

With regard to the volume of discharge of the Congo, from careful observations made at Stanley Pool, Mr. Stanley calculated that it reached 1,436,850 cubic feet per second when the river at that point was at its lowest. During flood it rises, he believes, twelve feet higher, giving a volume of 2,529,600 feet per second. If these estimates are correct, then Mr. Stanley calculates that the river discharges into the sea three million cubic feet of water per second.

Mr. Stanley's new work is so fully occupied with the details of the founding of his numerous stations, his dealings with chiefs and people, his road-making and

other engineering enterprises, and the general work of engineering the enterprise, that there is little space left for geographical details. He does give a list of the products of the Upper Congo region, but as this is entirely from a commercial standpoint, its value to science is not great. The various species of palms, as might be expected, abound on the banks of the river and its islands, the oil-palm being the most valuable from a commercial point of view. Then come the various species of india-rubber plants, besides other gum-producing trees. Ivory, Mr. Stanley reckons only fifth in rank among the natural products of the Congo. He presumes that there are

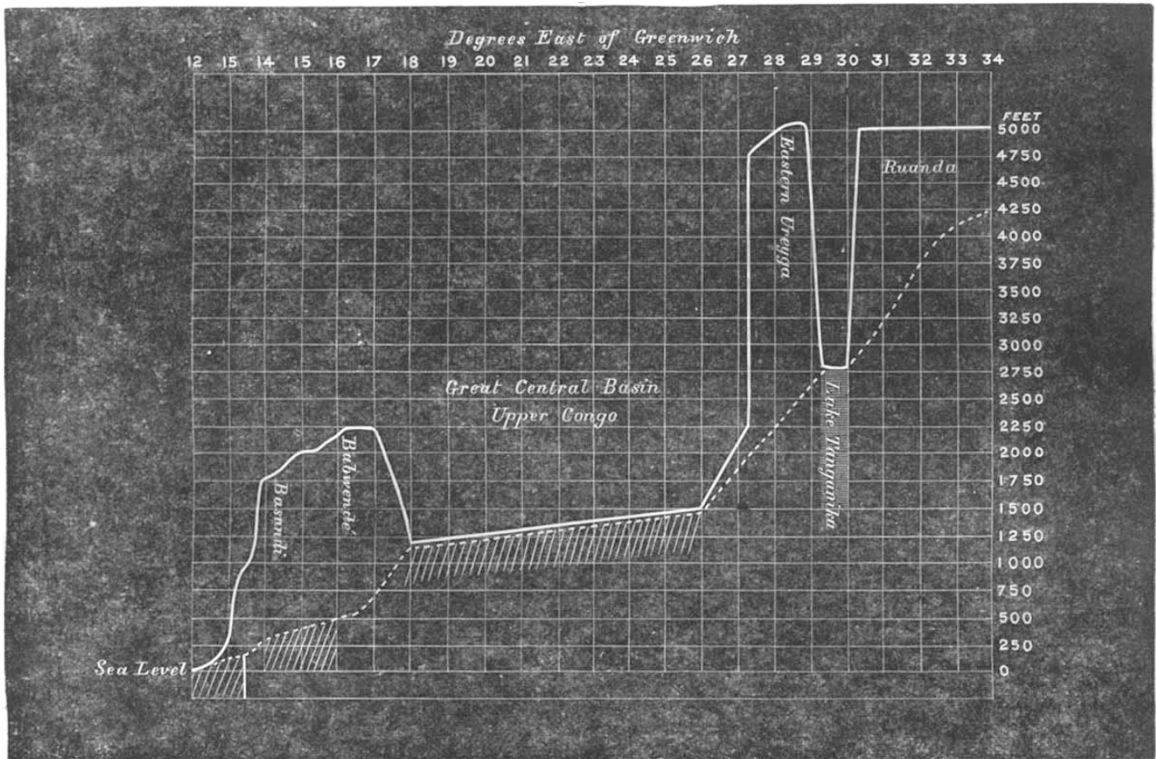


FIG. 6.—Profile of Country between the Sea and Ruanda, across the Congo Basin.]

almost 200,000 elephants in about 15,000 herds in the Congo basin, each carrying an average of 50 lbs. weight of ivory in his head. Iron, he tells us, is abundant. The copper mines near Philippeville supply a large portion of Western Africa with their ingots. Plumbago is also abundant, and gold has been found in the beds of streams. Mr. Stanley gives a long list of tropical plants which abound in the Congo basin, while several European vegetables and fruits have been found to thrive. The Arabs, moreover, he tells us, are introducing the large-grained upland rice with extraordinary success. He adds many details concerning the trade, actual and possible, of the Congo region, his object, of course, being to show

that here exists a magnificent field for the European trader, European capital, and European settlers.

