ernmost limits. This fact argues strongly for a pre-Miocene land bridge between North and South America, just as the North American ancestry of the Edentata, as I have already pointed out, calls for a similar explanation. Had the conditions been favorable, and the southern barriers been sufficient to arrest further progress, we could believe that through stress of environment a much higher type of monkey, and possibly a man, might have been evolved in the Western Hemisphere in the manner so ingeniously suggested by Duncan. But as it is the Cebidæ represent the highest expression of Simian development which has ever been attained on this continent.

J. L. WORTMAN.

YALE UNIVERSITY MUSEUM,
January 23, 1901.

AMERICAN PSYCHOLOGICAL ASSOCIATION.

THE ninth annual meeting of the Association was held in Baltimore, December 27 and 28, 1900, in affiliation with the American Society of Naturalists. The President of the Association, Professor Joseph Jastrow, was in the chair, and on the afternoon of the 27th delivered the presidential address. At the business meeting held the same afternoon, Professor Josiah Royce was elected President of the Association for the ensuing year, and Professors J. Mark Baldwin and John Dewey were elected members of the Council for terms of three years. Several matters of interest were discussed at the business meeting. An invitation from President Harper to hold the next annual meeting at the University of Chicago was received and after full discussion it was voted unanimously that the invitation be accepted, power being given to the Council to arrange for the meeting.

A committee of five was appointed to consider the question of undertaking in part the publication of Dr. J. H. Leuba's proposed catalogue of psychological literature and to report at the next meeting of the Association.

A resolution was adopted that the Committees of Arrangements of Foreign Congresses of Psychology be requested to confer with the American Psychological Association with regard to the American representation at such congresses and the participation of American members in their proceedings.

Sessions for the reading of papers were held on the morning of the 27th and on both the morning and the afternoon of the 28th.

Professor Jastrow's presidential address was upon 'Currents and Undercurrents in Psychology.'* The speaker took up in turn various aspects of modern psychology. After discussing the significance of the evolutionary conception of the science, he spoke of the three-fold mode of approach, viz., the genetic, the normal and the abnormal, to many of its problems as being productive of interesting and valuable advance, and outlined the advantages and limitations of each aspect. The contemporary interest in certain functional complexes, notably reading and writing was noticed and the whole question of the practical bearing of psychology was discussed, the speaker assuming a conservative position in the matter.

At the first session on Thursday morning, Mr. Robert M. Yerkes, of Harvard, read a paper on 'Habit Formation and Memory in Invertebrates and Lower Vertebrates.' This was a preliminary report of some experimental studies in animal psychology now being conducted in the Harvard Laboratory. The chief purposes of the work are (1) to determine to what extent, with what rapidity, and precisely how, animals learn; (2) to test the permanency of any associations formed and (3) to make as many supplementary observations on the

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general habits and reactions of the animals used as possible. The labyrinth method, in various forms, has been used for all the work. Observations have thus far been made on the crayfish, green crab, fiddler crab, newt, frog and turtle. Crayfish in a simple labyrinth, involving choice of direction only once, improve rapidly from fifty per cent. correct in the first ten trials to ninety per cent. correct in the sixth ten. There is evidence of the habit (*i. e.*, memory) after two weeks' rest. Newts, judging from these studies, learn very slowly and there is successive variability among individuals. Frogs alone, of the animals named, have shown the formation of a habit as the result of a single experience. Turtles are very apt in the formation of labyrinth habits, and retain them for weeks. They give a curve of learning very similar to those of the cat and dog. In all the experiments record is kept of the time taken to escape from the labyrinth and of the course followed.

