

DR. RICHARDSON asks us to say that in his article on Fleuss's New System of Diving in last number, p. 63, col. 2, 25th line from bottom, "fully seven minutes" should be "forty-seven minutes."

THE additions to the Zoological Society's Gardens during the past week include a Yellow Baboon (*Cynocephalus babouin*) from West Africa, presented by Mr. Cecil B. Hankey; a Colared Peccary (*Dicotyles tajacu*) from South America, two Domestic Sheep (*Ovis aries*), presented by Mr. H. Sandbach; a Little Grebe (*Podiceps minor*), British, presented by Mr. A. F. Buxton; a South American Rat Snake (*Spilotes variabilis*) from South America, presented by Mr. Thomas Harrod; two Geoffroy's Cats (*Felis geoffroyi*) from Paraguay, two Barbary Falcons (*Falco barbarus*) from North Africa, a Red-throated Diver (*Colymbus septentrionalis*), British; a Common Curlew (*Numenius arquata*), European, deposited; two Common Tiskins (*Chrysomitris spinus*), a Reed Bunting (*Emberiza schenckus*), a Pied Wagtail (*Motacilla yarelli*), British, purchased; a Gaimard's Rat Kangaroo (*Hypsiprymnus gaimardi*), two Smooth Snakes (*Coronella levis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

THE "URANOMETRIA ARGENTINA."—The publication of this great and meritorious work is just announced, though, so far as we know, the complete volume has not yet reached Europe. The system of observations upon which it is based was designed and commenced by Dr. B. A. Gould, the distinguished director of the Argentine Observatory, immediately after his arrival at Cordoba in September, 1870, on accepting the superintendence of the new establishment, and while awaiting the completion of the observatory buildings and the arrival of telescopes which had been ordered in Europe, but delayed by the outbreak of the Franco-German war, and the work upon it has been continued with more or less attention to the present year. It was intended to represent in a series of charts and accompanying catalogue the sky from the south pole as far as 10° north of the equator, as it appears to the naked eye, showing all stars down to a round magnitude fixed at 7.0, with their characteristics of duplicity, variability, and colour, and the milky-way in all its ramifications and gradations of brightness. The actual observations were assigned to the four assistants, Messrs. Rock, Davis, Hathaway, and Thome, who had proceeded to Cordoba from the United States, the first three returning home at the expiration of three years, when the Uranometry was already finished as to its general details. Mr. Thome subsequently reviewed the entire work twice, and with the result that Dr. Gould considers it improbable that any star so bright as 7.0, on a scale which it has been desired to extend accurately from Argelander's, will have escaped insertion, while notwithstanding the great degree of nicety implied, he thinks the magnitudes are essentially correct to the nearest tenth. During the first two years the work was continued on all cloudless nights, both summer and winter, at an average of six hours' work each night. The total number of stars of which the magnitudes have been assigned is 10,649, and the total estimates of magnitudes 44,510, or more than four for each star.

With the view to having a uniform basis for estimates of magnitude throughout the whole heavens, Argelander's magnitudes for a region lying from 5° to 15° north of the equator, having the same meridian altitude at Bonn and Cordoba, were collected by classes, and "the stars of each class then assorted and shaded into the adjoining ones until a scale of tenths was formed." . . . "The scale as finally adopted resulted from the accordant estimates of all four assistants for each tenth up to 7.0." A "Type-belt Catalogue" of 722 stars was formed in this way, intended, as we have intimated, to serve as a standard for all future determinations of magnitude, in whatever part of the heavens. All the stars occurring in the "Uranometria" have been observed for accurate position at least four times with the meridian circle, and a general catalogue will appear in due course.

The charts are thirteen in number, and an index-chart is added showing at once the whole extent of the Uranometry. The printing was effected by the photolithographic process, as the most accurate and least expensive. Photographic nega-

tives of the manuscript charts were taken, thus permitting their exact transfer to the stones. The chief trouble experienced in the printing was to give the star-dots the proper blackness, and yet to keep the milky-way within reasonable shade.

