

British Museum by the late Dr. Gray, which, being associated with some British newts, were supposed to have been obtained in the neighbourhood of London. Through a somewhat similar error, some specimens in the collection of the Jardin des Plantes at Paris were believed by Valenciennes to have been obtained in France, near Toul, and other examples were supposed to have been found living at Antwerp. It has thus come to pass that naturalists, copying one from another, have assigned "England, France, and Belgium" as the locality of this newt. It now turns out, from M. Lataste's researches, that all these localities are erroneous, and that the so-called *Triton vittatus* is no other than the *Triton ophryticus* of Berthold, an Eastern species of newt which is found in Syria and Asia Minor. The British newts are now, therefore, reduced to three in number—the crested newt (*Triton cristatus*) and the smooth newt (*Triton teniatus*), both of ordinary occurrence, and the rarer palmated newt (*T. palmatus*).

SPERM WHALES ON EUROPEAN COASTS.—Prof. Turner, of Edinburgh, has been collecting and investigating a number of rare prints of sperm whales stranded on European coasts at the end of the sixteenth and beginning of the seventeenth centuries. One of these illustrates a whale caught in the port of Ancona in 1601, 56 feet long, 33 feet in girth; the scene is an active and lively one, representing a landscape, fishing-boats, men engaged in cutting up the whale, spectators, &c. The Netherlands seem to have had numerous specimens stranded. These, like those occasionally visiting the Scottish coast, are all males, which, when fully grown, appear to go singly in search of food. Other whales, as cachalots, visit the south in larger numbers. Over thirty cachalots, mostly females, were stranded in 1784 in the Bay of Audierne, department of Finisterre; and a school visited Citta Nuova, in the Adriatic, in 1853.

AMERICAN JURASSIC DINOSAURS.—Prof. O. C. Marsh publishes in the current number (November) of the *American Journal of Science and Arts* the principal characters of some new species of dinosaurs. On the flanks of the Rocky Mountains a narrow belt can be traced for several hundred miles, which is always marked by the bones of gigantic dinosaurs. The strata consist mainly of estuary deposits of shale and sandstone, and the horizon is clearly upper Jurassic; the dinosaurian remains in this series of strata are mostly of enormous size, and indicate the largest land animals hitherto known. One new species (*Atlantosaurus immanis*) must have been at least eighty feet in length and several others nearly equalled it in bulk. With these monsters occur the most diminutive dinosaurs yet found, one (*Nanosaurus*) not being larger than a cat. Some of these new forms differ so widely from typical dinosauria that Prof. Marsh has established a new sub-order to receive them, called Saurópida, from the general character of the feet. They are the least specialised forms of the order, and in some of their characters show such an approach to the mesozoic crocodiles as to suggest a common ancestry at no very remote period. In them the front and hind limbs are nearly equal in size; the feet are plantigrade with five toes on each foot. The carpal and tarsal bones are distinct; the precaudal vertebrae contain large, apparently pneumatic cavities; the sacral vertebrae do not exceed four, and each supports its own transverse process. The pubic bones unite in front by a ventral symphysis; the limb bones are solid. One of the species described and partly figured in Prof. Marsh's paper is called *Morosaurus grandis*; when alive it was about forty feet in length; it walked on all four legs, was probably very sluggish in its movements, and had a brain proportionately smaller than any known vertebrate.

ZOOLOGICAL STATION AT TRIESTE.—It may not be generally known that the University of Vienna in addition

