THE NATIONAL ACADEMY OF SCIENCES.

The National Academy of Sciences met on Tuesday, the 16th inst., at Columbia College, New York city, and continued in session during the three following days. The President, Dr. William B. Rogers, was prevented by sickness from being present, and the chair was occupied by Professor O. C. Marsh, of Yale College, the Vice-President of the Society.

Among the members present were: John H. C. Coffin, U. S. N.; Professor George F. Barker, Philadelphia; James Hall, Albany; Samuel H. Scudder, Cambridge, Mass.; Professor Charles F. Chandler, Columbia College; Professor Walcott Gibbs, Cambridge, Mass.; J. Hammond Trumbull, Hartford; J. Sterry Hunt, Montreal; Professor B. Silliman, Yale College; Professor E. C. Pickering, Cambridge, Mass.; Professor C. A. Young, Princeton; Louis M. Rutherford, New York; E. H. F. Peters, Hamilton College; Edward S. Morse, Salem, Mass.; Professor Edward D. Cope, Philadelphia; Professor H. A. Newton, New Haven; Professor Alfred M. Meyer, Hoboken; Professor J. S. Newberry, Columbia School of Mines; Professor Henry Morton, Hoboken; Professor John W. Draper, Hastings, N. Y. Professor Ogden N. Rood, and Professor Eggleston, New York; Professor S. F. Baird, Washington; Professor William H. Brewer, of Yale College, and Professor A. Guyot, of Princeton, N. J.; Professor George J. Brush, of New York.

Professor Marsh, after calling the Academy to order, stated that the present session was for the reading of scientific papers only.

We postpone until next week the report of the papers read at this meeting of the Academy, to enable authors to prepare abstracts, or correct those already rendered.

THE ANTHROPOLOGICAL SOCIETY.

The Anthropological Society of Washington met November 16, in the Smithsonian Institution, Dr. J. Meredeth Toner in the chair. Two papers were read: "Aboriginal Remains in the Valley of the Shenandoah River," by Dr. Elmer R. Reynolds, and "Tuckahoe or Indian Bread-root," by Professor J. Howard Gore. Dr. Reynolds was one of a company sent out last Summer to examine the celebrated Luray cave. While upon this journey he was so fortunate as to discover in the vicinity of Luray a group of three very interesting mounds, one of which he examined in person and received the report of the exploration of others from some of the residents of the valley. The tumulus opened by Dr. Reynolds was identical in its strata with many opened in the Mississippi valley, and refutes the oft-repeated theory that no mounds are to be found on waters emptying into the Atlantic ocean. There were in this mound forty-three chipped implements, four tablets, pieces of pottery, four plates of mica, charred bones (indicative of cremation), quartz crystals, lumps of white quartzite and rude flakes. These objects were grouped about the head of the buried chieftain.

In regard to the second paper, Mr. Gore first mentioned the circumstances which suggested the subject for investigation, and the unsettled condition of the various theories now held concerning the nature and use of Tuckahoe. The early writers attributed to it great nutritive qualities, and nearly every author writing upon the subject since then has made the same assertion. In order to determine its exact value as an article of sustenance to the Indians, it was necessary to ascertain the geographical distribution, and the prevalence of Tuckahoe in those localities.

This was accomplished by sending circulars of inquiry through the Smithsonian Institution to nearly every Cryptogamic Botanist in the United States, to the newspapers along the Atlantic coast and in the Mississippi valley.

It is found that it is more or less abundant in the States from New Jerssy to Florada, in Kansas and Arkansas.

The question "Does its growth depend upon circumstances always existing?" was answered by giving an outline of the process of its development, and specimens were exhibited by way of proof. Likewise the means by which it could have been found by the natives, if its value as food was sufficient to pay for the trouble.

Its exact nutritive value was determined by an elaborate analysis made by Dr. Parsons, which gave only three-fourths of one per cent. of nitrogenous matter; this being insufficient to repair the waste in the animal tissues it was pronounced *valueless* as *food*.

The speaker then suggested that there must have been other roots or tubers called Tuckahoe, and quoted from a number of histories, showing that a root by this name was frequently described, which was entirely different from the one in question, finally succeeding in identifying five roots, which were once known as Tuckahoe, or similar to roots known as such. Also the derivation of the word Tuckahoe given the speaker by the distinguished Ethnologist, Dr. Trumbull, shows that it is from "pluckqui," meaning something round, or rounded, and not from a word meaning bread as heretofore supposed.