In a special chapter, Dr. Gould collects all variable and suspected variable stars, with particulars, thus providing interesting work for those amateurs who can command the southern heavens, and work from which much may be learned.

From a discussion of the general distribution of the stars throughout the sky, Dr. Gould is led to conclude that "there is in the sky a girdle of bright stars, the medial line of which differs but little from a circle inclined to the Galactic circle by a little less than 20°. The grouping of the fixed stars brighter than 4.1 is more symmetric relatively to that medial line than to the Galactic circle, and the abundance of bright stars in any region of the sky is greater as its distance therefrom is less. The known tendency to aggregation of faint stars towards the milky-way is according to a ratio which increases rapidly as their magnitudes decrease, and the law of which is such that the corresponding aggregation would be scarcely, if at all, perceptible for the bright stars." These facts, Dr. Gould continues, indicate the existence of a small cluster, within which our own system is existentially situated, but which is itself not far removed from the mean plane of the Galaxy; this cluster he considers to be of a flattened shape, somewhat bifid, and consisting of rather more than 400 stars, of an average magnitude of 3.6 or 3.7, but comprising stars from the first to the seventh.

We have abridged these particulars from an interesting article on the "Uranometria Argentina," in the Buenos Ayres *Standard*.

It is impossible to avoid expressing admiration for the scientific spirit and enlightenment of the Government of the Argentine Republic in providing means for the execution of this important work, the first astronomical contribution from their National Observatory, but, we believe, to be followed by others, for which materials are completing, and which, it cannot be doubted, under the superintendence of Dr. Gould, will collectively secure for the Observatory of Cordoba a high position in the history of astronomical establishments, and, in connection with other enterprises of which we hear from time to time, for the comparatively small nation by which it is supported, the respect and good wishes of the scientific world.

THE "LICK OBSERVATORY," CALIFORNIA. From San Francisco we receive details of recent progress towards carrying out the intentions of the will of the late James Lick, who died October 1, 1877, bequeathing the sum of 700,000 dollars to trustees for the purpose of purchasing land and erecting upon it "a powerful telescope, superior to and more powerful than any telescope ever yet made," with an observatory and other appurtenances, to be conveyed eventually to "the Regents of the University of California." The first site considered was at Lake Tahoe, but it was soon rejected; Mount St. Helena, at the intersection of Napa, Sanoma, and Lake counties, was then visited; it is upwards of 4,300 feet high, and was known to have atmospheric conditions favourable for astronomical purposes. Mr. Lick spent one night upon its summit. Among other points visited was Mount Hamilton, the elevation of which is still greater, and Mr. Lick finding that its advantages, so far as known, were equal to those of the former mountain, finally determined upon Mount Hamilton as the site of his proposed observatory; it is something less than fourteen miles east by south, from San José in Santa Clara county. A road to the summit twenty miles long was commenced in 1875, and finished in December, 1876, at the expense of Mr. Lick, and surroundings to the extent of more than 1,500 acres were secured to form the observatory property. The site was thus, contrary to what has been generally stated, decided upon before Mr. Lick's decease, and Prof. Newcomb had been asked to test the capabilities of the station, to obtain a guide as to the size and character of the instrument or instruments to be provided; Prof. Newcomb was too much engaged upon his official duties to undertake this work in 1877, and recommended application to be made to Mr. S. W. Burnham, of Chicago, who arranged last April to visit Mount Hamilton, with his own 6-inch Alvan Clark refractor; he arrived in the middle of August, and after spending thirty-two nights upon the mountain, up to September 27, all of which except five were extremely favourable, he appears to have agreed in opinion with Prof. Newcomb, who was able to visit Mount Hamilton early in October, that it is "the finest observing location in the United States." With regard to the size of the great telescope to be

mounted there, much will probably depend upon the success attending the construction of the 30-inch refractor, which Alvan Clark and Sons have engaged to furnish for the Imperial Observatory at Pulkowa, but the trustees purpose to secure a 12-inch to be used in the observation of the next transit of Venus, and to remain one of the permanent fixtures of the Observatory.

