*Proc. Okla. Acad. Sci.*, **24**, 17–20 (1944).]

A study was made as to whether the amount of sleep has any effect on the body's need for ascorbic acid (I) as measured by the excretion of (I). Two subjects were studied, and excretion values of one indicated a slight decrease in (I) after wakeful nights. The excretion values of the other subject were irregular, with inconclusive results.
H. J. PREBLUDA (Chem. Abstr.).

A Study of Canine Hysteria Produced by Feeding Certain Baked Dog Foods and Wheat Gluten Flour. Wagner, J. R., and Elvehjem, C. A. [*J. Nutrition*, **28**, 431–41 (1944).]

Canine hysteria of the nutritional type was produced in dogs by feeding baked dog foods containing wheat gluten flour and experimental rations containing wheat gluten flour. The disease appears to be caused by some toxic factor present in the wheat products. Although the proteins of these products are deficient in lysine, supplements of protein and lysine did not prevent the disease. Hysteria could be caused in dogs receiving nutritionally adequate rations by the addition of wheat gluten flour. W. B. ESSELEN, jun. (Chem. Abstr.).

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Absence of Nerve Degeneration in Chronic Thiamine Deficiency in Pigs. Wintrobe, Maxwell M., Follis, Richard H., jun., Humphreys, Stewart, Stein, Harold, and Lauritsen, Marjorie. [*J. Nutrition*, **28**, 283–8 (1944); *cf. C.A.*, **38**, 569⁵.]

Additional experiments in pigs in which chronic thiamine deficiency was produced failed to support the claim that lack of thiamine causes degenerative changes in the nervous system. Autoclaving was found to destroy thiamine and to reduce the pantothenic acid content of yeast fed in the diets. It was suggested that certain effects heretofore attributed to lack of thiamine may have in reality been due to lack of pantothenic acid.

W. B. Esselen, jun. (Chem. Abstr.).

Comparative Toxicity of Pentobarbital in the Newborn and Adult Rat. Etsten, B., Alexander, F. A. D., and Himwich, H. E. [*J. Lab. Clin. Med.*, **28**, 706–10 (1943).]

The lethal dose of pentobarbital for the newborn rat is 0·3 mgm. per gm., while the adult rat does not succumb until it has received 0·5 mgm. per gm. It appears that pentobarbital inhibits the development of the anaerobic energy required for survival in the absence of O. Doses of pentobarbital and metrazole, which are lethal when given singly, may antagonize each other and promote survival when given together. Howard W. Robinson (Chem. Abstr.).

3. Pharmacology and Treatment.

Barbiturates. XXVII: Tolerance and Cross Tolerance to Barbiturates. Green, Melvin W., and Koppanyi, Theodore. [*Anesthesiology*, **5**, 329–40 (1944); *cf. C.A.*, **38**, 993⁵.]

Dogs, upon repeated daily injections of evipal-Na, pentothal-Na, and nostal-Na, develop a marked tolerance to these drugs characterized by a significant reduction in sleeping time. With nostal, anesthetic doses eventually fail to produce sleep in tolerant animals. Dogs made tolerant to evipal, pentothal or nostal show cross tolerance to the other two barbiturates, and also to the long-acting barbital-Na. The tolerance to barbiturates is not lasting. Pentothal-tolerant animals practically lose all their tolerance in less than two weeks. Dogs which developed tolerance to the narcotic action of evipal failed to show tolerance to the peripheral actions of this hypnotic, namely, vasodepression, vagal paralysis, and prevention of the elevation of blood pressure after occlusion of the common carotid artery. The tolerance to the narcotic action of these barbiturates is probably a true cellular tolerance. The development of this phenomenon can only be obtained by a careful balance between the rate of administration and the rate of essential elimination; in other words, it may be obscured either by cumulative effects or by partial loss of tolerance between administrations. Ruth Berggren (Chem. Abstr.).

Experimental Treatment of Barbiturate Poisoning with Picrotoxin. Caizzone, Giacomo, and Rigano, Giuseppe. (*Arch. ital. sci. farmacol.*, **9**, 231–48 (1939); *Chem. Zentr.*, **1**, 563 (1944).]

In rabbit experiments picrotoxin proved to be a better antidote than strychnine for barbiturate poisoning. L. E. Gilson (Chem. Abstr.).

Antagonism of Na Succinate to Barbiturate Depression. Pinschmidt, N. W., Ramsey, Helen, and Haag, H. B. [*J. Pharmacol.*, **88**, 45–52 (1945).]