Mr. Stanley's work is chiefly of value as telling the story of one of the most unique and interesting enterprises on record. This story he tells with abounding interest; there are many incidents throughout the volume told with the dramatic effect so well known to readers of "Through the Dark Continent." The work of founding the Free State has been well begun, but it is only the beginning; for the sake of its complete success it is to be hoped that nothing may occur to sever Mr. Stanley's connection with it until it has been firmly established.

#### NOTES

THE Royal Society's *conversazione*, held on the evening of June 10, was a very great success, and those who had the labour of bringing the various things together must have felt themselves amply rewarded by the great interest taken in them by the Fellows and guests, both ladies and gentlemen, who attended. Among the objects exhibited we may note the following:—Geological map (unpublished) of Palestine and

Arabia Petraea, exhibited by Prof. Edward Hull, F.R.S.; original drawings of the skeletal, digestive, and vocal organs of birds, made in the years 1842-46, drawn and exhibited by Prof. W. K. Parker, F.R.S.; Sketches of the eclipse of the moon, October 4, 1884, and a very beautiful series of sketches of the wonderful sunsets and after-glows, painted and exhibited by Mr. W. Ascroft; star-charting by photography (enlarged prints from negatives made in 1883 and 1884), exhibited by Mr. A. A.

Common, F.R.S.; electrical influence machine, exhibited by Mr. James Wimshurst; New microscope with novel fine adjustment and sub-stage arrangements, exhibited by Mr. Crouch; large Nicol prism polariscope, for projecting axes of crystals, &c., on the screen (improved form), exhibited by Messrs. Harvey and Peak; Tate's calculating machine, exhibited by the inventor. By means of this machine long operations in the fundamental rules of arithmetic can be performed with rapidity and unflinching accuracy. Eight figures can be multiplied by eight figures in about fifteen seconds. New forms of spectroscopes, exhibited by Mr. A. Hilger; photographs of fractures of railway carriage and waggon axles, tested to destruction by Mr. Thos. Andrews, Wortley Iron Works, near Sheffield, exhibited by Mr. Andrews; three cases of living animals: (1) Examples of the Tuatera (*Sphenodon punctatus*) from New Zealand. This reptile is remarkable as deviating from all the lizards in its osseous structure, and is considered by Dr. Günther (*Phil. Trans.*, 1867, p. 620) to constitute an order by itself—*Rhynchocephalia*. (2) Large bird-eating spider of the genus *Mygale* from Burmah—probably *M. fasciata*. (3) Butterflies and moths, showing the way in which living insects are exhibited in the Zoological Society's Insect House, exhibited by the Zoological Society of London. A series of microscopic sections of vegetable tissues, prepared and lent by Mr. J. E. Sunderland, of Hatherlow, near Stockport, showing remarkable effects of double and triple anilin staining; a series of botanical microscopic preparations, mounted by Charles Vance Smith, of Carmarthen, being part of a series prepared by him to illustrate the textbooks of Julius Sachs and Otto Thomé, exhibited by Prof. Moseley, F.R.S. A series of slides with stained specimens of *Tenia echinococcus* of the dog, prepared and lent for the occasion by Dr. J. Davies Thomas, of Adelaide, Australia, in illustration of his paper on the artificial rearing of this parasite by feeding with human hydatids (to be read before the Royal Society, June 18); a slide showing the same species of tapeworm, reared by Mr. Edward Nettleship, F.R.C.S., by means of hydatids obtained from the lungs of a sheep (*Proc. Roy. Soc.*, 1866). To compare with the above:—Specimens, in bottles, of *Tenia serrata*, *T. marginata*, and *T. caninus*, &c., artificially reared by Dr. Cobbold, by feeding dogs with the scolices appropriate to each particular species. Also adult examples of *Tenia cucumerina* and of *T. canis lagopodis* (*T. literata*), the latter from Iceland, prepared by Dr. Krabbe, *Bothriocephalus dubius*, and other species from the cat and dog, exhibited by Dr. Cobbold, F.R.S. Case of gems, including a great Indian diamond, the largest known opal, a series of cat's eyes, and allied mineralogical specimens, exhibited by Mr. Bryce Wright, F.R.G.S.; "Frith's Selenium Cells," showing the alteration of resistance and photo-electric currents due to the action of light on selenium, exhibited by Prof. W. Grylls Adams, F.R.S.; a sulphur cell, the electrical resistance of which, like that of selenium, is reduced by light, exhibited by Mr. Shelford Bidwell. The sulphur has been heated while in contact with silver, and therefore contains some sulphide of silver. The electrodes are of silver. The original integrating machine, invented by Mr. C. V. Boys; engine-power meter which has been developed from the same, exhibited by Mr. Boys.