The conclusion then given was, that Tuckahoe was a term applied to all roots which were rendered esculent by cooking, until all of these, except *Pachyma cocos*, received a special name, this alone retaining the appellation Tuckahoe; and that when we read of Tuckahoe contributing so largely towards the support of the aborigines, we can only know that an edible root was referred to. The paper was illustrated by six large charts, giving twelve Botanical Synonyms, eight Affinities, five roots once known as Tuckahoe; an analysis of one of these, showing that it was nutritious, ten Indian Synonyms, and an analysis of Tuckahoe.

ASTRONOMY.

THE VELOCITY OF LIGHT.

Vol. I, Part III, of the "Astronomical Papers prepared for the use of the American Ephemeris and Nautical Almanac," containing the experiments upon the velocity of light, made by Master A. A. Michelson, U. S. N., has just been published. Mr. Michelson read a paper upon this subject at the St. Louis meeting of the American Association in 1878, and has since published the results of his work in the *American Journal of Science, Third Series, vol.* 18, *page* 390, so that his method of investigation (an improved form of Foucault's method) may be considered not unfamiliar. In brief this method is as follows: A beam of light is allowed to pass through a slit and to fall upon the face of a mirror free to move about a vertical axis. From this free mirror the light passes through a lens of long focus, and falls upon a fixed plane (or slightly concave) mirror, from which it is returned through the lens to the movable mirror, and thence, if the mirror is at rest, to the slit. If, however, the movable mirror is made to revolve rapidly, the light will not return directly to the slit, but will be deviated by a certain amount which depends upon the time it takes the light to transverse twice the space between the mirrors, and also upon the distance through which the mirror has revolved during that time.

It is upon the accuracy of the measurement of this displacement that the value of the determination largely depends; and to render the displacement as great as possibie, Mr. Michelson placed the revolving mirror within the principal focus of the lens, and increased the speeed of rotation. The lens, having a focal length of 150 feet, was at a distance of about 80 feet from the revolving mirror, and the fixed mirror at a distance of about 2000 feet. By this arrangement, with a speed of rotation of 257 turns per second, he obtained a deflection of 115 millimeters; whereas, Foucault using a speed of 400 turns per second, and causing the light to traverse a distance of 20 meters, had obtained a deflection of 8 millimeters. The revolving mirror was driven by a turbine-wheel operated by a blast of air. Its speed, which was measured by an electric tuning-fork, was readily adjusted by a stop-cock, and the deflection was measured by a micrometer.

Mr. Michelson gives a most careful discussion of the errors of his constants, including the determination of the value of the micrometer screw, the rate of vibration of the tuning fork, etc., and concludes with the consideration of several "objections" which have been suggested from time to time.

The final value for the velocity of light *in vacuo* is 299944 $\pm$ 51 (in air, 299864), or, in round numbers, 299940 kilometers per second = 186380 miles per second,* the remarkably small error, $\pm$ 51 kilometers, being composed of the total constant error in the most unfavorable case, and the probable errors of observation. This quantity, $\pm$ 51 kilometers, cannot be said to express the *probable error* of the determination, in the ordinary acceptance of the term; combining, as it does, *probable errors*, strictly speaking, and estimated constant errors.

These experiments were made by Master Michelson at the Naval Academy, Annapolis, at private expense, and to him the entire credit is due. A new determination of the velocity of light, embodying essentially the same arrangement, but with more elaborate and expensive apparatus, is now being made under official auspices by Prof. Newcomb, Superintendent of the Nautical Almanac.

It is probable that in this way the most accurate value of the solar parallax, so essential to astronomy, can be deduced.

ASTRONOMICAL MEMORANDA.—(Computed for the meridian of Washington, D. C., November 29, 1880):

	H.	M.	S.
Sidereal time 05 mean noon	16	35	50
Equation of time		11	15

mean noon *following* apparent noon.

The *Sun* is 21° 39′ south of the equator, at meridian transit, and will continue to move south until December 21.

The *Moon* reached its last quarter on November 24d. 8h. 47m. It does not come to the meridian until 10 A.M. of November 30.