Repetition of the experiments of Soskin and Taubenhaus (*C.A.*, **37**, 4471⁶) on use of Na succinate as an antidote to barbiturate poisoning in hooded rats gave results similar in nature but less striking. Pre-administration of 1 gm. of succinate per kgm. of body weight protected 80 per cent. of the treated rats against death from 8·5 mgm. of Na pentobarbital per kgm., whereas only 47·5 per cent. of the controls survived. In an identical experiment with albino rats 70 per cent. of the treated rats and 50 per cent. of the controls recovered. Na succinate shortened the duration of Na pentobarbital anesthesia in rabbits to a limited extent. It was far less effective than a moderate dose of picrotoxin. L. E. Gilson (Chem. Abstr.).

Influence of Some Analeptics on Activity of Narcotics. Giovanna, G. Della. [*Arch. ital. sci. farmacol.*, **8**, 35–50 (1939); *Chem. Zentr.*, **1**, 562 (1944).]

Narcotics such as $CHCl_3$ and CBr_3CH_2OH flocculate soap gels. In animal experiments analeptics, such as coramine, caffeine, metrazole, camphydrol and strychnine antagonize the action of these narcotics. They also inhibit the flocculation of soaps by the same. Na barbital has scarcely any flocculating action on soap, and its action is not affected by the above analeptics.

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

Benzedrine in Contrast to Barbiturate Action. Carratala, Rogelio. [*Semana med.* (*Buenos Aires*), **1**, 1229–34 (1944).]

The minimum lethal dose was determined for various barbiturates and benzedrine in dogs, rabbits and rats. Benzedrine, injected first, delays the coma after minimum lethal doses of barbiturates, but does not prevent death in all animals. If benzedrine is given after barbiturate coma has developed it is possible to awake the animals or shorten the coma, but not to save all the animals. Benzedrine is inferior to coramine, metrazole, strychnine and picrotoxine. Barbiturate narcosis can be prevented with preceding injections of benzedrine. Established narcosis can be interrupted with benzedrine. The effect of benzedrine can effectively be counteracted with barbiturates. A. E. Meyer (Chem. Abstr.).

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The Influence of Amphetamine (Benzedrine) Sulfate, d-Desoxyephedrine Hydrochloride (Pervitin), and Caffeine on Work Output and Recovery when Rapidly Exhausting Work is Done by Trained Subjects. Foltz, E. E., Ivy, A. C., and Barborka, C. J. [*J. Lab. Clin. Med.*, **28**, 603–6 (1943).]

The effects of amphetamine (I), desoxyephedrine (II) and caffeine (III) on work output and the effect of (I) and (II) on recovery in subjects doing rapidly exhausting work have been observed. All three drugs stimulated some of the subjects mentally so that they felt more alert. The sensations resulting from (II) and (III) were more pronounced when the drugs were given to a non-fatigued subject than when given following exhaustion. The subjects could not work longer and did not recover more rapidly when given (I). If (II) was given before work began the subjects worked longer, but recovery was not hastened if (II) was given to exhausted subjects. The subjects worked longer when given (III), and recovery was hastened if (III) was given to exhausted subjects. These experiments do not pertain to the type of work performed during a march or while standing guard. Stimulants should be chosen according to whether increased work output is desired, or whether more rapid recovery from fatigue is necessary.

HOWARD W. ROBINSON (Chem. Abstr.).

The Influence of Amphetamine (Benzedrine) Sulfate and Caffeine on the Performance of Rapidly Exhausting Work by Untrained Subjects. Foltz, E. E., Schiffrin, M. J., and Ivy, A. C. [*J. Lab. Clin. Med.*, **28**, 601–3 (1943).]

Twenty-three untrained subjects were given capsules containing a placebo, or 10 mgm. of amphetamine, or 0·5 gm. of caffeine sodium benzoate. The output of work was the same regardless of the capsule taken, but training had a much greater effect on the output of work. No side effects were noted from the drugs except that most of the subjects felt euphoric and as if they could do " a lot of work to-day." The euphoria did not increase the work output. The average percentage of recovery was very constant. H. W. ROBINSON (Chem. Abstr.).

Action of Pentamethylenetetrazole (Metrazole) on the Superior Cervical Ganglion of the Cat. Croxatto, H., and Alonso, O. [*Rev. med. y alimentación (Santiago, Chile)*, **5**, 57–8 (1942–43); *cf. C.A.*, **38**, 5578[1].]

Metrazole has a depressing effect upon the superior cervical ganglion.

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

Effects of Pentamethylenetetrazole on the Neuromuscular Synapses. Salvestrini, H., Croxatto, H., Alonso, O. [*Ibid.*, 58–60.]

