the catalogue. The cost of the annual volume on physiology is $9.20. Many physiologists will probably wish also the volume on general biology, the annual price of which is $2.45. The Smithsonian Institution acts as the representative of the central bureau in the United States, and receives subscriptions.

The International Catalogue is the one catalogue of scientific literature whose permanence can be relied upon. Its first issue is full of promise. Its ultimate completeness will be hastened by the cordial cooperation of those whose labors it is intended to lighten.

Frederic S. Lee.

Columbia University.

Societies and Academies.

The Washington Meeting of the American Physical Society.

The spring meeting of the American Physical Society was held at Washington, D. C., April 22 and 23, at the invitation of the Washington Philosophical Society. Two sessions for the reading of papers and an evening lecture by Dr. Alexander Graham Bell on his famous tetrahedron kites were all held at the rooms of the Cosmos Club. These and other courtesies of the Cosmos Club were much appreciated by the society.

On Friday evening a considerable number of members of the society dined together at the Hotel Barton, and on Saturday, at the close of the morning session, the Philosophical Society entertained all members of the Physical Society who had been attending the session at luncheon at the same hotel. In the afternoon a visit was made to the new buildings of the Bureau of Standards, which are located near Connecticut Avenue in the northwestern suburbs of the city, about four miles from the White House.

There was a good attendance at the meeting and an unusually full list of papers was presented. All the papers in the following list were presented by the author or authors, excepting those by S. J. Barnett and A. A. Bacon, the authors being absent, and E. B. Rosa and M. G. Lloyd, because the hour for luncheon had arrived.

K. E. Guthe: 'A Study of the Silver Voltameter.'

P. G. Nutting: 'Some new Rectifying Effects in Conducting Gases.'

E. L. Nichols and Ernest Merritt: 'The Effect of Light on the Absorption and Electrical Conductivity of Fluorescent Liquids.'

F. A. Saunders: 'Some Additions to the Arc Spectra of the Alkali Metals.'

W. F. Magie: 'The Volumes of Solutions.'

G. W. Patterson: 'Absolute Electrodynamometers.'

E. P. Adams: 'Induced Radioactivity due to Radium.'

S. J. Barnett: 'The Energy Density, the Tension, and the Pressure in a Magnetic Field.' (Read by title.)

L. A. Fischer: 'A Recomparison of the U. S. Prototype Meter at the International Bureau of Weights and Measures.'

C. W. Waidner and G. K. Burgess: (*a*) 'High Temperature Measurement by means of Optical Pyrometers.' (*b*) 'Note on Special Problems in Optical Pyrometry.'

C. W. Waidner and H. C. Dickinson: 'Apparatus for Platinum Resistance Thermometry.'

C. W. Waidner and H. C. Dickinson: 'Intercomparison of Primary Standard Mercurial Thermometers.'

F. A. Wolff: 'The Standard Cell.'

F. A. Wolff: 'The Peculiar Behavior of Some Resistance Standards and Its Explanation.'

F. A. Wolff: 'A Direct Reading Apparatus for the Calibration of Resistance Boxes.'

E. B. Rosa and F. W. Grover: 'Absolute Measurement of Capacity.'

E. B. Rosa and F. W. Grover: 'Absolute Measurement of Inductance.'

E. B. Rosa and F. W. Grover: 'The Testing of Mica Condensers.'

E. B. Rosa and M. G. Lloyd: 'Testing of Alternating-Current Instruments.' (Read by title.)

A. A. Bacon: 'Equilibrium of Vapor Pressure over Curved Surfaces.' (Read by title.)

E. B. Rosa,
Secretary pro tempore.

The Botanical Society of America.

The annual report of the secretary embodied in Publication 24 is a statement of conditions and record of progress during the first decade of the existence of the society that must be highly satisfactory to its mem-

bers. The total constituency of the society now numbers 58, and its accrued funds amount to nearly three thousand dollars, a large part of which is treated as permanent endowment, the income only being used. Recently the policy has been adopted of making grants from current funds in aid of investigations by members and associates. Thus far the following awards have been made:

To Dr. Arthur Hollick, for the study of the fossil flora of the Atlantic coastal plain, $200.

To Dr. D. S. Johnson, for the study of the seeds and endosperm of the Piperaceæ and Chloranthaceæ, $200.

To Dr. J. C. Arthur for investigations on plant rusts, $90.

