

which terminates flush with the lower side of the cork. Above, the tube is bent twice at right angles, the other extremity of the tube dipping below the surface of water of ordinary temperature.

The water of the flask is now boiled, and as soon as the air has been driven from the flask remove the flame and allow the water of the vessel to recede into the flask. At the first entry of the cool water the steam will be so greatly condensed that a brisk ebullition will take place, which for a few seconds checks the inflow of the water, driving it down the tube; further cooling quickly causes more water to enter, when the same phenomenon is repeated. After two or three oscillations of this kind the water runs continuously, and with great velocity, into the flask, which should not be allowed to fill, as it is in that case usually broken by the shock, which terminates the experiment.

FRANCIS E. NIPHER

St. Louis, April 12

Sound-emitting Crustaceans

IN an article in NATURE, vol. xviii. p. 53, you say: "Everybody who had searched for animals on coral-reefs, or had dredged in tropical seas, was familiar with the 'clicking' sounds emitted by the *Alpheæ* and their allies."

Those who wish to hear this sound need not go to coral reefs, or tropical seas—as the shores of Guernsey, Herm, or the other Channel Islands, produce *Alpheus ruber* and other *Alpheæ* in abundance.

Keeping them as I do in aquaria, it is startling sometimes in the evening to hear the loud snap, produced by sharply striking together the two claws on the larger leg.

May 10

H. STUART WORTLEY

GEOGRAPHICAL NOTES

AFTER the suppression of the Mahometan rebellion in the Chinese province of Yunnan, a number of the so-called Panthays took refuge in British Burmah to avoid the indiscriminate cruelty of their conquerors; but they have recently migrated, apparently *en masse*, to another region. This, we gather from a Rangoon paper, is a tract of country on the north-east of Upper Burmah, which belongs neither to the Siamese nor the Burmese, and over which the Chinese have never pretended to exercise any authority. This district is ruled over by a number of Shan and Kachyen chieftains, some of whom were at first inclined to oppose the Panthay settlement, but have ceased to make any opposition to it. The immigrants are said to be nearly 3,000 in number, and are divided into two settlements about ten miles apart. They have intermarried with the women of the country, and in course of time will, no doubt, form a considerable community among these savage tribes. Their principal occupation is agriculture, though a few of them have taken small quantities of goods from Mandalay, and have laid the foundation of a trade with the surrounding tribes. These Panthays, it seems, prefer the rude independence of their colony in the wilds to settling in either Upper or British Burmah.

NOTWITHSTANDING the embarrassed position of Russia at the present time, there seems to be no falling off in the exemplary activity of the Russian Geographical Society; indeed, it is well known that while its researches in Asia are of high scientific value, they are also not without political utility, and perhaps significance. The April meeting, the official abstract report of which is just to hand, was Asiatic all over. It was reported that the expedition to explore the divide between the waters of the Obi and Yenesei had set out on March 12, and that M. Smirnov was to set out on April 15 for the Petchora, to spend the summer in investigating the magnetic elements. The Society has projected two other expeditions for this summer, one of an ethnographical character in European Russia, the other purely geographical to Mongolia. M. Potanin, who had just returned, gave a summary of the results of his explorations in the Altai regions, some details of which we have already given. For the first time we have something like

an adequate account of the extent, the offshoots, the physical geography, and the ethnology of the Altai region. The second part of the third volume of the results of the Siberian expedition of the Society has been published, and contains a study, by Prof. Oswald Heer, of the flora of the jurassic beds of the government of Irkutsk and the region of the Amoor. The eighth volume of the *Memoirs* of the Society, also recently published, ought to interest ethnologists, containing as it does a large collection of information on "customary law" as it exists in various districts of Russia and among some of the tribes on her borders.

THE *Times* Paris correspondent states that according to the German papers Hermann Soyaux, the botanist of the German Expedition to the Loango coast, 1873-76, will set out in July or August on another expedition to equatorial Western Africa to explore the Gabun and Ogovai country in the interests of natural science, and at the same time, under the patronage of the Hamburg firm of Wörmann, to make experiments with a view to the starting of plantations. A long account of Herr Soyaux's travels in Loango and Angola is about to appear, published by Messrs. Brockhaus.