The response to indirect stimulation is depressed, in a manner similar to that observed with strychnine. H. L. WILLIAMS (Chem. Abstr.).

Mode of Action of Pentamethylenetetrazole or Metrazole on the Nervous Centers. Chauchard, Paul, Mazoué, Henriette, and Lecoq, Raoul. [*Compt. rend.*, **217**, 619–21 (1943).]

The mode of action of metrazole was studied with subconvulsive doses injected intraperitoneally into rabbits, guinea-pigs and rats. The rabbits received 3–15 mgm. (the convulsive dose is 50 mgm. given intravenously and 150 mgm. intraperitoneally). The guinea-pigs and rats received 3 mgm. The observations were carried out on the intact animals (Chauchard, *C.A.*, **38**, 1770[9]; Chauchard, A., B., and P., *Compt. rend. soc. biol.*, **136**, 784 (1942)), and concerned the chronaxies of the nerves to extensors and flexors of the toes, the corresponding muscular chronaxies, the sensory chronaxies of the reflex of crossed flexion of the paw, and the cortical chronaxies of flexion of the toes, the electrodes being applied to the skin at desired points. It was found that in addition to its action on the muscles, metrazole has complex effects on the nervous centers. The higher centers, especially the cerebral cortex, are depressed, while the lower centers are excited. To the idea of the role of the lower centers in the genesis of metrazole convulsions (J. Asuad, *Presse méd.*, **48**, 794, 1043 (1940)) is now added the idea of a cortical depression, to which is to be attributed the loss of consciousness observed in man. The nervous disturbances provoked by metrazole are indentical to those found in insulin coma (Chauchard, P., *Rev. neurol.*, **73**, 245 (1941), Chauchard, B. and P., Mazoué, H., and Lecoq., R., *Compt. rend. soc. biol.*, **137**, 653 (1943)). Attention is called to the fact that the insulin cure of Sakel has the same therapeutic indications as the metrazole cure of von Meduna. Both methods are depressive from a cerebral point of view, and may be contrasted with the pure encephalic excitation observed in strychnine poisoning and B_1 avitaminosis, and with the encephalic depression without peripheral excitation observed in ordinary hypnotic states. M. A. (Chem. Abstr.).

Antagonism between Urethan and Pentamethylenetetrazole (Metrazole) on the Spinal Reflex of the Toad (Bufo chilensis Gay). Croxatto, H. [*Anales acad. biol. Univ. catolica Chile*, **3**, 77–81 (1940); *cf. C.A.*, **39**, 355[3].]

The heightening of the crossed spinal reflex produced by metrazole in the toad is neutralized by urethan and *vice versa*. A dose of 3 to 4 mgm. of urethan neutralizes the effect of 5 mgm. of metrazole. WM. M. GOVIER (Chem. Abstr.).

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Biological Test for Metrazole. Espinal, Oscar. [*Rev. med. exptl.* (*Peru*), **3**, 163–70 (1944).]
Metrazole has a convulsion-producing action on *Palemon gaudichaudii*, a shrimp from Peruvian rivers, when solutions are injected into the abdominal muscle, and this animal is more sensitive than higher animals formerly used. The convulsion-producing dose (50 per cent.) is 25 mgm./kgm. and (100 per cent.) 50 mgm./kgm. The sensitivity to metrazole was reduced during the winter. H. L. WILLIAMS (Chem. Abstr.).

The Central Stimulation Produced by Nicotine. Kuschinsky, G., and Hotovy, R. [*Klin. Wochschr.*, **22**, 649–50 (1943).]
Rat experiments showed that nicotine (I) in small doses can cause central stimulation similar in character to that produced by caffeine or pervitin. In stimulated animals (I) often appears to have a transitory sedative action. These experiments favor the view that smoking is done, not in spite of, but because of the (I). RUTH BERGGREN (Chem. Abstr.).

