

lished in NATURE, vol. xix. p. 527, with Dr. Schulze's elements, only with the perihelion passage assumed March 30^h 57^m 16 G.M.T., the differences from observation are $\Delta a = -2'.1$ and $\Delta \delta = +1'.3$. This position, therefore, with others obtained by Prof. Strasser and Dr. Tempel, show that when the mean anomaly is so altered as with the other elements of Dr. Schulze's orbit to bring about an exact agreement between the observed and calculated geocentric longitudes, there is still an outstanding difference between the latitudes of from one to two minutes, which indicates that, notwithstanding the apparently careful computation of the perturbations since the comet's last appearance in 1873, the elements determining the position of the plane of the orbit are susceptible of correction. The ephemeris we gave last week will, however, amply suffice for readily finding the comet, and we shall continue it for May in our next.

Mr. Tebbutt, of Windsor, N.S.W., writes that, aided by Dr. Schulze's ephemeris, he found the comet on February 22, and observed it again in the fading twilight on the following evening. It could hardly be seen with a telescope of less than four inches aperture. It had the appearance of an elliptic nebulosity, the major axis of the ellipse extending in the direction of the parallel of declination.

NEW MINOR PLANETS.—Prof. Peters, of Clinton, New York, notifies his discovery of No. 194, on March 22, in R.A. 12h. 11m., Decl. $+9^{\circ} 31'$, magnitude 10.5. No. 192 was found by M. Palisa at Pola on February 17, and No. 193 by M. Coggia, at Marseilles, on March 1.

GEOGRAPHICAL NOTES

At the meeting, March 22, of the Russian Geographical Society, Col. Petrousevitsh read a very interesting paper on his exploration of the Amu-daria, from Chardjui, in Bokhara, to the delta of the river, and on its former beds. M. Petrousevitsh has arrived at the conclusion, based on a thorough levelling of the country, that the turning of the waters of the Amu-daria into the Sara-kamysh depression through one of the former beds, would not meet with great difficulties. This depression being, however, very wide and deep, the waters of the Amu River once arrived there, would form a great lake, and it would be difficult to direct them further to the Caspian. For this last reason it would be better to open a way for the waters of the Amu along one of its former beds which run southeast from the lake Sara-kamysh. All explorations make it very probable that in this way the Amu-daria could easily reach the Caspian. The Russian Trade Society sends, next summer, an expedition for the study of the lower parts of the Amu-daria, of the best direction for a railway to Central Asia, and of the possibility of a canal between the Amu and the Caspian. Several officers of the Russian general staff, with geodesists, a geologist, a botanist, an archæologist, and an artist will be members of this expedition. They will start from the Ural River, passing through Kara-tugay, Tashkent, and Samarkand; further they will go down the Amu to the Uzboi.

UNDER the title of "L'Afrique Centrale en 1522," M. A. J. Wauters, Assistant-Secretary of the Belgian Geographical Society, has drawn up an interesting memoir, in which he has gone with much care into the doctrine of Portuguese geographers respecting the discovery of Central Africa in the sixteenth century. M. Wauters was induced to study the subject by the recent discussions in regard to the geographical data furnished by the great globe in the Lyons Library, and if anything were required to dispose of its claims to originality, this memoir does it most effectually. He traces back the idea of a great central lake, under the name of Saphat or Sachaf, to the days of Martin Hylacomilus and Gerhard Mercator, so that the data on which it was based must have been known

previous to the year 1522. M. Wauters's memoir appears in the current number of the *Bulletin* of the Belgian Geographical Society, and is illustrated by a facsimile map.

A LISBON paper gives the text of a letter which Major Serpa Pinto addressed to Sir Theophilus Shepstone from Shoshong, Bamangwato country, on January 2, and which adds some information to that already made public respecting his adventurous journey. He states that he went beyond the Zambesi and purposed proceeding to the east coast through the country of the Chocolumbes, when successive obstacles obstructed his passage. Having lost all his resources and being abandoned by his carriers, he found himself in the greatest difficulties, when fortunately he heard of a missionary who had arrived at the Upper Zambesi, and he resolved upon finding him. After a journey of 200 miles he found the missionary, M. F. Coillard, a Frenchman of the Evangelical Mission of Sesuto, Basuto-land, director of the station of Lesibo. His strength being exhausted, Major Pinto was taken seriously ill, but on his recovery succeeded in reaching Shoshong with M. Coillard and accompanied by eight of his followers, the only ones who continued faithful.

