

LER. The author presents some notes on X-ray photographs of minerals and thin sections of rocks; the article is accompanied by an illustration.

SOCIETIES AND ACADEMIES.

ACADEMY OF SCIENCE OF ST. LOUIS.

At a meeting of the Academy on May 4th Prof. Nipher read a preliminary paper on *A Rotational Motion of the Cathode Disc of the Crookes Tube*.

He had been studying the change in the character of the Crookes effects due to long continued operation. It was observed that the cathode disc of aluminum was slightly loose, and that it was rocking to and fro in rotary motion on the aluminum wire. It finally became loosened and started into a slow rotation. The motion was a halting one, as the disc was out of balance and the bearings were rough. When stopped by pinching in the bearing, it began to struggle and rock against the restraint and would finally become loosened again and continue its motion.

It was impossible to either accelerate or retard the motion by powerful bar magnets, applied as in Barlow's wheel. Change in position with respect to the earth's field or the induction coil produced no effect on the rotation. Looking at the disc from the point where the cathode wire enters the tube, the disc rotates counter clockwise. The brush discharge of a Holtz machine yielded even better results than the induction coil when the leading conductors were separated by spark intervals.

The rotation has not yet been obtained between spark terminals in air of ordinary pressure nor when the movable disc forms the anode, but work on these points is not yet concluded.

Prof. Nipher stated that the experimental evidence thus far indicates that the effect is due to action and reaction between the cathode plate and the radiant matter. If so, the radiant matter starts from the disc in a vortex, whose axis passes through the dark spots opposite the disc faces. It may also be due to direct action and reaction between the disc and the surrounding field due to the current. He is now having apparatus constructed which will determine be-

tween the possible explanations. Prof. Nipher stated that he had long sought some experimental basis for imposing a condition of rotation upon the equations for force and potential within a wire conductor. Without such term the equations lead to absurd results.

Dr. E. C. Runge described an interesting case of insanity, unrecognized for twenty-eight years.

WILLIAM TRELEASE,
Recording Secretary.

NEW YORK ACADEMY OF SCIENCES.—SECTION OF ANTHROPOLOGY, PSYCHOLOGY AND PHILOLOGY.

THE Academy met on April 27th, with President Stevenson in the chair, and proceeded to organize the new Section in Anthropology, Psychology and Philology. Prof. N. M. Butler was chosen temporary chairman.

Prof. F. H. Giddings was nominated and elected Permanent Chairman of the section; Dr. Livingston Farrand, Secretary of the sub-section of Anthropology and Psychology, and Prof. A. V. Williams Jackson, Secretary of the sub-section of Philology. The officers were elected for a term that will end at the annual meeting of the Academy, and it was resolved that the two sub-sections meet in alternate months.

Prof. F. H. Giddings read a paper on *A Plan for the Systematic Study of tribally organized Societies*, which will be printed in SCIENCE.

Prof. J. McKeen Cattell described a *Method for Determining Photometric Differences by the Time of Perception*. A series of gray surfaces was exhibited making over 200 nearly equal shades between black and white. The shades are so nearly alike that they cannot be distinguished with certainty, and when the observer attempts to sort them out in order an error of displacement occurs which measures his accuracy of discrimination. With nine observers the error varied from 6.04 to 11.05, the average being 8.1, from which it follows that about 25 shades can be distinguished between black and white. The relation of the error of observation to the brightness of the light was shown. The speaker further described experiments now being carried out with the same gray surfaces, in which the time it takes to distinguish the difference between two sensations is used to measure

the amount of difference in intensity between the sensations.

Dr. Livingston Farrand, in a paper on *Primitive Education*, discussed methods of training and general education among primitive peoples in their bearings on primitive conceptions of morality, taking up the general condition of the child in the savage community and more particularly the relations of the child and parent.

The question of education was discussed under three heads: (1) the natural training which the child obtains by natural reaction on his environment and without definite instruction by his elders; (2) the practical education where the child is definitely instructed in the arts which will be of use to him in his later life and (3) his ethical education. Attention was called to certain phases of the subject where observations are particularly faulty or altogether wanting.

Dr. Franz Boas spoke on the *Correlations of Anthropometric Measurements*. He pointed out that when any two biological measurements are considered as correlated, and individuals showing a certain value of the first measurement are grouped together, then the average of the values of the second measurement for the group of individuals will also be changed, but to a less degree than the first. When, however, the grouping of individuals is made according to social aspects, then all the measurements change either proportionately or according to laws differing from the one quoted before, the reason being that in the second grouping a certain set of causes influence all the measurements in the same manner. By applying this principle it is possible inversely to determine social causes that produce certain anthropometric peculiarities, as in groupings which are made according to the proportions and to the absolute values of measurements combined, the social classes will be represented in varying proportions.

LIVINGSTON FARRAND,
Secretary of Sub-section.

PROCEEDINGS OF THE TORREY BOTANICAL CLUB
WEDNESDAY EVENING, APRIL 29, 1896.

THE Club met as usual in Hamilton Hall, with President Brown in the chair. There were present 64 persons.

Dr. Britton reported a successful field meeting at Prince's Bay, S. I., on April 25th, it being the first of the season.