This paper was succeeded by one by Dr. Shepherd Ivory Franz, of the Harvard Medical School on 'Frontal Lobes and Association.' The experiments were undertaken to determine whether or not the frontal lobes in animals are concerned in the production of certain sensory-motor associations. Cats were given the opportunity of learning simple habits, after the learning of which the frontal area anterior to the crucial sulcus was excised. After the operation the habits previously learned were lost. A series of control experiments shows that this result cannot be accounted for on the supposition of surgical shock. The conclusion was drawn that the frontal lobes are *normally* concerned in the formation of these habits. The animals that had thus acquired and lost certain associations were found to have the ability for re-learning these habits and for acquiring new ones. This ability (re-learning) may be due to the use of other association areas (either the parietal or the occipito-temporal lobes), but the evidence is not yet complete.

Dr. R. S. Woodworth and Dr. E. L. Thorndike reported the results of the continuation of their experiments on 'The Influence of Special Training on General Ability.' The following conclusions seem to them justifiable:

The mind is, on its dynamic side a machine for making particular reactions to particular situations. It works in great detail, adapting itself to the special data of which it has had experience. Change in the time or precision or quality of any one of these particular reactions need not and often does not influence appreciably other reactions, similar enough to be called by the same name. Change in any one almost never brings about an equal change in any other reaction, no matter how similar, for the working of every mental function is conditioned by the nature of the data on which the function is employed. The amount of influence of changes in any one mental function upon others is much less than has been supposed. The cases of such influence and of its absence make it seem probable that change in one function affects others only where and in so far as identical elements are present in both. By identical elements are meant concrete elements, such as sensations, images, movements, etc., the actual content of which is identical.

Professor J. McK. Cattell reported on 'Psychological Tests of Abnormal and Exceptional Individuals.' Attention was called to the desirability of extending physical and mental tests to those suffering from disabilities and disease on the one hand, and to those showing exceptional aptitudes on the other. A description was given of cases of nervous disease tested by the speaker, and it was shown how these differed from normal individuals and how far the nature and

progress of the disease could be deduced from such tests. Turning to an exceptional case, similar tests made on the chess player, Mr. Pillsbury, were described. The speaker also noted the correlation of the tests made on the freshmen and seniors of Columbia College, mentioned tests made on the cleverest and dullest children in a primary and in a high school, and described a photographic method of measuring the features.

The last paper of the morning, by Professor E. F. Buchner, on 'Volition and Experiment,' was read by title.

On Friday morning Professor Edward A. Pace presented 'A Note on Binocular Rivalry.' The purpose of the experiments was to determine whether the fluctuation of retinal fields is influenced by such mental factors as expectation and recognition. It was found that when the fields (colored squares or figures) are presented in succession, the new field dominates in consciousness. The mere fact that one field is familiar and the other strange does not affect the result. Efforts of the will to retain a field when a new stimulus is applied to the other retina are not at first successful. By repetition, however, control is gradually acquired, so that, in proportion as the novelty of the intruding field wears off, inhibition becomes easier.

Professor Charles H. Judd followed with a paper, 'The Analysis of Writing Movements.' The method consists in attaching a tracer to the hand in such a way that it will not be affected by the fingers, but will record any movement of the hand as a whole. If one writes with such a tracer attached to the hand, the written letters will contain the finger components as well as hand and arm movements, while the tracer record will not contain the finger components. Apparatus and records were exhibited to illustrate the method. It is found that the hand and arm do not participate in the finer formative parts of the writing movement, but merely carry the fingers forward, thus contributing the grosser elements, especially those in a forward direction. Marked differences appear in the modes of coordination employed by different individuals.

Professor J. A. Bergström demonstrated an ergograph and reported studies made with the instrument.

Dr. Arthur MacDonald spoke on the susceptibility to disease and physical development in college women, the data on which his statistics were based having been furnished by the professor of physical culture and the resident physician in one of our woman's colleges.

Dr. E. W. Scripture described further experiments on rhythm made in the Yale Laboratory and Professor E. C. Sanford spoke briefly of some new apparatus.