THE Danish Government has appointed Lieut. Jensen to explore all the fjords in Greenland from Holsteinborg to the coast facing Disco. The explorations will bear on the moving ice-fields which send so many icebergs into the Polar Ocean.

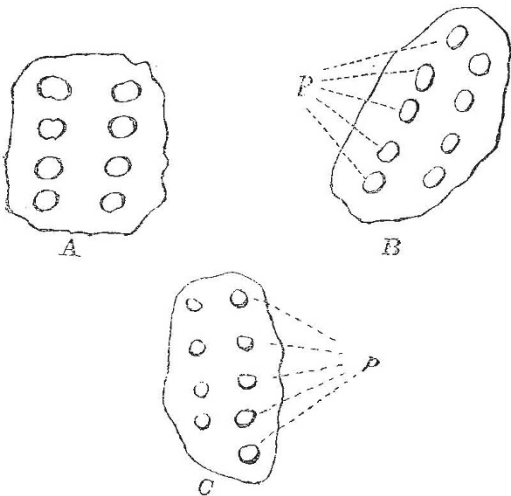
MR. IM THURN paid a second visit to the Kaieteur Falls, on the Potaro River, British Guiana, in February and March last, when the river was in full flood. Referring to our remarks on his previous visit, he states that he by no means intended to depreciate the grandeur of the fall. At his last visit he found it "so infinitely more grand, so infinitely more beautiful, that it is painfully hopeless to try to express in words anything of its beauty and grandeur." Mr. im Thurn's brief account contains several interesting notes on the botany and zoology of the region traversed.

THE WOLF FISH

OF late the wolf fish (*Anarrhichas lupus*) has been somewhat plentiful in the Frith of Forth. A specimen which lived in the Edinburgh Aquarium for a little over a week, came into my possession a few days ago, and I have thought that an account of the dental armature of this curious fish may prove interesting to readers of NATURE. The wolf fish is a near relative of the Blennies. In this fish we see the same elongated dorsal fin, and the same anal fin as in the Blennies; but the dental arrangements of the wolf fish are of a much more specific and unusual kind than are seen in the former group. The specimen dissected measured twenty-five inches from the top of the nose to the extremity of the caudal fin. It was therefore by no means a large specimen, since from six to seven feet is not an unusual length for the sea wolf to attain. Its dark grey body was faintly banded with brown, but the head was beautifully and distinctly marbled with black on a grey ground. The aspect of the mouth, provided with its well marked teeth, partakes somewhat of a feline look, and has suggested the name "sea cat," often applied to it on these northern shores, where the fish is frequently eaten, it somewhat resembling the cod in taste. The appearance of the mouth is highly characteristic. In front of both jaws is found an array of sharp incisor teeth. The upper jaw bears five of these pointed teeth, the two lateral teeth being large, and the central three teeth small. The lower jaw possesses six teeth of similar pattern, the two central teeth being larger than the four lateral ones; and when the jaws are closed

the lower teeth interlock in an exact manner with the upper. The hold or grip of a wolf fish must therefore be of a tenacious kind. Behind these incisor teeth, both above and below, are seen a few small teeth, destined by the ordinary laws of dental succession in the fish-group to replace the incisors in case of injury or loss. These front teeth are firmly ankylosed to the bones on which they are borne.

More interesting are the palatal teeth, and the corresponding teeth of the lower jaw. To these latter, the name of "molars" or "grinders" is frequently applied. Close to the front of the upper jaw we find a series of three tooth-masses, one central and two lateral, arranged in diverging fashion. The central and largest mass resembles the tuberculate molar of a bear in form, and is composed of four firmly united segments, each segment in turn consisting of two pieces. The lateral teeth of the palate, similarly consist of a double series of firmly united segments, but in each of these lateral pieces the outer row of pieces is composed of sharp-pointed segments, resembling miniature incisors. The accompanying diagram will afford an idea of these curious palatal arrangements :



A is the central piece; B and C are the lateral pieces, the outer teeth of which (*p p*) consist of pointed and incisor-like pieces. It follows from this description that the sea wolf possesses in its mouth an apparatus not merely adapted for tearing its food but for exercising a triturating and bruising action as well.

