a water-tight wicker bowl with many ceremonial observances. The bowl is passed around sunwise and everybody helps himself with his fingers to four morsels. But before the men partake, the gods are fed—a morsel of gruel is laid on the mouth of each mask. After the gruel is finished all partake of pollen.

About midnight the ceremony of waking the gods begins. Although the Navahoes do not use time-pieces, this act occurs always almost exactly at midnight. The shaman sings a long song, the burden of which is Hyideznâ (he stirs, he moves); a different god is mentioned in each stanza. When the singer mentions the name of a god he lifts the appropriate mask and shakes it in tune to the song. The last prayer occurs after dawn, the vigil ends, and the lodge is prepared for the work of the fifth day.

The paper closed by giving the reasons for certain Navaho symbolisms, especially that which assigns the north to the male and the south to the female.

The closing paper on *Racial Anatomical Peculiarities* was read by DR. D. K. SHUTE.

GEORGE R. STETSON,
Recording Secretary.

NEW YORK ACADEMY OF SCIENCES.

IN the absence of the President the meeting was called to order by Prof. R. S. Woodward. The minutes were read and approved and Dr. Franz Boas, of the American Museum of Natural History was elected resident member. Twenty-six members and guests were present. Prof. M. I. Pupin then read before the Section of Astronomy and Physics a paper on the *Magnetic circuit.* In transformers, especially of closed iron core, it has long been known that the upper 'harmonics' of the fundamental rate of alternations present in the primary are choked out by the transformer leaving the potential difference of the secondary coil represented by a simple sine curve. The choking out is less if the magnetic circuit is incomplete, and least when the coils have no magnetic core. Various explanations have been offered to account for this phenomenon; it is doubtless true that it is due to Foucault currents and to hysteresis. Dr. Pupin pointed out from certain mathematical considerations that by appropriate measurements, especially of the angle of lag, it would be possible to separate the energy consumed in Foucault currents from that consumed by hysteresis, and thus be able to study this latter puzzling phenomenon. Investigations are in progress to test the method experimentally. Prof. Crocker remarked upon the interest and importance of the questions involved.

The second paper was by Dr. A. A. Julien upon 'The condensed gas film on the surface of solid bodies with relation to (1) Newton's rings of the first order; (2) sand flotation; (3) sand in harmonic vibration.

Owing to the lateness of the hour Dr. Julien passed over the first two heads, giving an outline of the literature of the question of liquid films on solids. He then outlined his experiments in sonorizing sands artificially, and demonstrating the necessity of an antecedent water film before the sand becomes sonorous. It must also be of approximately uniform size of grain. The paper was discussed by Profs. Mayer, Van Nardroff, Pupin and Hallock. At 10:30 the meeting adjourned.

W. HALLOCK,
Secretary of Section.

GEOLOGICAL CONFERENCE OF HARVARD UNIVERSITY, DECEMBER 17, 1895.

The Geology of the Woonsocket Basin. (Preliminary Report.) By F. C. SCHRADER.

The basin consists of a local widening in the normally trenchant valley of the Blackstone River where the river traverses a narrow belt of soft rocks. The outline of the basin is roughly that of the cross-section of a plano-convex lens, whose straight edge, representing the southeast side of the basin, extends from Primrose, south of Woonsocket Hill, in Rhode Island, ten miles northeastward to South Bellingham, in Massachusetts. The convex edge includes near its middle point Blackstone village on the northwest, whence the Blackstone river, like a vertical let fall to the opposite side just below the city of Woonsocket, bisects the basin, whose width is here about three miles.

The rocks in the basin are eroded to a depth of two hundred or more feet below the upland or old baselevel of the surrounding country. Some bed-rock hills are, however, still prominent within the basin, and the deposits of glacial drift, chiefly water-laid, frequently approach a hundred feet in thickness.

The rocks enclosing the basin are mainly gneisses, hornblende granites, and, on the west, some quartzites. Excepting a few of the granites, they are all Pre-Carboniferous and extend over wide areas of country. They have a southeast-northwest trend, and the gneisses and quartzites dip to the northeast, as seen in the Manville section and at Woonsocket Hill. Compared to the rocks within the basin, they are hard and form good resisters to weathering. To this difference of resistance to weathering between the extra- and the intra-basin rocks, the basin doubtless mainly owes its present topography.

The rocks within the basin are soft, have a southwest-northeast trend, and dip northwest. They are much younger than the enclosing rocks, with which they exhibit marked unconformities, as with the quartzites on the west and the gneisses on the north. The lowest and apparently oldest of these rocks, but of unknown age, is a uniformly very fine grained, grey, talcose, silicious mica-schist, which in the past has been worked with profit in the whetstone industry. It occurs chiefly in the southeast side of the basin. Above this grey rock, but unconformable with it, in the west part of the basin, is found a shiny black hornblende mica-schist, also of questionable age; while unconformably over both the grey and the black lie the youngest rocks in the basin. These latter, though as yet they have yielded no fossils, are probably Carboniferous, judging from their geological relations and lithologic resemblance to the well-known Carboniferous on the east, in the Narragansett Basin. They consist of grey conglomerates with interbedded mica-schists, sandstones and slates. They are derived chiefly from the surrounding older rocks of the upland, as is manifest by the granite and quartzite pebbles contained in the conglomerates, occurring east of Forestdale and at Woonsocket Hill.