TECHNICAL EDUCATION IN UNIVERSITY COLLEGE, LONDON

IN November, 1876, a short paragraph was inserted in NATURE (vol. xv. p. 69) which contained a notice of the commencement of technical teaching at University College in connection with the classes of mathematics, physics, engineering, and drawing. It may be of interest to state what progress has been made in the workroom up to the present time under rather unfavourable conditions. This we endeavour to do after a recent visit paid at the request of M. Robin, M.Sc., the able and painstaking superintendent of the department, under the direction of the professorial staff. At present the workroom is open on each week-day from ten to five, except on Saturdays, when it is closed at two. The superintendent is present from ten to three on three of the days. Students, who make use of the room, may choose their own hours for work.

Following the order indicated in the syllabus, we first examined the models in the mathematical section. Here we were specially interested in the models illustrative of most of the propositions of modern geometry; pencils of planes and of lines (to show the simple contrivances employed, we may say these models were made of knitting-needles with small spherical ends of sealing-wax of different colours, thus enabling the student to see their different directions; in other cases joints were indicated by ties of differently coloured wool, thus allowing motion to the figures, as in a model showing that the corresponding points of two perspective triangles meet in a line). Projective rows of points made of pricked wood, the corresponding points joined by india-rubber threads; models exhibiting the generation of ruled surfaces of the second order, movable models made of silk threads stretched by weights, parallel pencils of lines making the paraboloid. The generation of curves by the intersection of pencils of lines; this was shown by two flat pencils of lines made of coloured silk in mahogany frames, one of which moved upon the other; at the intersection of certain pairs of threads were placed small indices which clearly showed to the eye various forms of ellipses and hyperbolas. This model we remember attracted considerable attention at the *conversazione* in June last, whilst Prof. Henrici was manipulating it so as to give the curves named. Curves are also produced, whose forms are shown by the aid of sawdust or of sand scattered on a glass plate; these were mostly got as envelopes. In this department, also, are several models of linkages giving approximate and true straight lines, illustrating the dis-

coveries of Watt, Peaucellier, Tchebycheff, Sylvester, Hart, and Kempe; also examples of Sylvester's and Kempe's isoclinostats. These last models are made, some in zinc, but most of them of printer's rules, the articulation being effected by brass pipes. We close our recollections of this section with the bare mention of an ingenious application of the zoetrope to illustrate certain mechanical combinations in motion.

In the engineering department was a collection of elementary plane mechanisms as described in Prof. Kennedy's translation of Reuleaux's "Kinematics": links, made as before of printer's rules; cylinder-pair of brass pipes, prism-pair of wood and brass allowing *any* joint to be fixed, and a complete motion, all the motion truly complane; also a contrivance used for fixing a link when its plane of motion is between two others. Among instances of other mechanisms given in Reuleaux, we noted a duangle moving in a triangle, triangle in a square, &c.; models of glass, centroids stuck on them, so making the conception clear; several examples of spherical quadrilaterals made of zinc. Here also we mention the model of a steam-engine excentric, showing the reversion of motion.

Among matters in preparation we examined with interest a pendulum apparatus which presented some novel features, but it would take too much space to dwell further upon what we saw under the courteous guidance of M. Robin. What we have said—and here we acknowledge our indebtedness to the superintendent's clear exposition, and to a short account of some of the models given in "Engineering" for June 15, 1877, descriptive of the scientific objects exhibited at the professor's *conversazione*—will sufficiently indicate the way that has been made in the short space of one year, under the careful supervision of the professors. Very many of the models are the work of the students. We had not time to examine the physical section, which is devoted to the construction of simple physical apparatus.

THE SETTLE CAVE EXPLORATION

THE Settle Cave Exploration Committee have again nearly exhausted the funds at their disposal, and are preparing a statement of accounts and a fresh appeal to the public.

