Melbourne on the same day or on the following day, so that the change in error of the places interpolated with second differences from the *Nautical Almanac*, has merely to be carried back for 9½ hours or carried forward for 14½ hours. The resulting mean solar parallax is 8″·96, and assuming that the probable error of a single observation of declination is 0″·5, the probable error of the result is ± 0″·051. The value obtained by Prof. Newcomb from similar observations in the year 1862 was 8″·855, nearly identical with that which Leverrier held to be pretty definitive, and which was given by the planetary theories, or 8″·86. In most of the national ephemerides, Newcomb's mean value, obtained in his paper on the sun's distance in the Washington Observations for 1865, or 8″·848, has been adopted; the *Connaissance des Temps* substitutes Leverrier's.

METEOROLOGICAL NOTES

MR. E. KNIPPING, Tokio, has written a brief account of three typhoons which occurred in the China and Japan Seas in September, 1878. In twelve charts and one diagram he sets down the paths of the three storms and the weather of each day from the 15th to 21st, when the third and most violent of the typhoons occurred. The heaviest squalls and gusts of wind were met with in the front part of the typhoon, or with north-east and south-east winds, whereas they are hardly mentioned in the ship's logs with south-west winds in the rear of the storm. The path of the typhoon was to north-west from 15th to 19th, to north on 19th and 20th, when it recurved to the north-east, following a course midway between Japan and the continent. Its rate of progress was 10 miles an hour on the average, rising to 25, and falling to 2½ miles an hour. The diagram, which summarises the author's views regarding the behaviour of the winds, seems to raise questions which call for further inquiry. Thus the south-east wind shows, near the centre of the hypothetical typhoon, an in-curving tendency, which becomes less and less on receding from the centre, till, towards the outskirts of the storm, it is represented as blowing outwards. On the other hand, the north-east wind, immediately contiguous, very decidedly in-curves near the outskirts of the storm, but on approaching the centre the incurvation becomes less and less till it disappears. The statement is made that at a distance of 900 miles from the centre, with a north-east wind, the centre of the typhoon bears right ahead, but with a south-east wind the centre bears south. For a satisfactory examination of the points here raised, and other points, such as the remarkable changes in the form of the typhoon while off the coast of Shanghai, fuller data are required, so that the positions of the centre at different times be more accurately ascertained. The publication of details of the data in an appendix to the work is equally necessary.

PROF. NIPHER'S *Missouri Weather Service Report* for October last is to hand, and is of more than usual interest. The returns show the weather of that State to have been unprecedently warm for the season, the mean temperature of St. Louis, viz., 63°·1, being the highest for any October of the past forty years. At the same time the rainfall was only 0·57 inch, being, with the single exception of 1872, when the rainfall was 0·29 inch, the driest October in forty years. The rainfall was unusually small over no inconsiderable portion of the State, extending to north-west of St. Louis, and in the extreme north-east it amounted only to about a ¼ inch, whereas, on the other hand, within a limited district immediately to southward round Cuba, and over a pretty extensive region in the west, lying to north and south of Kansas City, it exceeded 4 inches. The service is being ably and vigorously worked, eighteen new stations being added in November, so that there are now seventy-three stations, the results of whose observations are quickly sent broadcast over the State and beyond it, reaching Europe even in the third week of the following month. We observe with much satisfaction that the efficiency of this weather service is to be greatly enlarged by the active co-operation of the directors of the principal railroads, who have intimated their readiness to make meteorological observations a regular part of the duties of their station agents at points selected by Prof. Nipher himself.

IN connection with the meteorological work proper of the Missouri Weather Service, Prof. Nipher has been carrying out a magnetic survey of the State during the summers of 1878 and 1879, the expense of the survey having hitherto been met by private subscriptions. The results of this survey are given on a valuable map which accompanies the October Report, showing the lines of equal magnetic variation, and attention is directed to the tendency of the needle to set at right angles to those river-valleys which do not run north and south. A report on the climatology of Missouri is in course of preparation by Prof. Nipher, at the request of the State Board of Agriculture. It is with some surprise we learn that the expense of organising and carrying on this service has been wholly borne by two of the directors and Prof. Nipher. But this state of things the Americans are too sharp-sighted to allow to go on, it being in the interests of the State to provide that a service which is so energetically and effectually working out the climatologies of its various agricultural centres does not run the risk of being starved out for want of the few dollars required to meet its working expenses.