The Value of CO_2 in Counteracting the Effects of Low O. Gibbs, F. A., Gibbs, E. L., Lennox, W. G., and Nims, L. F. [*J. Aviation Med.*, **14**, 250–61 (1943).]
A study of arterial and internal jugular blood and of brain function in eight healthy young men who breathed mixtures containing low percentages of O and varying ratios of N and CO_2 indicated that normal brain function can be maintained in spite of low O in inspired air (as low as 2 per cent.), provided the CO_2 tension of the body is maintained. The addition of CO_2 to low O mixtures permitted maximum utilization of the available O because of increased pulmonary ventilation and consequent increased oxygenation of arterial blood, because of peripheral vasoconstriction and cerebral vasodilation (insuring a maximum share of circulating blood to brain), and because of a shift in the hemoglobin dissociation curve. The maintenance of CO_2 tension of the brain was of equal importance for normal brain function. Gross cortical dysfunction, manifested by high-voltage slow activity in the electroencephalogram and by mental confusion, occurred when the CO_2 tension of the brain fell as a result of breathing low O mixtures, even though the O tension of the brain was sufficient to maintain normal brain function. When the O tension of the brain was lowered while the CO_2 tension of the brain was maintained, consciousness was lost without a preceding period of confusion and without the occurrence of high-voltage slow waves in the electroencephalogram. All studies were carried out with the subjects recumbent. The mixtures employed for inhalation were: 10, 8, 6 and 4 per cent. O in N, and 10, 8, 6, 4 and 2 per cent. O plus 5 per cent. CO_2 in N.
MAURICE M. RATH (Chem. Abstr.).

Acute Toxicity of Choline Chloride Administered Intraperitoneally to Rats. Hodge, Harold C. [*Proc. Soc. Exptl. Biol. Med.*, **57**, 26–8 (1944); *cf. C.A.*, **37**, 946[1].]
The amount of choline chloride required to kill the albino rat is greater the more diluted the solution. Expressed as mgm. per 100 gm. body weight the LD50 values are: 29–34 for a solution containing 200 mgm./c.c., 37–38 for 100 mgm./c.c., 41–49 for 40 mgm./c.c. and 59–75 for 20 mgm./c.c. The large doses killed within 5 minutes. Death was preceded by respiratory paralysis, trembling, convulsive movements, salivation and hemorrhage around the eyes. Rats which survived 20 minutes after injection of any dose invariably lived and showed no symptoms of damage on the days following. L. E. GILSON (Chem. Abstr.).

Paralysis after Tritolyl Phosphate Poisoning. Braun, Ernst. [*Deut. med. Wochschr.*, **70**, 118–20 (1944).]
Numerous persons were poisoned by tri-o-tolyl phosphate mistaken for edible oil. The paralysis and other symptoms described were similar to those reported by numerous previous investigators. L. E. GILSON (Chem. Abstr.).

Direct Measurements on the Effects of Bromides, Sodium Amytal and of Caffeine in Man. Jacobson, Edmund. [*Ann. Internal Med.*, **21**, 455–68 (1944).]
If suitable electrodes are placed in neuromuscular regions, direct measurements can be obtained of the effects of stimulants, sedatives or other types of medication, in terms of action potentials. Measurements are best made with the integrating neurovoltmeter. Bromides by mouth in 1 gm. doses have little effect on normal individuals. Doses of 6 gm. in 2 hours gave diminished potentials in some individuals. Intramuscular injection of 0·17 gm. of Na amytal produced a greater quieting effect. Caffeine Na benzoate in 0·5 gm. intramuscular doses produced no effect in some cases, but was definitely stimulating in others.
JOHN T. MYERS (Chem. Abstr.).

Action of Curare on the Autonomic Neuroeffector Systems. Luco, J. V., and Mesa, J. [*Rev. med. y alimentación* (*Santiago, Chile*), **5**, 60 (1942–43).]
The effect of curare on automatically stimulated systems was studied, separating the pre- and post-ganglionic synaptic fibers, and measuring the variations in diameter of the pupil and contractions of the nictitating membrane. Adrenalectomy was performed to prevent adrenaline modifying the diameter of the pupil. Curare paralyzed the effectors studied against preganglionic synaptic or parasympathetic stimulation (cholinergic). Curare in doses 3–5 times that required to arrest respiratory movements caused partial dilatation of the pupils when it is injected during the stimulation of the post-ganglionic parasympathetic fibers (cholinergic). In contrast no

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effect was observed during stimulation of the post-ganglionic sympathetic fibers (adrenergic), or during direct stimulation of the muscles of the pupil, from which data it is concluded that curare action is manifest only in effectors innervated by cholinergic fibers.

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

Anesthetic Action of, and Reflex Activity of, the Spinal Medulla to Steroid Hormones in the Toad (Bufo chilensis Gay). Croxatto, H., and González, M. [*Rev. med. y alimentación (Santiago, Chile)*, **5**, 71–3 (1942–43).]