To Dr. C. J. Chamberlain, for the study of the spermatogenesis, oogenesis and fertilization of *Dioon* and *Ceratozamia*, $150.

To Professor F. E. Lloyd, for the study of certain types of desert vegetation to be carried on at the Desert Botanical Laboratory of the Carnegie Institution, $150.

To Dr. J. C. Arthur, for securing drawings of rusts, $50.

In order to promote unity of botanical interests a committee consisting of B. T. Galloway (chairman), C. R. Barnes and C. E. Bessey was appointed at the St. Louis meeting and requested to prepare a plan for cooperation with other botanical organizations, for consideration at the eleventh annual meeting.

The increasing demand upon the time allowed by the society for the presentation of scientific papers has made necessary the action of the council in accepting only papers from members, associates and persons specially invited to contribute by the council. The programs, almost without exception, are now made up from papers, the titles of which are sent to the secretary in advance of the meetings.

Among those who have recently presented papers before the society by special invitation are Professor K. Goebel, of Munich, Germany; Professor H. de Vries of Amsterdam, Holland; Professor T. H. Morgan, of Bryn Mawr, and Mr. Frances Darwin, of Cambridge, England.

The reprinted addresses of the past presidents are the only scientific publications issued by the society and may be taken as a fair index of the maturer investigations that have been prosecuted in America. The list includes the following titles:

PROFESSOR WILLIAM TRELEASE: 'Botanical Opportunity.'

PROFESSOR CHARLES E. BESSEY: 'The Phylogeny and Taxonomy of Angiosperms.'

PROFESSOR JOHN M. COULTER: 'Origin of Gymnosperms and the Seed Habit.'

PROFESSOR L. M. UNDERWOOD: 'The Last Quarter; The Reminiscence and an Outlook.'

PROFESSOR B. L. ROBINSON: 'The Problems and Possibilities of Systematic Botany.'

PROFESSOR J. C. ARTHUR: 'Problems in the Study of Plant-rusts.'

DR. B. T. GALLOWAY: 'What the Twentieth Century Demands of Botany.'

At the tenth annual meeting recently held in St. Louis the following associates were elected members:

Frederick Edward Clements, University of Nebraska.

Henry Chandler Cowles, University of Chicago.

William Ashbrook Kellerman, The Ohio State University.

Also the following associates were elected:

William Austin Cannon, Desert Botanical Laboratory, Tucson, Arizona.

Karl McKay Wiegand, Cornell University.

The officers for 1904 are:

President—Frederick Vernon Coville, U. S. Dept. of Agriculture, Washington, D. C.

Vice-President—Charles Edwin Bessey, The University of Nebraska, Lincoln, Nebraska.

Treasurer—Arthur Hollick, New York Botanical Garden, New York City.

Secretary—Daniel Trembly MacDougal, New York Botanical Garden, New York City.

Councilors—Benjamin Lincoln Robinson, Gray Herbarium, Harvard University, Cambridge, Mass., and John Merle Coulter, University of Chicago, Chicago, Ill.

The above officers, with Past President Charles Reid Barnes, constitute the council of the society.

D. T. MACDOUGAL,
Secretary.

THE NEW YORK ACADEMY OF SCIENCES.
SECTION OF ANTHROPOLOGY AND PSYCHOLOGY.

THE regular meeting of the section was held on March 28 in conjunction with the New York Branch of the American Psychological Association. The afternoon session was held at the Psychological Laboratory of Columbia University, the evening session was held as usual at the American Museum of Natural History. The program was as follows:

Mental Resemblance of Twins: Professor E. L. THORNDIKE.

A report was made on the general results of a comparison of twins in tests of attention, perception, association, rate of movement, addition, multiplication and stature. The resemblances as measured, by a rough, preliminary method, were about .75. The amount of this resemblance that should be attributed to similarities in home training was apparently slight. There was no evidence in the results to support the theory that twins fall sharply into two species, those very closely alike and those no more alike than ordinary brothers and sisters.

Measurements of the Mentally Deficient: Miss NAOMI NORSWORTHY.

The paper was a report of some work done among one hundred and fifty mentally deficient children in two state institutions for the feeble-minded and in two of the special classes organized in the New York schools. The measurements taken were physical, such as height, height and temperature, tests of maturity, as perception of weight and of form, tests of memory and tests of intelligence or the ability to deal with abstract ideas. The main conclusion reached was that the difference between idiots and people in general is less than has been commonly supposed, and is a matter of degree rather than of kind.