WE give in another column, on the *audi alteram partem* principle, the first part of an address recently given by Dr. Janssen, putting before us the French view of the Prime Meridian question. It will be gathered from it that the feeling in France is strongly against the conclusion at which the Washington Congress arrived. Taking the world as it is, however, much as a strictly neutral prime meridian might be to be desired, the general opinion will probably be that the Congress arrived at the only *practical* solution.

WE are glad to see that University College, Liverpool, is about to appoint a Professor of Engineering. An endowment of 375*l.* has been raised, and the advertisement of the Chair appears this week in our pages. We understand that a certain amount of professional work, such as is consistent with a due fulfilment of the duties of the Chair, will be permitted, and recognised as enabling the Professor to keep himself in touch with the life of the practical world. The College already has endowed Chairs of Mathematics, Physics, Chemistry, and Biology, in addition to the Literary and Medical Departments: it has lately become a part of the Victoria University, and in many ways it shows signs of health and vitality.

IN the production of the first part of the Philological Society's new English Dictionary, the editor, Dr. Murray, was obliged to advance 150*l.* out of his own resources, and, further, to incur a debt of 500*l.* The delegates of the Clarendon Press, who are publishing the Dictionary, decline to contribute more than 100*l.* towards the payment of this debt, and the Council of the Philological Society deem it their duty, therefore, to appeal to the public to relieve Dr. Murray from a debt incurred on behalf of what is really a national undertaking. It is to be hoped that there will be no difficulty in obtaining the sum required; those of our readers who are inclined to help should send their subscriptions to Mr. Benjamin Dawson, the Mount, Hampstead, London, N.W.

THE Spanish Commission of Medical Inspection has examined the composition of the liquids and virus employed by Dr. Ferran against cholera. The opinion of the majority of the members is that the presence of Koch's *Bacillus virgulus* cannot be questioned. After some opposition, the Spanish Government granted the necessary authorisations for inoculation, which has been practised on a number of doctors and four newspaper writers. It is said, moreover, that all the inoculated patients experienced during the first twenty-four hours after the operation all the symptoms of cholera with more or less intensity, but without any fatality having occurred. When twenty-four hours had elapsed, a favourable reaction took place. The question which remains to solve is the extent of the protection resulting from Dr. Ferran's system. The numbers given are in favour of the new theory, but all the documents coming from Spain on cholera must be received with caution, owing to the intense panic prevailing in that country since the last outbreak of the plague was noticed in Valencia. A fact curious to notice is the tendency of the rural populations of this province to congregate in the cities in spite of all the measures taken against this exodus. *El Imparcial* states that not less than 7000 people have located themselves in the chief city.