San José is in about $121^{\circ} 50'$ west of Greenwich, and $37^{\circ} 16'$ N. Of Mount Hamilton it is stated that, "although practically out of the coast range fog-belt, an occasional gale blows the mist across the Santa Clara Valley from two points—Monte Rey Bay and the Sand-hill Gap just south of the city. On extraordinary occasions this fog reaches the crest of Mount Hamilton, but ordinarily the sky is cloudless all summer." The trustees have their work well in hand, though there remains much to be done before the whole design of the munificent founder of the observatory can be realised. It is intended that a meridian-circle, an instrument necessarily requiring considerable time in its construction, and other accessories, shall be provided in addition to the great telescope and the smaller equatorial. If we are not mistaken, Mr. Burnham has added a number of new double-stars to our lists, from his tentative work with the 6-inch refractor on Mount Hamilton.

GEOGRAPHICAL NOTES

A RUSSIAN journal announces the early departure of a scientific expedition, under the direction of Lieut. Onatsevitch, to make hydrographic investigations in the Sea of Japan and the Sea of Okhotsk. One of M. Onatsevitch's assistants, Ensign Heller, has already gone to Vladivostock in the cruiser *Asia*, taking with him numerous instruments with which the hydrographic department has equipped the expedition. M. Lanevsky Volk and four other naval officers will accompany M. Onatsevitch by way of Siberia. The object of this expedition is to fill lacunæ in the works of Babkine, Bolchew, Staritsky, Yelagnine, and others. It will have to explore, especially from the hydrographic point of view, the mouths of rivers which fall into the Sea of Japan, from the southern frontier of Russia to the Bay of Castries. It will make geodetic observations in the south-west part of Peter the Great Bay and at the mouth of the Amour. Lastly, it will study the water-courses, and the east and south parts of the Isle of Sakhaline, the district of La Perouse, &c.

AT the meeting of the Geographical Society on Monday evening the secretary read a paper by Capt. A. H. Markham on the Arctic campaign of 1879 in the Barents Sea. The title of the paper, however, is somewhat of a misnomer, as the narrative was chiefly confined to the proceedings of the *Isbjörn*, to which we have already referred. Some few details were also furnished as to the trip of the second Dutch expedition in the *Willem Barents*. Among the various matters of interest dealt with, perhaps one of the most interesting was the description of a large glacier on one part of the coast of Novaya Zemlya. This glacier Capt. Markham ascended, and walked along it for some two or three miles into the interior; he found numerous fissures in it, at the bottom of which ran rivulets, and some of which were so deep and wide that they could not be crossed except by making a long *détour*. During the trip a considerable amount of information was gained in regard to the movements of the ice in the Barents Sea, and the best season for future attempts at exploration, especially in the direction of Franz Joseph Land; it was made quite clear, however, that a larger vessel and the aid of steam are absolutely necessary to secure really useful results.

WITH reference to the discovery of the sources of the Niger, it is stated that MM. Zweifel and Moustier traversed the Hokko and Limbah countries, which, covered with forests on Winwood Reade's visit ten years ago, was now found very little wooded, the demand for the oily almonds of the palm tree having induced the natives to plant oil palms in the place of forests. A Koranks mission told the explorers that the Niger passed between Mount Lemat and another mountain, and that its three sources, the junction of which formed a small lake, were two days' march from the latter. After many dangers and privations, the travellers found the main source near the village of Koulaks, on the frontier of Koranks, Kissi, and Kono, its native name being the Tembi. The travellers could not enter the Sangara country on the right bank of the river; but they are confident that the Tembi is the longest of the three streams mentioned by

the Koranks, and consequently the origin of the Joliba or Upper Niger.

