

After the winter quarters had been prepared, it was the intention of Holm to examine the fiord of Fredricksthal, and the region between it and Tasermit, which has not yet been explored with care.

It was his intention to start for the eastern coast about the end of April, or early in May, 1884; and during the winter of 1884-85 some members of the party were to remain there.

HUMIDITY AND CHRONOMETER RATES.

MAJOR-GEN. J. F. TENNANT, of her Majesty's mint, Calcutta, communicated to the Royal astronomical society in November last a paper on humidity as a cause of variation in the rate of chronometers. He had borrowed from the government-stores about the end of March, 1882, a chronometer, by Fletcher of London, which had been some time in India, but had not been cleaned since its arrival, and was said to have a good rate. From a gaining-rate of 6^s.5, which it preserved fairly well for about two months; it suddenly fell to a gaining-rate of 2^s.0; this being the commencement of a succession of rather abnormal fluctuations of rate which Major Tennant carefully observed and recorded for about eighteen months. These rates were first compared with a plot of the published daily mean temperatures of the meteorological observatory, with results not quite satisfactory; for, though it would seem at first sight that the rate depends on temperature, further examination showed that it can do so to a moderate extent only, and confirmed the belief, which Major Tennant had from general impressions, that rate does not depend on temperature. The extraordinary differences of rate at times of nearly equal temperature leave no doubt that there is a periodic change of rate; and the cause of this, Major Tennant believes to be humidity. His first suspicion of this was raised by the sudden fall in rate of this chronometer, in 1883, being coincident with the first heavy rains producing great damp; and by the fact, also, that the same thing occurred the year previous, and that the whole period of low gaining-rate was that of the rains, while the lowest was the warm time at the end of the rains, when the soil is generally loaded with moisture. The same phenomenon recurred. It is, however, much more difficult to compare the supposed cause and effect without special arrangements; and, in any case, it is doubtful whether air-humidity could be more than a rough guide.

If the oil in the arbors of the balance be hygroscopic, it is easy to see that it may become more fluid in damp weather, the arc of oscillation will increase, the balance-vibration take longer, and the chronometer lose; but the momentary humidity of the air will not correspond to the rate, as the temperature does more or less. Major Tennant, remarking the undoubted connection in this particular case, suggests special experimenting in the following directions:—

1°. Are chronometer-oils, or any of them, hygroscopic?

2°. Can they become so by exposure to a tropical climate?

In this latter case he conceives that the climatic influence cannot be imitated in Europe. The effect of the heat, and probably the light, are very destructive of some materials. Vulcanized india-rubber, for example, does not bear exposure in India, though it seems to answer in Europe, even in heat and damp.

Lastly, in estimating the effect of humidity on a given chronometer, it will probably be best to use one of the old hair or grass hygrosopes for the humidity, placing it in the case, enclosed with the chronometer.

DAVID P. TODD.

THE GREAT COMET OF 1882.

THIS comet is one of the most interesting that has appeared for a number of years, owing to its very near approach to the sun-surface, and the resemblance of its orbit to the two great comets of 1843 and 1880. It was a brilliant object in the morning sky in September, 1882. Calculations of the orbit have been made recently by Dr. Morrison, Professor Frisby, and Dr. Kreutz. The periods obtained are as follows: Dr. Morrison, 712.1 years; Professor Frisby, 793.9; Dr. Kreutz, 843.1. These periods are, however, somewhat uncertain, owing to the peculiar nature of the nucleus of this comet. Instead of being a single bright body, there appeared to be a row of small nuclei, so that it was a mere matter of judgment with the observer what part of the comet he should observe. The observations were naturally made upon the middle of the row of points, and it is not possible to say with certainty that this corresponded to the centre of gravity of the comet. It is worthy of note, that bright comets are recorded in the year 370 B. C. and in A. D. 1132, both of which could be reconciled with the great comet of 1882 by supposing the period of 751 years.

THE WORK OF THE CAMBRIDGE ARCHAEOLOGICAL MUSEUM.

THE trustees of the museum of American archaeology and ethnology, founded by George Peabody, held their annual meeting on the 18th of February, the anniversary of the birth of the founder. The Hon. Robert C. Winthrop, president of the board, presided; and Professor Asa Gray, Dr. Henry Wheatland, Mr. John C. Phillips, Mr. Samuel H. Scudder, and Mr. F. W. Putnam (the curator of the museum) were present. The Hon. Stephen Salisbury of Worcester was prevented by temporary illness from attending, and the Hon. Theodore Lyman was unable to leave his duties in Congress.

The report of the treasurer, Mr. Phillips, showed that the \$150,000 given by Mr. Peabody is well invested. Of the income of \$8,334, only \$5,186.50 was expended on account of the museum: \$3,110 belonged to the building-fund, and the remaining \$37.50 was expended on insurance. Mr. Winthrop

called attention to the wide-spread operations of the museum, which had so far exceeded the early expectations of the trustees as to have entirely outgrown its foundation. The original fund, although a munificent gift at the time, is now inadequate, owing to the unforeseen growth of the science. He hoped that in any account which might be given of this meeting, it would be clearly stated that this trust is in no way connected with the Archaeological institute of America, with which it has, no doubt, been confounded in some minds.