Color Contrasts: Dr. R. S. WOODWORTH.

Dr. Woodworth presented a modification of Hering's binocular demonstration of the 'physiological' origin of simultaneous contrast. If monocular fields of different colors, with a gray spot on each, be combined by the stereoscope, each gray retains the contrast color suitable to its own field, however the conscious background may vary as the result of fusion or rivalry of the two fields. The demonstration is readily extended to cover brightness contrast, by placing gray spots on white and black fields which are combined as before. To show that these effects are not the result of a binocular mixture of the gray with the opposite field, a number of gray spots may be scattered over one field, and the other field made particolored; the gray spots appear all alike, or nearly so, though binocular mixture would have made them differ.

New Apparatus and Methods: Professor J. MCKEEN CATTELL.

(1) Kymographs were exhibited in which typewriting ribbons were applied to secure the records. Electro-magnetically moved points strike the paper tape, whose rate of movement may be adjusted, and a record is left by the slowly moving typewriter ribbon. Two forms were exhibited, in one of which the kymograph was driven by an electric motor and in the other by clock-work. In the latter the clockwork could be started and stopped by an electric current by an observer in another room. The kymographs, while not especially suited for drawing curves, are much more convenient than smoked paper or siphon pens for time records, such as rhythms, conflict of the visual fields, after-images, etc. (2) Instruments were shown by which a number of faint clicks could be given at intervals of a second for testing sharpness of hearing and defective hearing. Instead of giving the observer a continuous sound, such as from the ticking of a watch, two, three, four or five faint sounds are made, and the observer is asked how many he hears. By this method errors from the common illusion in the case of faint sounds are avoided. (3) A method was exhibited for testing color blindness by the time it takes to distinguish one color from another. By the normal individual red can be distinguished from green in about the same time as blue from yellow, but it takes longer to distinguish red from orange. If the observer belongs to the red-green class of the color blind, he can distinguish blue from yellow as quickly as others, but not red from green. An instrument was shown by which

the conditions of the railway service can be imitated, it here being necessary first to distinguish a certain color and then to make the proper movement.

The Time of Perception as a Measure of Differences in Sensation: V. A. C. HENMON.

The aim of the investigation upon which this paper is based is to measure qualitative differences in color by the time of perception. The colors taken as standards were red, orange and yellow, whose wave-lengths had been definitely determined. Equal intermediate steps between orange and red were produced by the mixture of pigments. Small squares of each of these colors, 3 x 3 cm., were mounted on cards side by side with red, and exposed to the subject by means of a drop-screen so arranged as to give almost instantaneous exposure. The subject reacts with the right or left hand according as the predetermined stimulus appears to the right or left. The registration is made with the Hipp chronoscope. The results of 6,000 reactions gave evidence of the validity of the method and the fruitfulness of the problem. Equal objective differences are correlated with differences for consciousness, showing a definite increase as the magnitude of difference is decreased.

The Daily Curve for Efficiency: Mr. H. D. MARSH.

Habits Based on Analogy: Professor CHARLES H. JUDD.

The Determination of the Habit Curve for Associations: Professor J. E. LOUGH.

A report of experiments made in the psychological laboratory of the school of pedagogy. It was found that the time required to write series of letter-equivalents when the 'key' of equivalents was not memorized, but was consulted as frequently as necessary, diminished as the associations between the letter-equivalents became more habitual. The curves representing the results of these experiments exhibit all the characteristics of the typical habit curve. Repetition of the experiment using new 'keys' shows little or no interference due to earlier associations, while with each succeeding 'key' the physiological limit was reached after a constantly diminishing number of trials.

A Neglected Point in Hume's Philosophy: Dr. WILLIAM P. MONTAGUE.

The paper aimed to show (1) that Hume (in Part IV., Section II. of the 'Treatise') had quite unwittingly furnished what from his own point of view should have been regarded as a logical deduction and justification —rather than the mere psychogenetic description, which it purported to be,—of the realistic belief in the independent and uninterrupted existence of sensible objects; and (2) that the *naïve realism* or positivism thus accidentally promulgated was from both the scientific and the popular standpoint, a far sounder and more inviting doctrine than the empirical idealism or sensationalism with which Hume's name is usually associated.

Action as the Concept of Historical Synthesis: Mr. PERCY HUGHES.