M. DE LÉSSEPS is to leave in a few days for Central America, in order to survey the concession granted by the Columbian Government for a sum of 750,000 francs, which was paid a few months since. The surveying within a certain time is an obligation which, not being complied with, would render the concession void. The promoter of the new canal took leave of the Geographical Society of Paris on November 21.

THE Freie Deutsche Hochstift at Frankfurt has received further news from Dr. Gerhard Rohlf's and his travelling companion Dr. Stecker, according to which the two travellers were already on a steamer sailing for Malta. Herr Rohlf's is said to be so exhausted that he intends to abstain from any further African exploring expeditions. Amongst the objects which the travellers were robbed of are all their diaries, notes, and scientific instruments, besides the rich collection of presents sent by the Emperor of Germany to the Sultan of Wadai.

No. 10 of Band xxii. of the *Mittheilungen* of the Vienna Geographical Society, contains papers on the Ethnological Conditions of South Russia at their chief epochs, from the earliest times to the first appearance of the Slavs, by Dr. Jar. Vlach; the Mississippi and its Basin, by Dr. Hesse-Wartegg; the district of Shushu, in Transcaucasia, by Carla Serena. Among the notes is a valuable statistical and geographical account of the Vilayet of Trebizond, from an Austrian Consular Report. As a supplement to the *Mittheilungen* is announced a *Zeitschrift für wissenschaftliche Geographie*, edited by Julius Iwan Kettler, assisted by a staff of eminent German geographers. This journal will embrace all departments of mathematical, physical, commercial, ethnological, descriptive, and historical geography; and promises to prove one of the most valuable geographical journals published. It will be issued every two months.

CAPT. HOWGATE has published a neat little volume on the cruise of the *Florence* in the preliminary Arctic Expedition of 1877-8. He gives many interesting notes made during the wintering in Cumberland Gulf, both of the country and people. The scientific results have been published separately, and these we shall notice in detail.

THE *Cape Argus* announces the starting in October of an African Expedition from the Cape, under, and at the expense of, two young Englishmen, Messrs. Beaver and Bagot. They have only two bullock waggons and a few blacks, but their ambitious programme is to make a "General and Astronomical" survey of the whole region between the Zambesi and the Albert and Victoria Nyanzas. This region is ignorantly described in the *Argus* as being almost totally unexplored. The two light hearted young Englishmen allow themselves four years to accomplish their gigantic undertaking. We shall watch their progress with curiosity. They are stated to have had an interview with the Geographical Society before leaving; the officials of the Society, we believe, are not able to recall the incident.

IN a letter to M. Sibiriakoff, Prof. Nordenskjöld expresses his intention of undertaking another voyage to the northern coast of Asia as soon as circumstances permit. "After my return," he says, "I think of spending a year on preparing an account of the voyage of the *Vega*, and it is my desire then to continue the exploration of the Icy Ocean along the coast of Siberia, making the River Lena the point of departure, and the New Siberian Isles the basis of operations. For the object I have proposed to myself—namely, the rendering of the northern part of Asia completely accessible to commercial shipping—the prosecution of these researches is of paramount importance."

A TELEGRAM to the *Moscow News*, dated Katt Koorgan, November 14, gives the latest intelligence received from the Russian scientific expedition appointed to explore the Oxus or Amu Darya, and report on the best route for a great Central Asian railway. On October 19 the members met the Khan of Khiva, who said he would give orders in due time for the demolition of the dams at Bant and Shamurat. The eldest men among the Yomouds and Tschenderen pledged themselves to procure labourers for the purpose of cleaning out the bed of the Usboi between Sary Kamysch and the Caspian Sea.

THE death is announced of the Dutch lieutenant, Koolemans Beynen, who accompanied Sir Allen Young in his two *Pandora* voyages, and last year was second in command of the Dutch