PROF. PASTEUR, the *Standard* Paris correspondent states, has published an interesting letter from Dr. Ferran, concerning vaccination for cholera. In this letter Dr. Ferran asserts that the results obtained become every day more irresistibly eloquent. The experience of Alcira had been confirmed in numerous other towns. Anti-cholera vaccination had been practised upon all classes of society, but in many places the greater number of those operated upon belonged to the pauper class, and the results proved no less satisfactory. While of opinion that one inoculation is effective, Dr. Ferran recommends that it be repeated, in order to make assurance doubly sure. In reference to the official prohibition of vaccination for cholera (which has since been cancelled in deference to public opinion), Dr. Ferran intimates that the measure was taken in consequence of two persons belonging to an already cholera-visited family dying the day after vaccination. These casualties Dr. Ferran attributes to the use of impure lymph, and states that in 16,000 cases, for which he had personally inspected the lymph, no evil results had followed. It is



not claimed that vaccination for cholera will give actual immunity, but that it will alleviate the attack whenever it may come. Anti-cholera vaccination, affirms Dr. Ferran, can never itself be the cause of an attack. If an attack comes within five days of vaccination it must have been previously contracted. Dr. Ferran attributes the discovery of anti-cholera vaccination to the theories of Prof. Pasteur.

DR. CORNISH, known for his investigations into the nature of cholera, has proposed (according to *Allen's Indian Mail*) that as between 300 and 400 persons are every year judicially sentenced to death in the Indian Empire and its dependencies, a number of these, say one-tenth, be made, with their own full knowledge and consent, subjects of experiments as to the spread of cholera, on condition that if they escape their lives be spared. An international commission of experts might, he suggests, be appointed to determine upon the experimental tests needed to ascertain if cholera is or is not a disease capable of being communicated from person to person. This would do more in the space of a few months to help forward the inquiry into the nature of cholera than has been accomplished by indirect observation during the last century. But if the principle underlying this proposal is admitted by the Indian Government, it might be extended to other most important experiments, such as the various causes and cure of cholera, the cure for snake-bites, hydrophobia, and the like.

THE following is an official statement of the number of visitors to the Whitechapel Fine Art Exhibition during the time it was open in March and April last:—Saturday, March 28, 1008; Sunday, March 29, 2494; Monday, March 30, 2622; Tuesday, March 31, 3332; Wednesday, April 1, 3292; Thursday, April 2, 1823; Good Friday, April 3, 3703; Saturday, April 4, 3269; Easter Sunday, April 5, 2717; Easter Monday, April 6, 4332; Easter Tuesday, April 7, 3720; Wednesday, April 8, 2944; Thursday, April 9, 2872; Friday, April 10, 1942; Saturday, April 11, 3348; Sunday, April 12, 3345; total for 16 days; 46,763. The Exhibition was opened in the afternoon of March 28, admission being by ticket only until 6 p.m., 6 to 10 p.m. free; after that it was opened free from 10 to 10 daily (Sundays 2 to 10).

AT the meeting of the International Committee of Meteorology (instituted by the Congress held at Rome) in the beginning of September next, at Paris, the following topics will be considered:—Report of the Secretary on the work of the Committee since the Copenhagen meeting; report of MM. Brito Capello, Hildebrandson, and Ley on the observation of Cirrus; Should a third International Congress be convoked? the establishment of stations of the first order on the Congo; discussion of the meteorological *résumés* issued in different countries, and eventual preparation of a more uniform plan; the utility of American meteorological telegrams proposed by Gen. Hazen, and organisation of their distribution in Europe; best means of securing the timely reception of meteorological telegrams; ought barometric heights to be reduced to the pressure under 45° of latitude? Should meteorological hours be reckoned from 1 to 24 in conformity with the resolution of the Washington Conference? Designation of a completely covered sky as to the form of clouds; definition of days of rain and snow; should not a uniform height above the ground be recommended for pluviometers? recent progress in the more exact measurement of snow; international meteorological tables; modification of the rules for administration of the International Meteorological Committee. Communications should be addressed to Mr. R. H. Scott, F.R.S., Meteorological Office, 116, Victoria Street, London, S.W.

IN a communication to the Physical Society of Berlin, on April 24 Herr Kayser read a note concerning his ex-

periments on the condensation of gases on surfaces, and Bunsen's criticisms thereon. In a paper published last year Bunsen had declared that the previous results under this head were erroneous, inasmuch as the observers had proceeded upon the false assumption that a maximum of condensation was attained in a few hours or days, Bunsen himself finding that the condensation might go on slowly for years. Herr Kayser, however, had, in reply, pointed out that Bunsen had not been sufficiently careful in cleaning the glass surfaces on which his experiments were made, and he now had the satisfaction to announce that Bunsen, after repeating his experiments with the necessary precautions, had arrived at the same conclusion as himself, namely, that there was no demonstrably slow condensation, but that the maximum of condensation was reached with extraordinary rapidity.