In the Philosophical Section of the Association, which held meetings both in the morning and in the afternoon of Friday, Mr. Henry Rutgers Marshall spoke on 'Self-consciousness and its Physical Correlate.' If each special mental state in a given individual corresponds with a differentiation of process in that individual's nervous system, then 'self-consciousness' must have coincident with it some special form of neural activity. The neural process in man is the activity of an enormously complex neural system which itself is made up of minor neural systems: consciousness then, under this hypothesis, must be looked upon as a vast psychic system made up of minor psychic systems. System as a whole, any increment of activity in any minor system will stand in contrast with the mass of activity of the complex system as a whole. The most ordinary presentations to the Self correspond with such special increments of neural activity; hence we are led to ask whether the Self may not be that part of consciousness which corresponds with the mass of psychic activity in the complex neural system as a whole.

Mrs. Christine Ladd Franklin read a paper on the 'Reduction to Absurdity of the Ordinary Treatment of the Syllogism,' which will be published in SCIENCE. Other papers in the philosophical section were 'The Kantian Doctrine of Space,' by Professor George S. Fullerton; 'Nietzsche,' by Professor Grace Neal Dolson; 'Professor Ladd's Theory of Reality,' by Professor William Caldwell; 'The Doctrine of the Two-fold Truth,' by Professor F. C. French; 'A Study of Pluralism,' by Professor A. H. Lloyd; 'The Problem of an Emotional Logic,' by Professor W. M. Urban; 'Examination of Professor Sidgwick's Proof of Utilitarianism,' by Dr. Ernest Albee 'A Peripatetic Formula for the Moral Ideal,' by Professor W. R. Newbold; 'Active and Passive Reason in the Writings of Aristotle,' by Professor W. A. Hammond. The last named paper was read by title.

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IOWA ACADEMY OF SCIENCES.

THE fifteenth annual meeting of the Academy met in Des Moines, Iowa, on December 26, 27, 28, 1900. A lengthy and an excellent program was carried out. The annual semi-popular lecture was given by Dr. Wm. Trelease, of the Missouri Botanical Garden, on the 'Harriman Alaska Expedition' on Thursday evening to a large and highly appreciative audience. The president, Professor W. H. Norton, delivered his presidential address on the 'Social Service of Science' on Wednesday evening. Professor Norton sketched briefly the service of science to society. This service is not appreciated as it should be, and yet nearly every modern convenience in the industrial world had its origin in the discovery of some scientific truth by some scientist, as in medicine, physics, electricity and mechanics.

Geological papers were presented by Dr. Charles R. Keyes on 'Depositional Equivalent of Hiatus at Base of our Coal Measures'; and the 'Arkansan Series,' a new terrane of the carboniferous in the western interior basin. The present Arkansas valley, however, has probably been formed entirely since Tertiary times, and by a system of drainage in no way dependent upon the carboniferous drainage. Where the great uplift of Missouri and Arkansas over the northern part—embraced by the so-called Ozark isle—and the southern part composing the Ouchita mountains were made up of resistant limestones, these yielded less quickly to erosion than the central soft shales; and the Arkansas river, which happened in old peneplain to traverse the central part of the uplifted area, was able to cut its way down as fast as the region rose, and was thus able to maintain its old course. In his paper on 'Names of Coals West of the Mississippi River' he indicated the stratigraphical units of the carboniferous in the western interior coal fields—the terranes of the Missourian, Des Moines and Arkansan being given. In a paper on the volcanic necks of Piatigorsk, Southern Russia, he briefly described the highest peak in Europe, Mt. Elburz, which is 18,526 feet above the level of the sea. Mr. T. E. Savage briefly gave an account of the 'pre-Kansan Drift Exposure in Tama County, Iowa.' His conclusions were based on the buried soil, in which organic matter was found, leaching, and an oxidized zone. Professor Shimek made a comparison of the loess and modern 'Molluscan Fauna of Iowa City and Vicinity.' A large number of the species enumerated are aquatic.

Of chemical papers, Professor Nicholas Knight, on 'Some Recent Analyses of Iowa Building Stones,' stated that the chemical composition varied from nearly typical dolomite to admixtures in different proportions of calcium carbonate and dolomite. In his paper on 'Potable Waters' chemical an-