to having a zoological establishment in Vienna, has also founded a zoological station on the borders of the Adriatic Sea at Trieste. The general director of both is Prof. Dr. Claus. The assistant at Vienna is Dr. C. Grobben, and the inspector at Trieste is Dr. Ed. Graeffe. As a first fruits of these two excellent establishments Prof. C. Claus has published Part I of a handsome 8vo volume entitled "Work Done at the Zoological Institute of the Vienna University and at the Zoological Station in Trieste." The work done consists of 1. A very exhaustible memoir, by Dr. Claus, on a new species of Halistemma (*H. tergestinum*), with remarks on the minute structure of the Physophoridae. This memoir is illustrated by five folding plates. 2. Contributions to our knowledge of the male reproductive organs in the Decapod Crustacea, with remarks on their comparative anatomy as compared with the same organs in the rest of the Thoracostraca, by Dr. C. Grobben, with six folding plates. 3. On the origin of the nervous vagus in the Selachians, with special regard to the electrical lobes in Torpedo; this is illustrated with woodcuts and one plate. The University of Vienna and Prof. Claus are indeed to be heartily congratulated at these first results from their new institution.

GEOGRAPHICAL NOTES

At the meeting of the Royal Geographical Society on Monday last, a paper on "Usambara, East Africa, and the Adjoining Country," was read by the Rev. J. P. Farler, who has spent the last three years there in connection with the Universities' Mission. Usambara is described as the Switzerland of Africa, and forms a link in the great East Coast range, which extends from Abyssinia to Natal; roughly speaking, it lies between S. lat. $4^{\circ} 20'$ and $5^{\circ} 25'$, and E. long. $38^{\circ} 20'$ and $39^{\circ} 10'$. The mountains form four detached lines running due north and south, and rising in the higher peaks to about 6,000 feet above the sea-level. The range was evidently thrown up by volcanic action, and consists of granite mixed with spar, with sandstone in the lower spurs containing plumbago. Mr. Farler describes the scenery as varied and beautiful, now soft valleys and hill-sides with hanging woods, now again wild ravines with precipitous cliffs of bare granite. Usambara is drained by four rivers: the Zigi, with its affluent, the Kihuwi, the Mkulumuzi, the Ukumbini, and the Luari, the two first-named emptying into Tanga Bay; none of the four, however, are navigable. Trees are found in the region in great variety, but mostly of stunted growth; euphorbias, fan-palms, and mimosa thorns are seen everywhere, and occasionally baobabs, tamarind-trees, and clusters of the Borassus palm; there is also a kind of wild palm-tree. Various animals are found in the Mjika, or wilderness—antelopes varying from the size of a cow to that of a small goat, gazelles, lions, leopards, hyenas, and large apes. Mr. Farler mentions a noteworthy peculiarity in regard to the River Mkulumuzi, which in the rainy season becomes a torrent: "The stream has cut a deep bed for itself in the granite sides of the mountain, and exploring this bed in the dry season, I have found perfectly round, well-like basins in the rock, varying from a foot in diameter and depth to 10 feet in diameter, and from 8 to 12 feet in depth. There is always a stone at the bottom of these basins, and they must have been formed by the torrent giving, during the rainy season, a rotary motion to the stone." The soil throughout Usambara is a red disintegrated clay upon a granite and sandstone foundation, and covered with a rich vegetable loam; the bottoms of the valleys contain beds of alluvial clay. Probably no more fertile soil could be found in the world, and it is capable of producing every tropical plant. The flora of the region is extensive; in the forests are found ebony, copal, teak, acacia, the india-rubber tree,

the orchella weed, the betel-pepper climber, prickly smilax, with several varieties of the strychnos tree, and many other trees producing valuable wood. The inhabitants are many of them rather Semitic than Negro in their type, having high foreheads, while the prognathous jaw and spur heel are both wanting. They average 5 feet 7 inches in height, are strong, though not robust, and in form and figure resemble bronze statues. After describing the curious marriage customs of these people Mr. Farler concluded with some interesting remarks on the Masai country, which, sooner or later, must be thoroughly explored, so as to obtain a short route from the coast to the Victoria Nyanza.

At the same meeting Sir Fowell Buxton, at the special request of Sir Henry Rawlinson, gave an account of the progress of the road-making experiment from Dar-es-Salaam to the north end of Lake Nyassa. The work does not appear to proceed very rapidly, for but forty miles of road have been made in over twelve months, but it is satisfactory to learn that the natives give no trouble and willingly take to the good road provided for them; as, however, they still persist in their old habit of walking in Indian file, their traffic does not do much towards keeping down the rapidly growing vegetation.