DCA, progesterone and testosterone in oil injected into the lymphatic sac or peritoneal cavity of toads weighing 32–48 gm. caused a profound state of anesthesia in doses of 7–10, 5·5 and 10 mgm. or more, respectively, a condition lasting 6–8 or more hours. All these hormones produce total or partial inhibition of the transverse extensor reflex. After the first few hours this reflex could be found after intraventricular injection of eserine salicylate, prostigmine or metrazole. The cholinesterase activity of the 3rd and 4th medullary segments removed during the condition of anesthesia showed a 20 per cent. increase. H. L. WILLIAMS (Chem. Abstr.).

Effect of Narcotics on Cholinesterase Activity. Experiments in vitro by Sheiner's Method. Mikhel'son, M. Ya. Farmakol. i Toksikol., **6**, No. 5, 49–51 (1943); *cf. Bull. biol. med. exp. U.R.S.S.*, **11**, No. 3, 230 (1941).]

The capacity of various narcotics to inhibit cholinesterase activity of biological fluids and tissue extracts parallels their narcotic activity; they produce an inhibition *in vitro* in concentrations similar to that required in blood and tissue to produce narcosis. The serum cholinesterase activity (horse) is decreased 50 per cent. by MeOH (0·26 M), EtOH (0·069 M), PrOH (0·0084 M), iso-BuOH (0·00757 M), isoamyl alcohol (0·00373 M) and chloroform (0·00627 M); and diethyl ether (concentration 0·0135 mol./l) produces 33 per cent. inhibition.

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

High Frequency Electric Current in the Treatment of Alcoholic Hallucinosis. Gruenberg, K. Y. [*Amer. Rev. Soviet Med.*, **1**, 544–52 (1944).]

The beneficial effects of high frequency electric current on schizophrenic patients whose predominant syndrome was of a delusional nature suggested to the author the use of the same therapy for alcoholic hallucinosis. Ten cases of the latter type were studied, and three case-histories are presented. The general effect of the treatment was an alleviation or removal of the hallucinatory syndrome, but there was a tendency for spontaneous recurrence of the symptoms. The possible therapeutic mechanisms of the action of high-frequency current are discussed as well as the question of the possible focal origin of hallucinations.

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

Treatment of Typhic Hemorrhagic Meningo-encephalitis by Intravenous Injection of Ascorbic Acid. Libov, A. L. [*Sovet. Med.*, **6**, *Nos.* 11/12, 20–1 (1942).]

Whereas after usual methods of treatment 12 of 15 patients died of the disease, following the injection of 12 ml. of a 5 per cent. solution of ascorbic acid the mortality was but 1 patient in 15.

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

Pyridinesulfonamide and Some Agents Acting on the Autonomic Nervous System. Steffenoni, Sergio. [*Boll. soc. ital. biol. sper.*, **16**, 224–5 (1941); *Chem. Zentr.*, **1**, 564 (1944); *cf. C.A.*, **36**, 1087[8].] L. E. GILSON (Chem. Abstr.).

Lactic Acid Content of the Brain after Insulin and Electric Shock. Lups, S. [*Nederland Tijdschr. Geneeskunde*, **87**, 1421–5 (1943); *Chem. Zentr.*, **1**, 559 (1944).]

In albino rat brain lactic acid decreased after large doses of insulin and after electric shock severe enough to produce prolonged tetany. L. E. GILSON (Chem. Abstr.).

Complications Through Treatment with Sulfanilamide Preparations, with Involvement of the Peripheral Nerves. Enneking, J. A. M. J., and Prick, J. J. G. [*Acta Med. Scand.*, **117** 313–33 (1944).]

Marked polyneuritic effects from therapy with sulfanilamide preparations are described in a number of patients. To study this complication to better advantage ultraseptyl (sulfamethylthiazole) was given intramuscularly to a pigeon and the development of paresis was studied until death resulted. Histological examination revealed extensive peripheral nerve degeneration.

S. MORGULIS (Chem. Abstr.).

Effect of Curare and Curare-like Substances on the Central Nervous System. Pick, Ernest P., and Unna, Klaus. [*J. Pharmacol.*, **83**, 59–70 (1945).]

When injected into the thoracic lymph sac, cryst. d-tubocurarine, dihydro-β-erythriodine, quinine ethochloride, nicotine and thiamine inhibited the electric activity of the frog brain. Prostigmine, which itself depresses brain potentials, failed to influence the effect of these substances on the brain potentials, although it counteracted their effects on the neuromuscular junction. Prostigmine partially inhibited the electric activity of frog brain; a subsequent injection of acetylcholine suppressed the electric activity completely. CH_2ICOOH and NaCN abolished the brain potentials of pithed frogs. These results are interpreted as an inhibition of central synaptic transmission by curare and substances with a curare-like action.

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

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