THE project to build a "Grassi-Museum" has now assumed a tangible shape at Leipzig, inasmuch as the site for the new museum has been chosen. The new museum is to contain the collections belonging to the Ethnographical Society, which are now crammed into premises entirely unsuitable for them.

DR. OTTO ZACHARIAS has recently made interesting researches concerning the freshwater fauna of the Silesian Riesengebirge and the county of Glatz. The Royal Prussian Academy of Sciences has just granted him a sum of money towards the continuance of his labours.

MR. HOWARD NEWTON, assistant municipal engineer, of Singapore, has published a series of notes and experiments on the different kinds of timber in ordinary use in the Straits Settlements. The pamphlet contains observations on the forests adjoining our colonies in the Malay Peninsula, and the need already of conservation. The trees are felled in large numbers for ordinary use, and the jungles are cleared and exhausted by the Chinese gambier and pepper planters. Twenty specimens of woods are then described in detail, and finally an account of the mode in which the experiments were conducted and elaborate tables of the results follow. The breaking weights of some of the timbers tested were as follow:—1850, 1836, 1656, 1374, 1286, and 1284 lbs. Notes on the toughness, fracture, deflection, &c., are also given. It is curious to notice that some of the finest trees near Singapore (in the Johore forests) have no botanical equivalents. Mr. Newton specially mentions a tree called by the Malays the *ballow*, which grows from 60 to 100 feet in height, with a diameter of 3 to 6 feet. It is a close-grained, tenacious, hard, heavy wood, very valuable for building. It is called popularly Johore teak, although it does not belong to the natural order *Verbenaceæ*.

THE Russian Geographical Society has awarded a gold medal to M. Klossowski for his work on thunderstorms in Russia. We take the following from M. Rykatcher's analysis of this remarkable work. The initiative of thunderstorm observations having been taken by the Geographical Society in 1871, no less than 1821 regular observations were made during the years 1873 to 1882 at 176 different stations. For 145 of them annual and monthly averages were calculated, and gave the following interesting results. The minimum of thunderstorms (5 to 7 per year) is found in the north; their number increases towards the Gulf of Finland (with a depression south of it) and on the middle Volga, where it reaches 12 to 15 per year, and remains nearly the same throughout middle and southern Russia, with a slight decrease in the Crimea. A rapid increase in the number of thunderstorms is found in Western Russia, especially in Bessarabia (33 at Kishineff), as also in the East, at Tamboff, Penza, and on the Lower Don. The maximum of thunderstorms, 41 per year, is found at Tiflis. As might be expected, the thunderstorms are more frequent where the summer rains and the relative humidity are the greatest. Their diurnal maximum is between

3 and 6 p.m., and the minimum between 3 and 6 a.m. Availing himself of the synoptical maps of Hofmeyer for 1874 to 1876, the author compares, day after day, the thunderstorms with the cyclones which reach Russia, and he arrives at the important conclusion that thunderstorms in Russia—without exception—accompany cyclones, their appearance being influenced at the same time by the local state of temperature and humidity. Marié-Davy, Mohn, and others subdivided thunderstorms into cyclonic and local ones, and the continental ones were reckoned to the second category; but M. Klossowski shows that even in so continental a climate as that of Russia, thunderstorms depend also directly on cyclones. They appear on the borders of the cyclones and mostly in their south-eastern quarters. By further researches, the author arrived at the conclusion that thunderstorms in Russia are secondary or tertiary cyclones appearing on the borders of a cyclone, and thus explains the oscillations of the barometer during thunderstorms, already noticed by Messrs. Scott, Mascart, and others. Hail is obviously closely connected with thunderstorms. It also accompanies cyclones and is always concentrated in its south-eastern quarter, in the zone of 750 to 760 millimetres' pressure. On the whole, the work of M. Klossowski is a valuable contribution to the study of electrical energy in the atmosphere.

