River. The district thus included lies along latitude 45° 50′, between longitudes 76° 40′ and 77° 40′; the town of Pembroke being 77° 10′, with an elevation above sea-level of 423 feet. At the upper end of the district the Ottawa divides its waters, and encircles the large Allumette Island; the Culbute Channel on the north being narrow, while the southern one expands so as to be known as the Upper and Lower Allumette Lakes. On the Quebec shore the land rises precipitously; the Laurentian Mountains seldom receding more than a mile, and at times rising sheer from the water's edge in towering cliffs of trap. On the Ontario side the land is comparatively undulating, and rises by a succession of plateaus separated by ridges of rock, or by ranges of hills gradually increasing in height. After a graphic description of the beauties of this district, the writer outlined the principal sand-plains which constitute a large portion of the steppes of the southern shore, and pointed out that their levels coincided with the well-marked terraces found on Allumette Island and at other points along the river. The formation of these sand-plains was then fully discussed; and it was claimed that they had undoubtedly been formed from the *débris* transported by flowing water from the rock ranges that bound and intersect them, and toward which the surface gradually changes from fine sand (or occasionally clay), through coarser sands, pebbles, etc., to bowlders. The principal plain is that called the Chalk-river sand-plain, extending from near Pembroke, twenty miles westward. It is interrupted toward the lower end by broken ridges, which harmonize in position with the rapids, and which formed parts of barriers between a higher level westward and a lower level eastward. Occasional sand-ridges occur, which lie between the ancient mouths of rivers, of which some are now extinct, and others, as the Petawawa and Muskrat, still flow in greatly diminished volume. The two principal levels of this plain correspond with two terraces boldly marked on the Laurentians near the head of Coulonge Lake, fully thirty miles away. A lake as large as, or larger than, Superior must in the past have hidden in its great depths Allumette Island, the entire Pembroke district, and adjacent sand-plains, as well as thousands of the now arable acres lying toward Renfrew. As indicated by the terraces, there had been two distinct periods, in the first of which the water had been 200 feet deeper, and in the second 100 feet deeper, than the present level. After describing the constitution of the soils derived respectively from the granite or trap ridges, and their relative capacities for agriculture, the writer very lucidly and interestingly explained the changes, as witnessed by him, which are still going on in the district, and the manner in which, by the incessant weathering and denudation of the rocks, sand-plains on a smaller scale are still being formed. The present barriers which cause the rapids interrupting navigation were explained to be of varying degrees of hardness, so that change proceeds more rapidly at certain points. Thus the channel rocks at the foot of the river-reach in question are composed of fine sandstones (Potsdam) compacted with bluish clay, and are being rapidly eroded; and at a not excessively remote date the channel will be so lowered that the upper and lower lakes will form one navigable level, while the channel to the west, having a much harder bed-rock, will be changed to impassable rapids by the subsidence of the lake below them. Reference was made to various older channels which evidenced former higher levels which the existence of terraces and undoubted water-lines fully confirmed. In the discussion that ensued, several members who had visited the locality and other portions of the Upper Ottawa gave evidence as to the existence of numerous traces of old water-currents at points now much above the present levels.

Mr. H. M. Ami presented a list of the Cambro-silurian fossils of the neighborhood, containing 228 species, and prefaced by a few notes as to its compilation. The report of the geological section on the summer's work was also read, and the president announced that classes in botany and zoölogy would be held weekly.

Franklin institute, Philadelphia.

Jan. 16. — The annual report of Board of managers exhibited the addition of a hundred and thirty-nine new members during 1883, and of over three thousand volumes to the library. Preparations for the Electrical exhibition, to be held during the autumn of 1884, are in an advanced state. A national conference of electricians is in contemplation. The subject of a "Proposed ordinance for the examination of steam-engineers" was warmly debated, *pro* and *con*, but no decisive action was taken. Mr. S. Lloyd Wiegand read a paper defending the use of cast iron in the construction of steam-boilers, it having been alleged by Nystrom and others that steam-boilers with flat cast-iron heads were dangerous. The secretary's report embraced a summary of engineering and industrial progress for the past year.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

The U. S. naval observatory.

Vice-Admiral Stephen C. Rowan was appointed July 1, 1882, to succeed Rear-Admiral John Rodgers as superintendent of the observatory. On May 1, 1883, Vice-Admiral Rowan was relieved by Rear-Admiral R. W. Shufeldt. The report of Admiral Shufeldt to Commodore J. G. Walker, chief of bureau of navigation, under date of Oct. 22, 1883, covers the work of the observatory for the past year.

The *personnel* of the observatory is as follows: —

Rear-Admiral R. W. Shufeldt, superintendent; Commander W. T. Sampson, assistant to superintendent; lieutenants, Pendleton, Moore, Bowman, Gar-

vin, Wilson, Harris, Sewell; ensigns, Brown,[1] Allen, Taylor, Hoogewerff; professors, Hall, Harkness, Eastman, Frisby; assistant astronomers, Skinner, Winlock, Paul; clerk, Thomas Harrison; computer, W. M. Brown, jun.; computers (transit of Venus), Woodward, Flint, Wiessner, A. Hall, jun.; instrument-maker, W. F. Gardner; also three watchmen and nine laborers.