No less characteristic are the dental arrangements of the lower jaw. In the front of this jaw are four incisor teeth, each fully three-quarters of an inch in length; whilst two smaller incisors exist as already mentioned, one at each side of the larger series. Behind these incisors are the rudiments of succeeding teeth, and these rudimentary teeth gradually merge into the main dental arrangement of the lower jaw, which consists of a prominent row of blunt teeth ankylosed to form a common mass, and partially forming a double row on each side of the jaw. Section of the jaw shows that the teeth are imbedded in a common groove, and that complete and thorough ossification of the various dental pieces renders the whole apparatus compact and solid. The arrangement seen in the mouth of the wolf fish suggests the idea of the high specialisation of this type of fish, as indicated by the development of the dental apparatus. In none of the near neighbours of this fish have we at all a near approach to the perfection of teeth thus exhibited; and in respect of its complexity and differentiation of type, we may well be inclined to lend some countenance to the idea of the independent origin in widely removed fishes of structures seen in still greater

perfection in such widely-removed fishes as the Elasmobranchiate Skates, Rays, and Cestracion.

The stomach of the specimen I dissected was greatly distended, and contained fully four ounces of digestive *débris*, consisting chiefly of disintegrated Ophiuroids, spider-crabs, broken shells, shrimps and prawns, along with sand and small gravel. The pyloric aperture was firmly contracted and the collection of matter in the stomach clearly pointed to some obstruction of the digestive canal as the cause of death. It was also instructive to find that close to the vent the rectum was largely distended with broken pieces of shells and fine gravel. These matters, along with those in the stomach, had evidently been intussuscepted before the arrival of the fish in the aquarium and probably caused death by the irritation consequent on their non-removal by digestion.

ANDREW WILSON

THE ETNA OBSERVATORY

IT will be within the recollection of some of our readers that in September, 1876, Prof. Tacchini, of Palermo, communicated to the Accademia Gioenia of Catania a letter, "Sulla Convenienza ed utilità di erigere sull' Etna una Stazione astronomico-meteorologica" (*vide NATURE*, vol. xv. p. 262). This letter was published in the *Atti* of the Academy, and afterwards appeared in the form of a quarto pamphlet with ground-plan and elevation of the proposed building. The project was at once taken into consideration both by the Italian Government and by the Municipality of Catania; plans were prepared, money was voted, and it was confidently believed that the observatory would be commenced in July, 1878. Owing, however, to certain delays, this was found to be impracticable, and the commencement was postponed till June, 1879. There is every reason to believe that the building will be erected and the instruments in working order by the end of this year. The cost will be borne by the Government, the Municipality of Catania, and the Province of Catania. Merz, of Munich, has offered to construct a 12-inch lens for the great refractor, at the price of a 10-inch lens, and the enterprise has received encouragement and support from various sources both at home and abroad.

The observatory will be erected at the Casa degl' Inglesi, 9,652 feet above the level of the sea. At the present time the Casa is an oblong building constructed of blocks of lava, and containing three rooms (*vide* the accompanying plan). It was built by the English when they occupied Sicily in 1811, and has since been used by those who ascend the mountain as sleeping quarters. A few years ago it had fallen into decay owing to the accumulation of snow in winter and to other causes, but it was put into complete repair in 1862 on the occasion of the visit of the present King of Italy. The observatory will be the property of the University of Catania, and will indeed be a kind of offshoot of the Bellini Observatory of Catania. It is to be devoted not only to astronomical and spectroscopic observations, but it will also be furnished with a complete set of meteorological and seismological instruments. Between the Etna Observatory and Catania three or four meteorological stations will be established at different elevations, as at Nicolosi, and the Casa del Bosco, and observations will be made at the same hour daily at each of these stations, at Catania, and at the Etna Observatory.

The Merz lens of 12 inches diameter, has a focal distance of 5½ metres. The telescope and clock-work movement are in course of construction by Signor Carignata, the mechanician of the Padua Observatory, who constructed the instruments which were employed by the Italian astronomers who went to India to observe the transit of Venus in 1874. The observatory will only be inhabited during the months of June, July, August, and September, and the large lens will then be transported