In a lecture delivered in the Institute of the Khedive at Cairo, Dr. G. Schweinfurth has given some account of the seats of manufacture of prehistoric stone implements in the desert of Eastern Egypt discovered by him in 1876 and 1877, and again visited and examined by him in his last journey. The two spots referred to are in the Wadi Sanur and Wadi Warag. The former lies due east of Beni Suef at a distance of thirty miles from that town; the latter is in the upper portion of the Wadi at the place where this water-course begins to be discernible as a longitudinal depression on the heights of the western part of northern Galala. Dr. Schweinfurth's belief that the two sites in question are really those of ancient manufactories of stone implements is grounded partly on the presence of accumulations of cores in the beds of the streams, partly on the fact that the raw material is found abundantly in the neighbourhood. The source of the raw material is a bed of flints belonging to the upper nummulitic limestone corresponding to that which exists behind Cairo. Implements and utensils indicating a stone period have now, Dr. Schweinfurth remarks, been found even in the very heart of Africa, and these show a surprising resemblance in form to those discovered in Europe. Those recently obtained by himself from Sanur and Warag, however, are of a special type, and Dr. Schweinfurth regards them as clearly distinguished from the forms already familiar by the fact that the facets are usually only upon one side and are very seldom seen surrounding the entire core.

In connection with the trial of Pel for poisoning, which has just resulted in Paris in the condemnation of the accused, some interesting experiments were conducted at the Morgue with a view to testing whether it was possible, as alleged by the prosecution, that the murderer could have got rid of the body of one of his victims by burning it piece by piece in a common stove. The professional witnesses stated that they procured a body weighing sixty kilogrammes. They removed from it forty kilogrammes of organic matter, and lighted a fire of wooden logs. They thus ascertained that in an hour the complete reduction to ashes of one kilogramme of organic matter could be effected, and in forty hours the complete combustion of a body weighing sixty kilogrammes could be completed. The accompanying smell was not disagreeable. The bearing of this on the question of cremation is obvious. It is possible to consume the human body by fire at a comparatively small expense, as these experiments show. In Japan, where cremation has been practised for

ages, the quantity of wood consumed in the cheapest cremation is so small that European doctors doubted the evidence of eye-witnesses. Cremation of the lowest class costs only two shillings, on account of the small quantity of wood used, and the operation generally lasts from six to nine hours. The smell for a considerable distance around the crematorium is, however, of a very offensive kind, and the accessories are, as a rule, far from agreeable. There is, however, no doubt that the body can be consumed at a far less expenditure of fuel than is generally considered possible.

THE following appears in the *Times*:—Last autumn, a bookseller named Meyer, of Ronneburg, tied a water-proof label under the wing of a swallow which had occupied a nest at his house, and had become comparatively familiar. On it he wrote a query in German to the effect that he wished to know where the swallow would pass the winter. The bird returned to its former nest bearing an exchange label similarly fastened, saying, in German also, "in Florence, at Castellari's house, and I bear many salutations."

THE Austrian Government has refused to authorise the establishment of private cremation societies, on the ground that they might encourage crime. The decree states that murders are often detected by the exhumation of bodies, and that, even if bodies were to be examined before cremation, there would be no time to apply in every case those delicate chemical tests which are used where poisoning is suspected.

A TELEGRAM from Tiflis states that a severe earthquake has occurred in the Eastern Caucasus. The town of Sikuch is said to have been completely swallowed up. The loss of property is estimated at several million roubles.

THE latest telegrams from India state that the Cashmere earthquakes continue to occur with increased severity. It is reported that 2280 persons have perished in the district of Muzufusabad.

INFORMATION has been received at the Hague from Java that the state of Krakatoa was causing some anxiety. Towards the end of April subterranean sounds were heard in the neighbourhood day after day, and flames arose from the crater. The rocks which emerged from the sea during the last eruption suddenly disappeared.