CAPT. TOYNBEE, in the *Journal* of the Meteorological Society for October, gives an interesting comparison of the temperature of the Atlantic during the Decembers of 1877 and 1878 from observations made on the temperature of the sea every four hours of these months by Capt. Watson, of the Cunard steamer *Algeria*. The result shows that for the outward and homeward passages to America the part of the Atlantic traversed by the *Algeria* was 3°·2 warmer in December, 1878, than in December, 1877. A comparison is also made of the mean temperature of the British Isles, and from observations at about forty stations it is shown that the December of 1878 was 8°·0 colder than that of 1877, "in spite of the fact that the sea to the westward was more than 3°·0 warmer." The higher temperature of the sea in December, 1878, would appear not to have extended far to northward, seeing that on the west of Scotland the sea was half a degree colder than in 1877, and in Farö 1°·7 colder, whilst on the north-west of Iceland the sea during December, 1878, was 0°·2 warmer. The interest attached to such an inquiry centres in the point that 8°·0 greater cold over the British Isles during 1878 as compared with 1877 may have been brought about in consequence of the fact that the Atlantic to west-south-westward was more than 3°·0 warmer. It is, for example, possible that this abnormal distribution of temperature in the Atlantic was more or less immediately connected with the more southerly course taken by our European storms since the end of October, 1878, from which have inevitably resulted the unusual prevalence of easterly and northerly winds and the cold weather we have had since. An inquiry more practically important could scarcely be suggested to meteorologists than an investigation of the point suggested many years ago by Sabine as to there being a possible connection between the temperature of the tropical and subtropical waters of the Atlantic during the autumn months and the severity or mildness of our European winters; and certainly no more suitable period could be selected for the inquiry than the last two years, a twelvemonth's warm, fine weather having set in during October, 1877, and a period of cold weather, exceptionally protracted and severe, having commenced in the end of October, 1878.

GEOGRAPHICAL NOTES

AT the meeting of the Geographical Society, on Monday evening, Mr. Wilfrid S. Blunt read a paper entitled "A Visit to Nejd," in which he gave an interesting account of a journey made last winter in company with his wife, Lady Anne Blunt, from Damascus southwards to Jôf and the Jebel Shammar in Central Arabia. The results of Mr. Blunt's expedition may be thus briefly summed up. The oases of Kâf and 'Ittery have now been visited and the Wady Sirhan explored by Europeans for the first time. By taking barometrical observations along its entire length, Mr. Blunt ascertained that the Wady Sirhan from Ezrak to Jôf lies on nearly a uniform level of 1,800 feet above the sea, from which he thinks that it was formerly an inland sea, and is miscalled a Wady or valley. Along the whole distance he roughly surveyed the pilgrim road, marking the position of the wells and the reservoirs made by Zobeyde. Mr. Blunt has also constructed a map of the Jebel Shammar district. The most interesting outcome of his journey, probably, is the collection of a series of facts relating to the physical condition of the great sand desert of Nefud, and in some material respects his observations are at variance with those of Mr. Palgrave. Mr. Blunt appears to be the first to call attention to the deep horse-shoe hollows, called by the Arabs *fulj*, with which the whole surface of the plain is pitted.

IN the present critical state of affairs between China and Japan in regard to the suzerainty of the Loochoo Islands, much

interest attaches to an official document issued in the latter country on the subject. All the Loochoo Islands, the Japanese maintain, are connected by certain geomantic signs in the earth with the Japanese province of Satsuma. The forty-eight characters of the Japanese alphabet are in use there, having been communicated to the islanders by Minamotonotametono. As regards language, they use a mixture of Chinese words and the Japanese alphabet in their literature. They call their own kingdom Okina, or otherwise, Okinawa. As regards religion, they worship Yi Shih, the Great Spirit of Japan, besides other divinities. In many of their domestic customs, too, the Japanese maintain that their practice indubitably indicates their origin.

THE new number of *Les Annales de l'Extrême Orient* contains some ethnographical notes on Thibet by the Abbé Desgodins, illustrated by a map of that country and the neighbouring regions.

THE just published part of *Le Globe* contains a paper by Dr. E. Dufresne, entitled "Une station d'hiver pour les phthisiques dans les Hautes-Alpes," and a third article by M. Venuikof on geographical discoveries in Asiatic Russia.

THE *Bulletin* of the Antwerp Geographical Society contains the text of the "Résolutions et Vœux," presented by the section of the late Commercial Geography Congress at Brussels, and adopted by the general meeting.

AT the last sitting of the Paris Society of Geography a letter from M. Sibiriakoff, one of the promoters of Nordenskjöld's North Asiatic Expedition, was read. This generous gentleman proposes to the Society to send a handsome subscription, in case a French expedition is sent to these parts. But it does not appear likely this suggestion will be taken into consideration.

M. HERTZ, the founder of *L'Explorateur*, the first popular journal of geography established in Paris, died a few days ago at the age of fifty. He was a member of the Council of the Geographical Society and one of the promoters of the Commercial Geographical Society.

U.S. NATIONAL ACADEMY

THE National Academy of Sciences held its semi-annual meeting at Columbia College, New York, October 28th-30th. Prof. W. B. Rogers presided. The meeting was welcomed by Prof. F. A. P. Barnard (President of Columbia College), as being the first use that has been made of the new building recently constructed and not yet quite finished, on the western front of the college grounds; thus appropriately inaugurating it in the interests of science. Prof. Rogers opened the meeting with a few brief but eloquent remarks, descanting on the far-reaching character of the researches which are now most prominently before the scientific world. As instances he cited the proofs brought by Prof. Whitney of the discovery of human remains in the pliocene; the evidence adduced by Mr. Lockyer, showing that in the sun many of the elements may prove to be compounds; the marvellous expositions of "radiant matter" in Mr. Crookes's experiments; and the striking discoveries in the uses of electricity and the telephone. Prof. Rogers is not ready to accept all the new theories which accompany these novel conceptions, but he feels assured that we are on the road toward new truths. The present age, like that which preceded the Newtonian era, has brought together a vast and somewhat chaotic mass of observations, out of which great principles shall be determined. In this work it is to be expected that some of the members of the Academy will bear an active part.