The great thickness of beds already excavated in the Victoria Cave has taken us down so far into the past that it would be a thousand pities to close the work prematurely before getting down to the cavern floor. But unless the Committee receive help soon they will be obliged to stop and leave the rest of the cave's history in obscurity. We have appealed to our readers in behalf of this important undertaking before, and we are sure we shall not do so in vain again. There must be many readers of NATURE interested to see the final results of the exploration of these interesting caves, and who are at the same time able and willing to give substantial help to the Committee. We are sure the smallest contribution will be thankfully received, and we trust the Committee will, without delay, be encouraged and enabled to continue their researches. The Treasurer, Mr. John Birkbeck, junr., will receive donations at the Craven Bank, Settle, Yorkshire.

ORGANISATION OF FRENCH METEOROLOGY

ON May 7 the Academy of Sciences adopted in its secret meeting the draft of a letter to M. Bardoux, the Minister for Public Instruction, asking him to state whether he was to establish a separate administration for meteorology or continue the existing system. The answer to this was considered as an essential preliminary to the selection of the candidates for the directorship of the Paris Observatory. The candidates have not been nominated yet, but a definite answer has been given to the Academy of Sciences. The decree

organising the meteorological division of the observatory into a distinct service was signed by the president on the 13th and gazetted on the 14th. It is prefaced by a summary of the several steps taken by Leverrier (whose name has been carefully omitted) to give the meteorological organisation its existing form.

The decree can hardly be considered as an innovation, and may be more aptly termed a resuscitation of a former stage in the evolution of official meteorology in France. In 1864 Leverrier had under him three subordinates: one was the head of the warning department; M. Rayet, the head of that which investigated general movements of the atmosphere; and the third M. Sonrel, the head of meteorological stations, their inspector, and general computer. M. Sonrel having died and M. Rayet having resigned, their offices were suppressed for the sake of economy. The whole of the work was executed on a reduced scale by subordinates. M. Bardoux has recalled into existence these two services, which are styled "Study of the General Movements of the Atmosphere" and "Climatology with Inspection of Meteorological Stations." The head of these two services will be a meteorologist, and one of the three meteorologists will be appointed director of the Central Bureau.

This appointment will not take place immediately, as the advice of a special council of the Central Bureau must be taken by the Minister. This council will be formed of members of the Institute and the large public administrative departments—Telegraphy, Admiralty, Public Instruction, War Office, &c., connected in any way with meteorology.

The greatest innovation is the authority given to the Central Bureau over the several meteorological observatories which have been established or will be established in the various districts of France, either at the expense of Government, of departments, or of townships. The more important of these observatories now in existence are Montsouris (Paris), Lyons, Puy-de-Dôme, and Pic du Midi. It is not stated whether the decree will extend to Algerian observatories, which publish a special journal and have their observations taken with a special system.

The Bureau Central will be in direct communication with the departmental commissions which M. Leverrier has established in almost every department. Each of these commissions will have the control of the agricultural stations in its own district. If the president requires it, he will receive *franco* a daily telegram to help him to issue special warnings, as the practice is daily gaining ground. In many parts of France departmental commissions have been grouped into regional organisations according to the initiative taken by Leverrier. The directors of regional meteorological observatories, delegates of regional commissions, and delegates of the Meteorological Society of France, meet once a year to deliberate on topics of interest for the progress of meteorology. The Meteorological Society is a free society supported by voluntary contributions. It is the first time that such a body has been endowed with official privileges.

The departmental commissions, although established mostly by the prefect and the local engineers of the Ponts-et-Chaussées, are supported by private exertions and contributions, as well as donations from departments and townships. M. Leverrier established an observatory in each normal school in France (there is one normal school in each department). All these observatories are to be visited by the delegates of the Bureau Central and their observations published by it. These normal school observatories will issue warnings for their localities. Some of them have already begun.

The Champ de Mars meteorological pavilion contains a number of valuable documents already sent by normal schools and departmental commissions, whose exertions will be regulated under the new system.