Cutting the rocks in the basin at intervals is a series of diabase dikes. They range from less than one to more than a hundred feet in width, dip about vertical, and run nearly parallel, bearing north-northeast.

Preliminary Report on the Stamford Gneiss: By W. H. SNYDER.

In the southwestern part of Vermont and extending into the northwestern part of Massachusetts there occurs a coarse banded gneiss covering about 50 square miles and called by the U. S. Geological Survey the Stamford Gneiss. It was known in Pres. Hitchcock's survey of Vermont as the Stamford Granite.

This gneiss is surrounded on the east and south by a metamorphosed conglomerate, the pebbles of which correspond to the blue quartz of the gneiss. At a short distance from the contact the conglomerate changes into a micaceous quartzite. In this quartzite there has been found by Walcott trilobites which prove it to be Cambrian. On the west the gneiss appears to be bounded by a very massive white quartzite, the dip and strike of which mostly correspond to that of the micaceous quartzite on the east. The northern boundary is as yet undetermined.

At the contact of the conglomerate and gneiss there is developed between the two a layer of about a foot in thickness in which the gneissic structure is particularly pronounced, the mica making lenticular folds around the quartz grains and giving the mass the appearance of augen-gneiss. Prof. Pumpelly has suggested that this layer is the disintegrated border of the gneiss upon which the conglomerate was laid down and which has since been metamorphosed.

The gneiss itself is composed of coarse feldspar crystals, irregular masses of blue quartz and thin layers of a greenish mica. In some parts there are large Carlsbad twins of microcline and in others rounded masses of feldspar 3 and 4 inches in diameter. At one point the weathering has developed nodular feldspar aggregates as large as a hen's egg, which give the face of the ledge a conglomeratic appearance. The rocks yield easily to weathering throughout the area. There are no glacial striæ apparent upon any exposed surface.

Near the western border of the gneiss there is an outcrop of a fine grained greenish gneiss very distinct from that of the main mass and surrounded on three sides by this mass. The fourth side is hidden by a bog. The Stamford gneiss apparently overlies this gneiss and sends apophyses into it. The contact between the two is distinctly marked, and although a careful microscopical examination has not as yet been made, it does not appear to be a metamorphic contact due to stretching, but an igneous contact, the Stamford gneiss having covered, when in a melted condition, the green gneiss. The Stamford gneiss is apparently a granite which has had the gneissic character impressed upon it.

The general occurrence, composition and structure of the Stamford gneiss corresponds very closely with the Rapakiwi granite of Finnland, described by J. J. Sederholm in Tschermak's Mineralogische und Petrographische Mittheilungen, Band XII., pages 1–31, 1891. Ueber die Finnländischen Rapakiwigesteine.

DECEMBER 10, 1895.

Preliminary Notes on the North Jersey Coast. J. EDMUND WOODMAN.

Three important causes of change are now in operation here—submergence, recession and advance. The first is widespread, but immeasurable. The evidence relevant to this is varied, but chiefly the presence of stumps in salt and brackish water. Deepening of inlets affords no criterion.

Recession is effected by (1) waves, and (2) currents. On Sandy Hook and south of Manasquan inlet this is replaced by advance or grade; hence these are nodal points. This recession is measurable, and may be prophesied approximately for any specified time within certain limits. It can be temporarily prevented at isolated points, although not by present methods, but its ultimate conquest is sure.

The waves act (1) by eroding the shore; (2) by damming inlets, and (3) by transporting material off shore to form bars. Erosion is irregular, and in places erosion and advance alternate and partially compensate. Cutting is greatest with a northeast wind—*i. e.*, when wind and current are in opposition; it is least with a southeast wind. This is contrary to general theory, but is readily explainable. The damming of inlets is caused partly by coastwise bars raised by the waves and partly by sediment from the streams falling in the dead water where current and waves meet. Probably the former cause does not operate until some sedimentation has taken place. Most of the sand eroded from the shore is carried a few hundred feet out to form bars, little migrating along the margin of the land.

The currents act (1) by carrying a small amount of sand along shore as mentioned; (2) by the migration of bars northward—the most important method of transportation, and, as a result, (3) by deposition of most or all the sand on Sandy Hook.

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

THE ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of January 6, 1896, President Green in the chair and eighteen other members present, the officers placed in nomination at the last meeting were declared as elected for the year 1896.

The reports for 1895 of the Treasurer and Librarian were read and accepted.

Prof. Engler pointed out a simple graphical method of drawing a normal to a parabola from a point outside the curve.

On motion of Prof. Pritchett, the Council was requested to arrange for a meeting of the Academy, in the near future, commemorative of the service of four distinguished men who had died in the past year: Dana, Helmholtz, Huxley and Pasteur.

Mr. Espenschied exhibited several samples of sisal and palm-fibre utensils obtained from the Bermudas and West Indies, explaining the mode of preparation.

Two new resident members were elected.

WM. TRELEASE,
Recording Secretary.

NEW BOOKS.

Movement. E. J. MAREY. New York, D. Appleton & Co. 1895. Pp. xv + 318. $1.75.

Computation Rules and Logarithms. SILAS W. HOLMAN. New York and London, Macmillan & Co. 1896. Pp. xlv + 73. $1.00.

Plant Breeding. L. H. BAILEY. New York and London, Macmillan & Co. 1895. Pp. vii + 293. $1.00.

The Chemistry of Pottery. KARL LANGENBECK. Chemical Publishing Co., Easton, Pa. Pp. vi + 197.