Dr. Henry Draper read a paper on the photography of star spectra, which we gave at p. 83.

Prof. C. A. Young contributed some "Spectroscopic Notes." He showed the want of true achromatism in the ordinary achromatic object-glass. By special arrangement of apparatus and the use of high dispersive powers, he has divided several spectral lines hitherto regarded as basic. The abundance of double lines in the spectrum has a meaning that needs to be investigated; as a curious fact, it is comparable to the excessive number of double stars that the telescope reveals. Prof. Young is prepared to indulge in a doubt as to whether the dark lines are really produced by absorption.

Dr. J. J. Woodward, Surgeon, U.S.A., read an elaborate paper on original researches reported in the second medical volume of the "Medical and Surgical History of the War of the Rebellion." This is a work published by the U.S. Government in several large quarto volumes. In preparing the work, Dr. Woodward consulted 124 different authors. His studies were aided by the use of the very large number of specimens in the pathological collection of the U.S. Army Museum. For various representations, *e.g.*, showing the cicatrices of diphtheritic ulcers, photography and the heliotype were employed. The special researches applied chiefly to diseases of the internal organs, such as dysentery and intestinal catarrhs. The minute changes indicating the beginnings of disease were closely studied. Dr. Woodward's conclusions tend to confirm the more recent and advanced views of pathology.

Dr. J. C. Dalton presented some observations on the structure of the human brain. He divided all brain matter, including the part which extends into the spinal column, into two kinds, the white and the gray. He proceeded to show that the gray kind was in three deposits, which are connected with one another—the spinal cord, the cerebral ganglia, and the extension into the outer sheath of the brain. The connection between these portions was shown to be continuous. The true shape of the corpus striatum and its connection with, as a part of, a circular organ called the surcingle, was demonstrated; and it was also shown that the lobes of the brain presented the appearance of being lapped together and doubled over around the crus cerebri. In the discussion that followed, Dr. Woodward stated that the brain had been so prepared by a peculiar process, that a single one was sawed into 1,000 slices for microscopical examination.

Prof. A. Guyot presented some remarks on a new map of the Catskill Mountains, and on the topographical relations of that mountain group to the adjacent regions of the Appalachian system. The excellent work that has been done by Prof. Guyot in the survey of the Catskill region was described some months ago in a paper read before the New York Academy of Sciences: copies are now furnished of the original map that was then exhibited. The object of the present paper was to call attention to the geological problems exhibited by the Catskill plateau. The author did not regard the carving of the mountains as glacial work, though the evidence of glacial scratches was not wanting. The process which had taken place, he thought, was an elevation of the whole district. But at the time of that rise the Adirondack formation was already in position, and by it the Catskill plateau was squeezed as it rose. The mountains which now occupy the place of that plateau were left by erosion, their valleys being carved out by the rivers. Prof. James Hall, in the discussion which followed, expressed himself as delighted with the adhesion of so good an observer as Prof. Guyot to this theory of the formation of mountains by erosion, and not by their separate upheaval. Prof. Rogers described an instance where one of the Shenandoah Mountains could scarcely have been formed by a separate upheaval, for all its strata were horizontal from bottom to top; but the surrounding region was full of the evidences of disturbance.

Prof. James Hall exhibited some new and remarkable forms of crinoids from the Lower Helderberg formation. These specimens were obtained partly in New York State, and partly in Tennessee. They were from three to four inches in diameter, and of varying shapes, no two alike, though mostly spheroidal; some were hemispherical or much flattened; others were turbinated. It was at first suspected that these were expansions of the bulbous root of crinoids, but subsequent observations indicated that these are the summits of the animal. They are made up of polygonal plates, but the arrangement is not distinctly radial, and its stellate character is greatly obscured. The specimens, which are now quite numerous, seem to be overgrowths, and present great difficulties in classification.—Prof. Hall read also a paper upon another Silurian fossil, *Lycopoditis vanuxem*. This has been regarded as a plant, allied to the ferns: a more thorough study of the subject has convinced Prof. Hall that this fossil was an animal form. It is found in quantities that cover many acres with a thickness of five to fifteen feet. The attention of the Academy was also called to the question as to the classification of *Stomatophora*, a coral found upon masses of favosite, and in the same horizon as the curious crinoids. In the discussion which followed, Prof. Newberry called attention to the sponge-like appearance of the crinoid specimens, suggestive of a missing link between crinoids and sponges.

Prof. Asaph Hall read a brief paper on this year's observations on the satellites of Mars. The discrepancies of position of Deimos are very small. It is found that Phobos comes to its