It is now definitely settled that the Earl of Dufferin will preside at the meeting of the Geographical Society on Monday, December 9, and as an appropriate compliment to his lordship's early experiences as a traveller, the evening will be devoted to Arctic matters. We understand that the papers to be read will include an account of the Swedish Arctic Expedition now being so successfully carried out by Prof. Nordenskjöld, a review of the work done by the recent Dutch Arctic Expedition, suggestions as to the best route for future exploration, &c.

FROM a letter of Prof. Nordenskjöld's, published by Mr. Oscar Dickson, the liberal patron of the North-East Passage Expedition, we learn that during the short stay of the *Vega* at Vaigatz Island the scientific staff did some good work on the fauna of the sea and the flora of the land. A large collection of fishes was made, and special attention was given to Arctic phanerogamous plants. Nordenskjöld himself made some important purchases of "idols" from the Christianised Samoeides, who, notwithstanding their baptism, worship and sacrifice to their old divinities.

WE have been favoured by a correspondent with the following extracts from a letter lately received from Mr. Carl Boch, who is exploring and collecting in Sumatra:—"I have been collecting for a month in the highlands of Mount Sago, and, considering the very bad weather, have been successful. My hut is on the south-eastern slope of the mountain, at an elevation of about 4,000 feet above the level of the sea. The mountain is about 8,000 feet high, and covered to the top with virgin forest. In about a week I purpose going on to Siedjoendjoeng, a place noted for its tigers, tapirs, and elephants, and said to be in every respect the best district for a naturalist. At Ayer Muntjer I met the celebrated Italian traveller, Signor Beccari, and stayed with him three days."

THE Emperor of Austria has conferred the Order of the Iron Crown upon Drs. Gerhard Rohlfs and Georg Schweinfurth, the celebrated African travellers, and upon Drs. Alfred Brehm and Eugen von Homeyr, the well-known ornithologists.

THE well-known African traveller, Dr. Nachtigal, has been elected president of the Berlin Geographical Society.

THE *Russische Revue*, as referred to in Behm's monthly summary, contains some further details of Mushketow's recent exploration of the Pamir Mountains. He ascertained that the Pamir consists mainly of granite, metamorphic clay, and mica slate, covered with beds of triassic formation; at least in the northern part

or Pamir Chorgosh. The direction of all the granite outcrops is that of the general direction of the Thian Shan, viz., east-north-east, or nearly so. North of the Pamir the granite soon ceases, and in the Trans-Alai Mountains diorite predominates, which takes the eastward direction of the main axis of elevation of the Trans-Alai Mountains, and forms the highest summits, which, as in Kaufmann Peak, reach a height of 25,000 feet. Further north, secondary formations prevail, with great diluvial accumulations. In the region explored by him M. Musketow could recognise no meridional elevation such as could favour the hypothesis of a meridional mountain-system, as was assumed by Humboldt.

IN an article on foreign trade with Western China, contained in a recent issue of the *China Overland Trade Report*, we find some interesting notes on the intention of the Russians to push their trade southwards from the Siberian frontier. For this purpose a great commercial station is to be founded in the south-east of the province of Semipalatinsk—probably at the town of the same name, which is well situated for such a purpose, and is even now one of the chief commercial centres of Siberia. It occupies a good site on the east bank of the Irtysh, one of the most important rivers of Siberia, and has a population of several thousands. There are also many Tartar merchants in the place engaged in trade with the Chinese frontier towns in the north, Bokhara, Tashkend, &c. The Semipalatinsk caravans carry southwards printed Russian goods, copper, iron, and hardware, and return with tea, silk, dried fruits, &c. The warehouses of Semipalatinsk also contain carpets from Persia and Bokhara, costly silks and shawls embroidered with gold, ornaments and porcelain from China, diamonds, rubies, and emeralds, together with curiosities and jewellery of various kinds. There is likewise a large trade in cattle, herds of 4,000 or 5,000 being driven into the town by Kirghiz at one time; more than two million sheep are also sold there every year, most of them being forwarded on to Ekaterineburg, where they are killed and the fat used in the great candle-works of the town. It is thought possible that the Russians may intend to hold at Semipalatinsk the great *Yermak* or fair, which now takes place at Irbit, on the frontier, and to induce Chinese and Thibetan traders to go there.