Rickert's description of the content of history as reality is amended to read *past reality,* the past of evidence. From this definition the individual, objective, moving and continuous character of historic content follows; and further, the conception of action as descriptive of both historic content and historic synthesis. An historical synthesis is a past action that itself has created a certain synthesis of evidence; which the historian discovers. In such synthetic actions, 'simple' actions retain their individuality as means, stimuli or hindrances to the main action, *i. e.,* in a functional relation.

At the close of the afternoon session the members were invited to attend a lecture given in Columbia University by Professor John Dewey on 'The Psychologist's Account of Knowledge.'

JAMES E. LOUGH,
Secretary.

SECTION OF GEOLOGY AND MINERALOGY.

THE section held its regular meeting Monday evening, May 16, with the chairman, Professor James F. Kemp, presiding.

The following program was offered:

Exhibition of the Series of Foot Bones Illustrating the Evolution of the Camel, Recently Installed in the Hall of Vertebrate Paleontology of the American Museum of Natural History: W. D. MATHEW.

This series corresponds to that illustrating the evolution of the horse, and is almost equally complete.

It shows the derivation of the camel from small primitive four-toed ancestors which are exclusively North American in habitat. The earliest known ancestors are tiny animals no larger than a rabbit. The camels reached their maximum size and abundance in the Pliocene epoch, when they were much larger than the modern camels. Then they spread to the other continents, disappeared entirely from North America, and became smaller in size and far less numerous in species elsewhere.

Some Erosion Phenomena in St. Vincent and Martinique: EDMUND OTIS HOVEY.

In this paper the author showed lantern slides from some of the photographs taken by him in those islands in 1902 and 1903, for the American Museum of Natural History, which illustrated the development of new drainage systems and the reinstatement of old channels in regions which were most thickly covered with ejecta by the 1902 and 1903 eruptions of the Soufrière and Mont Pelé.

The principal paper of the evening was:

Some of the Localities in France and England where Monuments of the Late Stone and Bronze Ages have been Found: J. HOWARD WILSON.

In considering the subject of these stone monuments, the author confined himself to those found in northern France and southern England, and especially the great groups near Carnac in Morbihau, and the well-known temples of Stonehenge and Avebury, in Wiltshire.

The monuments were divided according to type into several classes, and a description of each of these given briefly with their comparative ages and the probable purposes for which they were constructed. Legends concerning these monuments were cited, and mention was made of the superstition and veneration with which they have been regarded by some of the more ignorant and conservative peasants, causing the worship of stone to be kept up to the present day in some remote districts.

Before closing the paper, attention was called to the engineering skill required in the placing and erection of some of the monuments and the early age at which it made its appearance.

The paper was followed by slides showing photographic views of some of the most famous monuments, maps and drawings of several of the curiously engraved stones.

EDMUND OTIS HOVEY,
Secretary.

DISCUSSION AND CORRESPONDENCE.

THE COMPLEX NATURE OF THORIUM.

TO THE EDITOR OF SCIENCE: The following appeared in *Nature,* April 28, p. 606:

THE COMPLEX NATURE OF THORIUM.

With regard to several letters on thorium and its complex nature that appeared in *Nature* of March 24 and 31, April 7 and 14, and in which my name is mentioned, I take the liberty of adding a few remarks, having had ten years' experience in working with thorium.

In 1897, at a meeting of the British Association in Toronto (Canada), I read a paper in which I pointed out that spectrum evidence proves the complex nature of thorium.

In 1898 (*Chem. Soc. Trans.*, p. 953) I isolated from some thorium fractions an earth with an atomic weight of 225.8 (tetrad). Knowing the difficulties of the separation of rare earths (I have been engaged in this kind of work since 1878), and not wishing to publish a premature conclusion, I did not declare this to be a novel constituent of thorium, but said that foreign earths were present, in spite of the fact that the reaction used ought to have separated them.

In 1901 I published another short paper (*Proc. Chem. Soc.*, March 21, 1901, pp. 67–68), in which I said that "my experiments may be regarded as proving the complex nature of thorium. Thorium was split up into the Th^{α} and Th^{β}. With Th^{β} I obtained so low an atomic weight as $R^{iv} = 220$. The fractions Th^{α} gave by the analysis of the oxalate, though it was prepared by pouring the thorium salt solution into an excess of oxalic acid, in order to avoid the formation of