SCIENCE

FRIDAY, NOVEMBER 15, 1895.

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THE NATIONAL ACADEMY OF SCIENCES.

A SCIENTIFIC session of the Academy was held at Philadelphia, in the Laboratory of Hygiene of the University of Pennsylvania, beginning Tuesday, October 29th, 1895, at 11 o'clock A. M. and continuing through the following day.

A special stated session was held on Wednesday, October 30th, to consider the President's Annual Report to Congress and other business.

The members of the Academy reported in attendance were: Alexander Agassiz, Carl Barus, John S. Billings, Henry P. Bowditch, William H. Brewer, W. K. Brooks, George J. Brush, Edward D. Cope, Samuel F. Emmons, Wolcott Gibbs, Theodore N. Gill, Benjamin A. Gould, Arnold Hague, Asaph Hall, Charles S. Hastings, O. C. Marsh, Albert A. Michelson, S. Weir Mitchell, Edward S. Morse, John W. Powell, Raphael Pumpelly, Frederick W. Putnam, W. H. Welch, A. E. Verrill, Francis A. Walker, Horatio C. Wood and Charles A. Young.

The papers presented were as follows:

OCTOBER 29TH.

I. *On the Paleozoic Reptilian Order of the Cotylosauria:* E. D. COPE. Prof. Cope said that the order Cotylosauria is of much interest from the fact that it is one of the two orders of paleozoic age, because it approaches nearest to the Batrachian class, and because it is the ancestral type of all the Amniota Vertebrata. The order was determined by the speaker in 1870, and is now known to include forms from North America, South Africa and Scotland, in the latter country in Triassic beds. Four families and ten genera are known, and

they range from the size of a caiman to that of a lizard.

II. *On a New Variable of Peculiar Character:* S. C. Chandler. This paper relates to the discovery of a new variable which appears, from a study of its characteristics, not to belong to either of the two recognized types of variables of short period. It fluctuates between the magnitudes 8.9 and 9.7 in the singularly short period of five hours thirty-one minutes and nine seconds. It is distinctly not of the *Algol*-type, being in continuous variation during its whole period. Its light-curve is also quite unlike that of the other known class of short-period stars, exemplified by η Aquilæ and δ Cephei, in which the duration of increase and decrease have the ratio of about one to three; since the increase and decrease of this star occupy nearly equal times, the increase being indeed rather the slower. The variations are very rapid, and maxima and minima are equally and sharply marked, both being observable with the same precision with which we are familiar in the stars of the *Algol*-type, namely, within a very few minutes.

III. *On a Bone Cave at Port Kennedy, Pa.:* E. D. Cope. Prof. Cope reported that the cave seems to be in a fissure of limestone, overlaid with red sandstone. It was discovered in 1870, when, after a blasting, a portion of its contents was exposed and examined by Prof. Cope, who then described 40 species of animals found in it.

About 30 feet have so far been examined, and the bottom is not yet in sight. The further down the diggings are made, the richer the find. On a base of clay, strata of vegetable matter, charred earth, wood and leaves, lie strata of crushed bones, powdered very fine, forming almost a meal.

The number of species so far discovered is 43, some of which have not been previously determined. The bones are those of tortoise, snake, birds, sloths, hoofed mammals and carnivora. Among the last are found the skunk, bear, and four species of the cat family, including allies of the jaguar and tiger. The teeth of several mastodons were found, but no traces of elephant. Very many specimens of jaws of the tapir were discovered, as were also the remains of extinct species of horses, differing considerably from the present horse.

Two specimens of teeth of a peccary, and one of an animal probably resembling the South American llama, were likewise taken from the cave. The tiger tooth is very interesting from the fact that, while the genus appears in the caves of America, it has not been found in Europe.

One of the species of bear resembles the existing black bear, while the other is similar to a rare species found in the Andes and California caves, and is not related to any form now existing in North America.

No remains of man have thus far been found, and the cave is probably the best example of the older caves existing prior to the Champlain epoch, or period of submergence, and after the glacial period. The great problem to be solved is, did man exist in North America prior to the Champlain period? If the remains of human beings are found here it will be of great importance, as the geologic time of this cave seems to be well known.

A stone quarry occupies the site of the cave, and blasting was done by Mr. Kennedy in 1840, but fossil bones were first noted in 1870. The bottom of the quarry is now 45 feet below the top of the hill. The bones lie in red clay, and are finely ground up, with here and there a larger mass. The entrance must have been overhead, and the debris brought from a distance and poured in from the top. No marine shells or other evidences of oceanic life have been found. Great blocks of wood, some of it retaining the bark, and nuts, seeds, grasses and leaves were discovered in the cave.

IV. *On Borings through the Coral Reef in Florida:* A. AGASSIZ.

V. *On the Alkali Uranates:* WOLCOTT GIBBS.

The reports by Professors Agassiz and Gibbs were presented informally in the absence of other papers to occupy the session.

OCTOBER 30TH.

VI. *The Olindiadæ:* W. K. BROOKS.

VII. *New Campanularian Medusæ* (read by title)*:* W. K. BROOKS.

VIII. *The Filar Anemometer:* CARL BARUS. Professor Barus in this paper discussed the sounds by the whistling wind, made whenever air in motion passes across a slender obstacle, like a wire. He showed that the velocity of the wind could be computed from the pitch of the note observed in case of a given diameter of wire and for a given temperature of the air. By aid of a special microphonic attachment such sound could be conveyed to any distance and isolated from the attendant noises at the place of exposure. So represented, the wind was given in every detail of its gusty and variable character, and the term micro-aulmometry seemed to be applicable to observations of this nature. Finally the direction of the gust could be inferred from the sounds obtained from three coördinate wires at right angles to each other.

IX. *The Countertwisted Curl Aneroid:* CARL BARUS. Professor Barus reported that he had investigated the maximum sensitiveness which an extremely thin-walled helical Bourdon tube would show. He pointed out the importance of sharp-edged tubes for the purpose of reducing the flexure of the tube to a case of pure bending, seeing that the products of the principal radii of curvature must then remain constant. He showed that for the same reason the sensitiveness could be enormously increased by untwisting the evacuated coil with an external spring. Furthermore, if the system of countertwisting spring and helical tube be so chosen that the viscosity as well as the thermal coefficients of viscosity and rigidity of the components are as nearly as possible the same, the system would possess nearly perfect elasticity at all temperatures. The paper was accompanied by a variety of data showing the behavior of simple and countertwisted helices or curls and the remarkable advantages of the latter form.

X. *On the Broadening of Spectral Lines by Temperature and Pressure:* A. A. MICHELSON. Professor Michelson's paper will be printed in the forthcoming number of the *Astrophysical Journal* and will be reported in this journal.

XI. *On the Asteroids* (read by title) : A. HALL.

XII. *The Early Segregation of Fresh-water Types:* TH. GILL. [Abstract will be printed in this Journal.]

THE THERMOPHONE.

DURING the recent session of the Summer School of Civil Engineering of the Massachusetts Institute of Technology, held at Keeseville, N. Y., the writer had the pleasure of describing to the students the construction and operation of a new instrument for obtaining temperatures. This instrument, known as a thermophone,* is an electrical telethermometer of the resistance type. It is designed especially for obtaining the temperature of a distant or inaccessible place, but it embodies a principle which may often be used to advantage in scientific work for determining temperatures with greater accuracy than can be obtained with a mercurial thermometer.

The operation of the thermophone is based upon the principle that the resistance which a conductor offers to the passage of an elec-

*Invented by Henry E. Warren and George C. Whipple.