FROM a report of Mr. H. Walker, Commissioner of Lands of British North Borneo, it appears that gold exists in considerable quantities in that territory. Some natives had brought a little to Sandakan, and Mr. Walker set out to verify its existence in the Sagama district. He searched thirty or forty different places and found gold at almost every place, generally in small distinct specks, large enough to be gathered with the fingers, sometimes larger, and always in conjunction with a black metallic dust and iron or copper pyrites. The rocks met with were granite, gneiss, quartz, limestone, jasper, porphyries, red sandstone. Steps will probably be taken to have the whole region thoroughly examined by a competent geologist. The minerals already ascertained to exist in North Borneo are gold, silver, copper, chromium, tin, plumbago, lead, and coal. Antimony and cinnabar are reported. On the west coast chromium, copper, and arsenic have been found; in the neighbourhood of Kinabalu silver ore and pyrites; a sample of native copper has been sent to London; a rich sample of galena and silver, yielding on assay 115 ounces of silver to the ton, has been found. Hitherto the officials of the Company and the other Europeans on the coast have been dependent for local information respecting these and other minerals on the rough statements of natives. It appears certain, however, that, besides its great forest and agricultural wealth, British North Borneo is also rich in minerals—how rich



cannot be said until a thorough examination by an expert has been made.

ACCORDING to the *San Francisco Courier* the great glacier of Alaska is moving at the rate of a quarter of a mile per annum. The front presents a wall of ice 500 feet in thickness; its breadth varies from three to ten miles, and its length is about 150 miles. Almost every quarter of an hour hundreds of tons of ice in large blocks fall into the sea, which they agitate in the most violent manner. The waves are said to be such that they toss about the largest vessels which approach the glacier as if they were small boats. The ice is extremely pure and dazzling to the eye; it has tints of the lightest blue as well as of the deepest indigo. The top is very rough and broken, forming small hills, and even chains of mountains in miniature. This immense mass of ice, said to be more than an average of a thousand feet thick, advances daily towards the sea.

It is contemplated to use the electric light in Algiers for night work during harvest time, in order to escape the heat, which is almost murderous for Europeans, and is an obstacle to their carrying on agricultural work.

THE borings undertaken for scientific purposes in the shaft situated near the railway station of Koetzschau, about five miles from Lützen (Germany), have now reached the depth of 1500 metres. Observations of temperature are now being made in the shaft.

THE Norwegian Government has voted a sum of 50*l.* to Dr. O. J. Olsen for the prosecution of his studies of wild edible mushrooms.

THE education of girls in Russia does not appear to stand very high. According to the *Moskov Viedomski* only 21 children out of 100 attending school were girls. The proportion varies with the religion. Thus, of Protestants the number was greatest, viz. 45.4 per cent.; of Jews, 34.1 per cent.; and of Roman Catholics, 14.4 per cent. The number is lowest amongst Greek Catholics, viz. 12.3 per cent.

THE additions to the Zoological Society's Gardens during the past week include a White-fronted Capuchin Monkey (*Cebus albifrons* ♂) from South America, presented by Mr. E. Luxmore Marshall; a Macaque Monkey (*Macacus cynomolgus* ♂) from India, presented by Mr. A. R. Brown; a Martinique Gallinule (*Tonornis martinicus*), captured at sea, presented by Mr. G. S. Webb; and two Grey-breasted Parrakeets (*Bolborhynchus monachus*) from Montevideo, presented by Miss Buist; a Red and Blue Macaw (*Ara macao*) from Brazil, presented by Mr. J. W. Beswick Purchas; a Yellow Conure (*Conurus solstitialis*) from Venezuela, presented by Mr. Albert H. Nicholson; a Barn Owl (*Strix flammia*), British, presented by Mr. W. Ostle; an Æsculapian Snake (*Coluber a-culapilii*) from Central Europe, presented by Miss Lenox Conyngham; a Domestic Sheep (*Ovis aries*, var. ♂) from Somali Land, deposited; two Larger Tree-Ducks (*Dendrocygna major*) from India, two Gould's Monitors (*Varanus gouldi*), two Great Cyclodus (*Cyclodus gigas*), two Carpet Snakes (*Morolia variegata*), three Diamond Snakes (*Morolia spilotes*) from New South Wales, received in exchange; a Japanese Deer (*Cervus sika*), three Pigmy Hogs (*Porcula salvania*), born in the Gardens.