Mr. Putnam, the curator, presented his report of the operations of the year, in which he dwelt at length on the explorations which had been carried on by means of the subscriptions of several patrons of science. With about \$1,600, the balance of the special subscription-fund of 1882-83, and less than \$1,000 spared from the income, work has been continued in Nicaragua and Ohio, and, in a very limited manner, in Tennessee and North Carolina.

The work in Nicaragua has been conducted for the past five years by Dr. Flint, who has made very important collections from the ancient shell-heaps and burial-places. During the past year, on Deadman's Island, in a trench lined with stones, he found a burial-jar containing decayed human bones, with old Venetian beads, and two gold ornaments like those found in the graves at Chiriqui. This shows that gold ornaments of this type were used by the natives of Nicaragua after the Spanish conquest had furnished them with glass beads. As they are exceptional among Nicaraguan antiquities, and are identical with those from farther south, it is probable that their original source is Chiriqui. Dr. Flint has copied successfully many pictographs and cave-inscriptions, some of which are of great antiquity. But the most interesting discovery is what Dr. Flint believes to be human footprints in clay under several layers of lava-rock, on the borders of Lake Managua. Under date of Dec. 24, 1883, Dr. Flint writes that he has cut out several of these footprints, which, with fossil leaves from the same stratum, are now on their way to the museum.

The work in the Little Miami valley has been continued with remarkable success, and has resulted in discoveries of far greater importance than could have been anticipated from previous exploration of the mounds. A year ago attention was called to some early results of this exploration; but now, just as the means for continuing explorations are wanting, the discovery has been made, that, important as these mounds have proved to be, as much of interest is to be found beneath them. At the bottom of the largest mound, under a layer of burnt clay enclosed by a stone wall, trenching has brought to light a series of pits six to seven feet deep. These pits are connected with tunnels of clay a foot in diameter and seven to eight feet long, ending in upright tubes five inches in diameter and two feet long. Fine ashes were found on the bottom of the tunnels or flues, and on the sides a glossy substance, as if the product of condensation and crystallization of vapors. The pits were partly filled with ashes containing minute

pieces of burnt bone, and the sides and bottom bore marks of fire. Two pits had dome-like covers of clay, in one of which were two small holes. A tube of clay opened into one pit opposite the flue. Although these facts seem to point out the manner of burning the dead in use among the people who built this group of tumuli, it would be premature to make such an assertion. This work has been under the direct supervision of the curator and Dr. Metz. It is unquestionably the most thorough and important exploration of a particular group of earth-works yet made in Ohio. Many mounds varying in structure, and evidently made at widely different times, have also been carefully opened; and several Indian burial-places and village sites have been examined. When this work in the Little Miami valley is completed, it will bring us nearer the solution of the problem, who built the mounds? Guessing will still go on, but thorough exploration by careful hands alone can give to science the answer it demands. The work is far more extensive than most persons imagine. The land has been hired by the museum, with exclusive right of excavation. It will be necessary to dig over a large area, including the whole altar-group, to trace in a systematic manner the underground works. A number of laborers will be required for months to come. Funds are therefore needed at once, that the work may be continued without interruption.

In closing his report, the curator urged the necessity of some immediate action for the preservation of the interesting monuments of aboriginal art, scattered over our western states. Probably nearly all which are in such condition as to be worth saving could be purchased at fair prices. Their owners, as a rule, would be glad to see the ancient works preserved, but do not feel able individually to sacrifice so large an amount of farming-land for the purpose. Special mention was made of the Hopeton works, with its twelve-foot embankments and large square and circle; the Cedar-Bank works, which are still well preserved, in the Scioto valley; the Great Serpent, 1,415 feet long, the only work of the kind in the country; the Stone Fort, enclosing fifty acres, known as Fort Hill, in the Brush-creek valley; Fort Ancient, with its four miles of wall, the largest of the many ancient fortifications in the United States, on the Little Miami River; Cahokia Mound in Illinois, the great pyramid of the Mississippi valley, and the largest tumulus in the country, nearly one hundred feet high, and covering an area of over eleven acres; and the singular group of low effigy-mounds in Wisconsin. Some of these mounds are more than a thousand feet long. Many other ancient works are equally worthy of preservation; but those mentioned had been recently inspected by the curator. With every year that passes, some mound or great embankment is levelled for economic purposes, or for the easier cultivation of the land; or the old walls of the hill-forts, which have stood for untold centuries, are thrown down. Forty years ago many of the works were perfect which are now nearly obliterated. Our children will not be able to trace their sites, unless destruction is immediately checked.