Mercury was in inferior conjunction, November 23, and is not now visible to the naked eye. It precedes the sun by about 52 minutes, and is five degrees farther North.

Venus is plainly seen in the southwest; a short time after sunset; following the sun by 2h. 33m., and gradually increasing the distance. Its declination is 24° 43′ south.

Mars is at present too close to the sun for observation.

Jupiter, though gradually growing fainter, is still the most brilliant object in our eastern sky at evening. It passes the meridian at 8 P.M., at an altitude of 54° above the southern horizon. Its more exact position at that time is: Right Ascension, oh. 37m. 43s.; declination, +2° 28′.

Saturn, less brilliant than Jupiter, is, notwithstanding, equal or superior to the larger planet in point of interest. It is readily found about 13° E. by N. of Jupiter, presenting a good view of the southern side of its rings.

Uranus is in right ascension 11h. om. 52s. declination +7° 9′.

Neptune is in excellent position for observation, reaching the meridian at about 10 P. M. It was in opposition on November 4, and may now be found in Right Ascension 2h. 41m. 27s. declination +13° 46′.

A new 10 in. equatorial, with an object glass by Merz, has been presented to the Geneva Observatory by its director, Prof. Emil Plantamour. It is to be devoted to observations of the major planets and their satellites, of parallax of stars, and of double stars, with occasional observations of minor planets.

DR. Schmidt has made a new determination of the time of rotation of Jupiter upon its axis, from observations in 1879 and 1880, of the red spot upon its disc. His preliminary discussion gives for the time of rotation 9h. 55m. 34.42s.

IN a letter to *Nature*, dated October 2, Prof. Pickering, of Harvard College Observatory, announces that the period of Ceraski's new variable star is probably 2.5 days, instead of 5 days, as previously published by Schmidt. It is especially remarkable for the rapidity of change during part of its period. The total variation is from about the 6.7th to the 10th magnitude. The approximate place for 1881 is, R. A. oh. 51m. 48s. Dec. +81° 14′.1. W. C. W.

WASHINGTON, D. C., Nov. 23, 1880.

MICROSCOPICAL COLLECTIONS IN FLORIDA.*

By DR. C. C. MERRIMAN.

It has been my fortune during the past two Winters to spend a few weeks in the regions of Central Florida. Lake Harris is the most southern and the most beautiful of the cluster of lakes which forms the source of that exceedingly picturesque river, the Ocklawaha. With high banks, and surrounded by a belt of hummock land as rich as any that Florida affords, this lake is becoming settled upon, and its lands are fast being taken up by enterprising southerners for orange-groves and pine-apple plantations. The sojourner will find the society of this lake-settlement intelligent and hospitable beyond anything that would be expected in so new and pioneer a country. The vegetation of this almost tropical region is so full of interest to the microscopist, and the causes conducing thereto so peculiar, that I have thought them deserving of especial mention and illustration.

The absence, or at least the rarity of frosts injurious to vegetation in these lake districts, gives the longest possible season for the growth and maturity of such organs as are best, or especially, adapted to the exigences of Florida plants. There is a period of rest, usually comprising about the three Winter months, after which vegetation takes up and continues its growth again as if there had been no period of interruption; so that practically there is a continous development of plant life, whether annual or perennial, from birth to death.

The soil of Florida, as of all the South-Atlantic seaboard, is sandy and naturally barren. No polar glaciers have ground up for these regions, as for the Northern States, a rich and abundant alluvium, sufficient in itself for the production of a rapid and vigorous vegetation. The South has apparently only the siftings of our Northern soil, carried down to the ocean by rivers, and then washed up by the sea-waves to form their interminable sandy plains. But to compensate for this natural infertility of soil, the atmosphere, especially of Southern Florida, abounds in all the elements of plant growth. The winds which come up from the Gulf on one side, or the Atlantic on the other, are charged with moisture, and bear also minute quantities of nitric acid and saline compounds; while the exhalations from the swamps and marshes furnish in abundance the salts of ammonia and carbonic acid. Now to utilize these precious products from the air, it is necessary for plants to

* NOTE.—Foucault's experiments gave the velocity as 185200 miles per second.

*Read before the Sub-section of Microscopy of the A. A. A. S.