#### OUR ASTRONOMICAL COLUMN

COMETARY ORBITS.—Prof. J. G. Galle has formed a most useful and very complete catalogue of orbits of comets which have been calculated since the publication of the third edition of Olbers's "Methode zur Berechnung der Cometenbahnen" in 1864. This catalogue appears in Nos. 2665–66 of the *Astronomische Nachrichten*. In one table are collected orbits of comets

before 1860, which have been more definitively determined during the past twenty years, with a few orbits of ancient comets computed for the first time or founded upon better data, including those observed by Toscanelli; in a second table are contained the most reliable orbits of all comets discovered since the year 1860. The elements are given in an approximate form only, but in the notes accompanying each table reference is made to the place of original publication. Prof. Galle's *résumé* will be of much service to the student in this branch of astronomy. It appears to have been drawn up on the suggestion of Prof. Krüger, seeing that there was no immediate intention of publishing a fourth edition of Olbers's celebrated treatise. Five newly-detected comets of short period figure in the second table.

BINARY STARS.—The following calculated angles and distances of several of the more rapidly revolving double-stars will serve to indicate how nearly measures made about the present time are represented by the best available orbits:—

Star	Epoch	Pos.	Dist.	Authority for orbit
ζ Cancri	1885.0	62.0	0.93	Seeliger
	1886.0	57.6	0.95	
η Coronæ Bor.	1885.5	173.9	0.61	Doberck
	1886.5	182.2	0.65	
ζ Herculis	1885.5	90.3	1.49	Doberck
	1886.5	85.3	1.50	
μ <sup>2</sup> Herculis	1885.5	285.6	0.80	Doberck
	1886.5	296.5	0.76	

Dubjago's orbit of β Delphini (Burnham 151) gives for 1885.6, Pos. 238°.1, Dist. 0".28.

TYCHO'S NOVA OF 1572.—Some years since it was shown by Prof. Wolf that this object was observed by Lindauer at Winterthur on November 7, 1572, and it is equally certain that it was seen by Maurolycus at Messina at its meridian transit on the following evening, though there appears to be some confusion between altitude and declination in his published description. It was not seen by Tycho until November 11.

In 1808 the Abbé Scina, in a work printed at Palermo, entitled "Elogio di Francesco Maurolico," referred to his observations of this star, apparently given in the first instance in a special treatise written by Maurolycus (*Judicium de nova stella*), to which Lalande alludes in his Bibliography, and subsequently in 1613 in a life of the astronomer written by his nephew. According to Clavius, Maurolycus thus records his first observation of the star: "Hanc ego stellam in hoc Messanæ horizontem observans in meridiano extantem circa tertiam noctis horam reperi altitudinem ejus esse 62. Unde conjecturam feci eam locari quasi, in summitate circuli arctici, ut distet hic a meo vertice per gradus 28, ac proinde ab æquatore per gradus 66½ fere, quoniam Messanæ latitudo habet gradus 38½, et eam sitam in puncto, in quo colurus æquinoctiorum secat arcticum circumulum, aut ipsi puncto vicinissimum."

According to Argelander the place of the star for 1573.0 was in right ascension 0*h.* 1*m.* 52*s.*, declination 61° 46' 4"; the sidereal time at mean noon at Messina on November 8 was 1*h.* 49*m.* 50*s.*, and consequently the star was on the meridian at 8*h.* 10*m.* 41*s.* mean time, or at 8*h.* 24*m.* 46*s.* apparent time, 3*h.* 24*m.* after sunset, and, the latitude of Messina being 38° 11', the meridian altitude was 66° 25', which was the distance from the equator given by Maurolycus. Nevertheless the Abbé Scina did not agree with Piazzii's suggestion that there was a typographical error in Clavius, and that 61½° should be substituted for 66½°. The only alternative, however, would point to an error of 4° or 5° in the observation (or estimation), and Scina writes of Maurolycus at this time that he was "très-avancé en âge (il avait alors 78 ans) dépourvu d'instrumens, accablé d'infirmités." . . . Zach sought unsuccessfully for the special work by Maurolycus, as well as for his "Life" by his nephew; Lalande gives no particulars of the former, and hence recourse has to be had to Clavius, who, as stated above, made some extracts from the *Judicium*.

#### ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, JUNE 21-27

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)