The report, which is not yet published, contains a brief account of the work accomplished with the principal instruments of the observatory, — the 26-inch and 9.6-inch equatorials, the transit circle, prime vertical and meridian transit, — and the progress in the chronometer department, the department of nautical instruments, the library, and also in the reductions of Gilliss's Zones of 1850, 1851, 1852.

The 26-inch equatorial. — This instrument has been in charge of Prof. A. Hall, with Prof. E. Frisby as assistant. Mr. George Anderson is employed as an assistant in the dome. The canvas covering for the opening of the dome is still used, and a change in the raising and lowering of this covering has been made in order to avoid the friction of the wire ropes. Thus far the new arrangement has worked well. This equatorial has been employed, as in preceding years, for the observation of double stars, satellites, and comets. The satellites of Saturn, Uranus, and Neptune have been observed; and we have now collected a large number of observations of these satellites. The ring of Saturn has been observed, but no remarkable changes have been noticed. In fact, many of the strange phenomena frequently described in connection with this unique ring, the observers here fail to see on the best nights. During the greatest opening of the ring, which is near at hand, it is intended to make a set of micrometric measures of the dimensions of the ring. Some observations for stellar parallax have been undertaken; but, as the observer resides at some distance from the observatory, such work is very laborious, and it seems better to defer it until more convenient arrangements are made. At the present time the pressing need on this instrument is, that the observations of satellites already made should be discussed for the purpose of correcting the orbits of these satellites, and of determining the masses of the planets. This discussion has been begun, and the numerical calculations are being made by Ensigns W. H. Allen and J. A. Hoogewerff.

The transit circle. — This instrument, in charge of Prof. J. R. Eastman, was employed in the same class of work as in 1881–82. The observers were Professor Eastman, and Assistant astronomers A. N. Skinner, Miles Rock,[2] and W. C. Winlock. Professor Eastman was absent, in charge of a transit of Venus party at Cedar Keyes, Florida, from Nov. 1, 1882, to Jan. 1, 1883. Assistant astronomer Miles Rock, who was detached in September, 1882, for duty with the transit of Venus party at Santiago, Chile, was away until Feb. 10, 1883. The whole number of observations made with the transit circle from Oct. 18, 1882, to Oct. 18, 1883, is 3,880.

[1] Appointed professor of mathematics, U.S.N., Oct. 13, 1883.
[2] Succeeded, Nov. 1, 1883, by Prof. H. M. Paul.

The meteorological observations have been continued, as in former years, by the watchmen.

The 9.6-inch equatorial. — This instrument has been in charge of Commander W. T. Sampson, assisted part of the time by Lieut. W. E. Sewell, and part of the time by Lieut. John Garvin. It has been used, as in former years, in observations of the phenomena of Jupiter's satellites, occultations by the moon, places of comets, and for obtaining corrections to the ephemeris places of minor planets.

Prime vertical instrument. — This instrument is in charge of Lieut. C. G. Bowman, assisted by Ensign H. Taylor. Observations with it were recommenced Nov. 14, 1882. Continuous observations have been restricted to about forty stars, in no case exceeding 2° zenith distance when on the meridian; and these, with one exception, have been closely confined to the time of the two maxima of aberration. The one exception referred to was in the case of α Lyrae, which has been regularly observed throughout the twenty-four hours, having in view the possibility of a determination of its absolute parallax. Up to this time about five hundred and eighty observations have been secured. In the reductions, Struve's formulae have been used; and the labor has been greatly lessened by the use of his auxiliary tables for the prime vertical transit.

Meridian transit instrument. — This instrument has been in charge of Lieut. U. R. Harris, and Lieut. E. C. Pendleton has assisted. Since July 10, Lieuts. Pendleton and Harris have alternated in determining the correction of the standard mean-time clock. The meridian transit instrument has been used for the observations of stars of the *American ephemeris* for clock and azimuth corrections, and the determinations of the right ascensions of the sun, moon, and major planets. The total number of observations of the character mentioned is fourteen hundred and eight. Observations have been taken as often as practicable, to obtain each day the correction of the standard mean-time clock for setting to correct time the transmitting clock, which is used in sending out the time-signals from the chronometer-room, and in rating the chronometers.

National museum.

Publications. — Volume 5 of the 'Proceedings of the National museum' has just been issued from the Government printing-office. It contains 703 pages, and includes 87 articles by 34 authors, grouped topically as follows: mammals, 4; birds, 21; reptiles, 2; fishes, 48; mollusks, 3; crustaceans, 1; insects, etc., 2; plants, fossil and recent, 4; minerals and rocks, 2; art and industry, 1.