Major Timothy E. Wilcox's paper, 'Botanizing in Arizona,' was then read. It was drawn from experience during four years residence at Fort Huachuca and was devoted to climate, seasons and topography, as well as descriptions of some of the little known plants of that locality. Botany was treated from an economic standpoint as well as otherwise. Lantern slides from original photographs were exhibited. Also slides showing other scenes were introduced.

Mr. Cornelius Van Brunt then rapidly showed a number of colored lantern slides of plants growing in Central Park, accompanying them with short descriptions and anecdotes. Most of these slides had not been exhibited before. Mr. Van Brunt described the method of coloring these slides by the use of aniline colors applied by hand.

W. A. BASTEDO,
Secretary pro. tem.

GEOLOGICAL CONFERENCE OF HARVARD UNIVERSITY, APRIL 14, 1896.

On the Function and Systematic Importance of the Aptychus in Ammonites. By C. R. EASTMAN.

The speaker described the nature and mode of occurrence of the aptychus, and exhibited several specimens with the aptychus preserved in the so-called 'normal position' and also directly at the aperture. The numerous theories regarding its function were discussed, principal attention being paid to the nidamental and operculate theories. The Dundry, Crimean and Solenhofen specimens described by Owen, Retowski and Michael, respectively, were next discussed, and these were shown to prove, beyond all doubt, the operculate function of the aptychus. The fact that aptychi do not represent the calcified head cartilage of Dibranchiates was used as an argument against Ihering's proposition for associating Ammonites with the latter group. The viviparous habit of Ammonites, as indicated by the discovery of a number of minute aptychi and shells within the living chamber of *Oppelia steraspis* was commented upon, and attention called to the fact that in the Upper Jurassic Ammonites, which were then entering upon their decline, the de-

velopment of the aptychus was initiated in the earliest shelled condition. The affinities between the Ammonites and Dibranchiates were shown to be on the whole very close, yet the evidence furnished by their internal structure and shell development is so strongly in favor of the Tetrabranchiata character of Ammonites that their separation from the Nautiloids seems at present unwarranted.

The Quartz Porphyry and Associated Rocks of Pequawket Mountain (the eastern 'Kearsarge' of New Hampshire). By R. A. DALY.

Both of the geological surveys of New Hampshire noted the presence of the remarkable flow breccia outcropping on what was long called 'Pequawket Mountain.' The second survey placed it in their table of formations under the name of the 'Pequawket Breccia.' The mountain is chiefly composed of a typical quartz porphyry in which inclusions of various rocks lie embedded. The object of this paper was primarily to present the results of an examination of a large number of microscopic slides prepared with the purpose of tracing the extent to which the inclusions had suffered from the metamorphism of the igneous body. The great slate mass on the south side of Kearsarge, is a gigantic horse in the porphyry. It is about four hundred yards long from east to west and one hundred and fifty wide and lies close against the contact of the older 'Albany Granite.' On the border of the slate, severe brecciation has been produced, some phases being composed entirely of aggregated slate fragments, others with a variable proportion of quartz porphyry cement. Throughout the mountain small inclusions of the same phyllitic slate, from two feet to a fraction of an inch in diameter, are exceedingly numerous. Now, the striking fact in connection with them is the almost absolute lack of metamorphic change which has affected these fragments. The great horse of the south side does not betray any marginal alteration, except in the physical way already noted. This is a marked exception to the general conclusion of Lacroix that chemical rearrangement is usual in bodies enclosed within volcanic rocks of his 'trachytoïde' type. (Mem. de l'Institut de France t. XXXI., 1894, p. 81.) It is all the more

remarkable on account of the fact that the field-evidence shows the porphyry to be not a surface flow, but the filling of a neck where we should expect high temperatures and pressures and the presence of mineralizers to have produced extensive alteration.

The contemporaneous porphyry of Moat Mountain is in a similar tectonic relation and is likewise filled with inclusions of the same general nature as those of Kearsarge. Here also the metamorphism is almost *nil*. It is of interest to note that the base is not vitro-phyric as in the Kearsarge rock, but granophyric with accessory crystalline ingredients. Besides the phenocrystic quartzes and micropertthitic feldspars, the rock is composed of a dense microgranitic matrix of quartz and feldspar, with abundant minute grains of hornblende, titanite, zircon, apatite and primary fluorite. This composition allies the rock closely to the 'Albany Granite,' which is, in part, the country rock of these porphyries.

The eruptions occurred after the last important White Mountain uplift. The eruptives are not squeezed, and their inclusions are, in part, derived from the crystalline schists, of the Montalban terranes. The slates, sandstones and phyllites probably represent masses which have sunk to their present level in the vent from the superficial zone of minimum metamorphism during the mountain building. It is, however, conceivable that they might have been carried up from a zone which lay below the level of no strain at the time of plication.

T. A. JAGGAR, JR.,
Recording Secretary.

PHILOSOPHICAL SOCIETY OF WASHINGTON.

At the regular meeting, on April 25th, the following papers were presented, both being extensively illustrated with photographs of buildings in various parts of the world and plans and designs for the Capitol and Executive Mansion in Washington, the one by Wm. Martin Aiken on the 'Influence of Climate on Architecture,' and the other by Mr. Glenn Brown on 'Early Government Architecture.'

BERNARD R. GREEN,
Secretary.