AN excellent little book has just been published by Hartleben, of Vienna. Its title is "Malta; Geschichte und Gegenwart, by Herr A. Winterberg. The work consists of three principal divisions. The first gives an exhaustive and well-written account of the topography, climate, position, and political division of the Maltese Islands, besides describing the agriculture, industry, commerce, and institutions of the little country. It closes with an interesting chapter on the physical and moral condition of the inhabitants. The second division treats of the islands from a military point of view, and contains minute descriptions of the fortifications, the various towns and villages, the harbours, bays, sources, and grottoes of the island. The final division, by far the most elaborate, is an ably-written summary of the history of Malta, which in its closing chapters has the additional interest of "showing us ourselves as others see us." The little book contains eighteen illustrations and two neatly-finished maps.

THE first article in the November number of Petermann's *Mittheilungen* (it still retains the name) is on the use of elephants in African exploration, by the late editor, and was found on Petermann's table on the evening of his death. The number contains besides a short account by Dr. Miklucho Maclay of his visit to some of the Pacific Islands and New Guinea, and a paper by the same on Volcanic Phenomena on the north-east coast of New Guinea; an account of Bernoulli and Cario's travels in Guatemala and South Mexico in 1877; the

conclusion of Dr. C. E. Jung's Contributions to the Geography of Victoria; an important paper, with map, on the Chinese province of Kwang-tung and its people, by Herr J. Nacken; another on D'Albertis' New Guinea Exploration, with map of the Fly River; with papers on the Exploration of the Ogowé, Nordenskjöld's Voyage in the *Vega*, and Dr. Behm's monthly summary. Thus it seems that Dr. Behm, the new editor, is likely to maintain the reputation and value of this, the most important geographical organ.

THE October *Bolletina* of the Italian Geographical Society contains a short account of the Progress of the Italian African Expedition, and letters from Lieut. Bove who accompanies Prof. Nordenskjöld in his North-East Passage Expedition. In the *Bulletin* of the Paris Society is a translation of the Grand Duke Nicholas's paper on the Shortest Route for a Railway to Central Asia; a paper by M. L. Simonin on the Indians of the United States, with a map showing the Indian reservations; the continuation of Dr. Decugis' Account of his Journey in Morocco; a long article by the Abbé Ménager on Guinea, besides shorter papers on a Uniprojectional Atlas, and the Rio Casca of Peru.

THE Portuguese African expedition, under Serpa Pinto, which left Benguela a year ago, reached Bihé in March last, and was to enter the unknown interior in two divisions. The Lisbon Geographical Society are moving Government for a scientific expedition into Portuguese Senegambia.

ON SOME IMPROVED METHODS OF PRODUCING AND REGULATING THE ELECTRIC LIGHT¹

AMONG the manifold functions which the elementary substance carbon performs in organic nature, not the least important is that by which it becomes the great source of artificial illumination, whether derived from oils, coal gas, or from coke rendered incandescent by the action of powerful electric currents. Since the time when Davy first produced the voltaic arc, between two points of wood charcoal, through which was transmitted the current from the great battery of 2,000 plates belonging to the Royal Institution, many experiments have been made to determine the best kinds of carbon for developing the electric light. The carbon which, until recently, was most commonly employed for this purpose, is obtained from the sides of gas retorts, where it accumulates in the form of coke during the destructive distillation of coal. The shells of coke from the retort are sawn up into pencils from one quarter to half an inch square, and from six to nine inches in length. Although very good results are obtained from carbon of this kind, it is a difficult material to work on account of its hardness, and it sometimes contains impurities which interfere with its conductivity. It is also liable to fracture when suddenly heated by the transmission of powerful electric currents. These defects have led to the introduction in electric lighting of artificial carbon, composed of powdered coke and lampblack, formed into a paste with molasses and gum. This material is pressed into cylindrical forms, and subjected for a given time to a high temperature in a special furnace. The manufacture of these carbon pencils has attained great perfection in the hands of Carré, of Paris, and they can be made into perfectly straight and cylindrical forms of from two to sixteen millimetres in diameter, and half a metre in length.