Catlin Indian paintings. — The Catlin collection of Indian paintings recently given to the museum by Mrs. Joseph Harrison of Philadelphia, is now being prepared for exhibition. This collection consists of over six hundred paintings, chiefly portraits and delineations of ceremonies, games, and hunting-scenes, made by the artist during eight years' residence in the western territories, Mexico, and British North America, previous to 1840. It contains authenticated

portraits of three hundred and fifty men and women, and over three thousand figures of Indians of the tribes known as Sacs, Foxes, Konzas, Osages, Comanches, Pawnees, Kiowas, Sioux, Omahas, Missouries, Mandans, Flatheads, Blackfeet, Crows, Gros Ventres, Crees, Assineboins, Chippewas, Iroquois, Ottawas, Winnebagoes, and twenty-seven other tribes. Its value as a record of ethnological characters is inestimable.

There were two collections, — one consisting of the original paintings done in the field, exhibited by Mr. Catlin for many years in Europe; the other, copies made at a later date, which was exhibited in the old Smithsonian building many years ago, and now the property of Mr. Catlin's heirs. The collection given to the museum is the original one, and is regarded by artists and ethnologists as by far the most valuable. The pictures, which have been for fifteen years stored away in a warehouse in Philadelphia, are in a remarkably good state of preservation.

There are also on exhibition five paintings by Stanley, — all that remains of the Stanley collection of Indian paintings destroyed by the fire in the Smithsonian building in 1865.

Naval officers in the museum. — In continuance of the policy adopted two years ago, the secretary of the navy has detailed six more ensigns to duty in the museum. These are graduates of the Naval academy in the classes of 1877–79, who have just finished their first three years' cruise, and will now give two years to scientific work under the direction of the officers of the museum. Mr. C. S. McClain has been assigned to the department of marine invertebrates; Mr. C. H. Harlow, to that of arts and industries; Mr. H. M. Witzul, to metallurgy; Mr. H. S. Knapp and Mr. O. G. Dodge, to mineralogy.

Department of mineralogy. — Prof. F. W. Clarke, chemist of the Geological survey, has been appointed honorary curator of minerals, and is preparing a series of minerals for exhibition. Mr. W. S. Yeates, aid in the museum, who has been in temporary charge of the minerals since the death of Dr. Hawes, the former curator, is acting as assistant in this department.

Mr. Joseph Willcox of Philadelphia has deposited his collection of American minerals in the museum, and one thousand of the choicest specimens have been placed on exhibition.

Foods and textiles. — Mr. Romyn Hitchcock is acting as assistant curator, having in charge the collections of foods and textiles. The collection is very rich in the textile products of the Indians, and has considerable quantities of food-materials acquired from foreign governments at the close of the Philadelphia exhibition.

Explorations in Corea. — Mr. Pierre L. Jouy, of the museum staff, is attached to the American embassy in Corea, and is making zoölogical explorations. Ensign J. C. Bernadou, U.S.N., has sailed for Corea, to spend two years in ethnological and mineralogical explorations. Mr. Bernadou was one of the officers detailed to duty at the museum last year.

Voyage of the Albatross. — The steamer Albatross sailed from Norfolk, Jan. 8, for a four-months' cruise in the Caribbean Sea, in the service of the hydrographic office of the navy. She is under command of Lieut. Z. L. Tanner, and carries a special staff of zoölogical workers, including Mr. J. E. Benedict, naturalist in charge; Mr. Willard Nye, jun.; and Ensigns Miner, Garrett, and Ackerman, U.S.N., of the museum staff.

Mammal department. — Mr. Frederick W. True, curator of mammals, is in England, studying methods of investigation and museum administration with Professor Flower, at the Royal college of surgeons in London.

Foraminifera. — Prof. L. A. Lee of Bowdoin college was in Washington, Jan. 3 to Jan. 8, studying the museum collections of foraminifera with reference to his investigations upon the materials obtained by the Fish commission.

Director's office. — During the reconstruction of the east end of the Smithsonian building, Professor Baird is occupying an office in the north-west pavilion of the museum.

NOTES AND NEWS.

ALL the parties sent out by the various governments at the suggestion of the International polar commission have returned home safely, and with valuable meteorological and magnetic records, with the exception of three. The Russian station at the mouth of the Lena will continue its work for another year, on account of delay from storms in reaching its destination. The Finnish, at Sodankyla, although it has finished one good year's work, will continue for another, as the government of Finland has supplied the necessary funds. The misfortunes of the Greely party are too well known.

— The first number of the *Auk*, published under the auspices of the newly organized American ornithologists' union, closely resembles the Bulletin of the Nuttall club, of which it is the continuation, and bids fair to be a credit to American ornithologists. An excellent colored plate forms a frontispiece to the number, and the articles are varied and interesting. One would perhaps justly complain of the space given to disputes over words, and lament the entire absence of papers upon either the anatomy or the general structure of birds, but these are perhaps to come in future numbers; and there is a pleasant flavor of careful out-door observation running through some of the papers, such as those of Messrs. Brewster, Barrows, and Bicknell. The effect of the formation of the union four months ago, is already seen in the plan offered by the committee charged with the subject for co-operative work in the study of bird-migration on this continent. We think a brief account of the formation and purpose of the union would have been a fitting introduction to the number.

— Professor F. M. Snow of the University of Kansas, from observations taken at Lawrence, reports that only three Decembers in the past sixteen years have been milder than that just passed, — 1875, 1877,