When the electric light is to be used for illumination, it is necessary that it should be as continuous as other modes of lighting. For this purpose not only should the current

be regular in its action, but the distance between the carbon points must not alter, which necessitates the use of some arrangement for bringing them nearer together in proportion as they are consumed. Much ingenuity has been displayed by electricians in solving this problem, and the automatic contrivances invented by Staite, Duboscq, Foucault, Serrin, and others, leave little to be desired in regard to the steadiness of the light, when the regulators are in good order, and in the hands of intelligent operators. All automatic instruments, however, from the delicacy of their mechanism, are liable to derangement, and their action is not easily understood by persons not having a special knowledge of their construction. To obviate the objection to the use of such instruments by unskilled attendants, I devised, a few years since, a regulator for use on H.M.'s ships of war, to be actuated by hand. In this arrangement the carbons are made to approach and separate from each other by means of a right and left-handed screw connected with the carbon holders. Each of the screws, with its carbon holder, can be actuated independently of the other, for the purpose of adjusting the points of the carbons to the proper focus of the optical apparatus used in connection with it. The regulator, with its carbon points, is placed in the focus of a dioptric lens, which parallelises the divergent rays of light into a single beam of great intensity. The lens with the regulator is pivoted horizontally and vertically on the top of a short iron column, fixed on a raised platform above the deck, and the beam of light may be projected upon any distant object within its range. This special application of the electric light, however, as will be seen, requires the frequent adjustment of the carbons by the operator, but as he is always required to be in attendance to manipulate the projector, no inconvenience is experienced through the absence of the automatic arrangement. This method of regulating the electric light has now been in use in the Royal Navy for more than three years, and has proved very satisfactory.

Simultaneously with the progress of improvements in the mechanism for regulating the electric light, experiments have been made with the object of dispensing with the regulator altogether. The most recent, as well as the most successful, of these attempts has been made by M. Jablochkoff, a Russian inventor. In the specification of his letters patent of 1877 he proposes to place the carbons side by side (as had been previously proposed by Werdermann in 1874), and to separate them by an insulating substance to be consumed along with the carbon. The inventor states that the insulating substance for separating the carbons may be kaolin, glass of various kinds, alkaline earths, and silicates, which he prefers to apply in the form of powder rammed into an asbestos cartridge-case containing the carbons. A powder which the inventor found serviceable consists of one part lime, four parts sand, and two parts talc. These materials are rammed into the cartridge-case surrounding and separating two parallel sticks of carbon placed in the case, at a little distance apart. One of the carbons is made thicker than the other to allow for its more rapid waste. The lower ends of the carbons are inserted into pieces of copper tube or other good conductor, separated from one another by asbestos, and the ends of the tubes are pinched between two limbs of a screw vice, connected respectively to the conducting wires. This combination of carbons and insulating materials the inventor terms an electric candle, which, when mounted on a stand or candle-stick, has the appearance of the Roman candle of pyrotechnists. The inventor further states that the heat produced by the electricity fuses the material between the carbons and dissipates it; and the freedom of the passage afforded by the fused material to the electric current permits the subdivision of the light by placing several lamps in the course of one electric circuit. It is also stated that the construction of the candle may be varied; and, among the forms described, is one in which the carbons, instead of being contained in a cartridge case,

¹ Paper read by Mr. Henry Wilde at the Manchester Literary and Philosophical Society, October 29.