sphere. An examination of the rate of progress of storms in north-western Europe, as compared with the rate in the interior of the continent, would contribute important data to the inquiry here raised.

PHYSICAL NOTES

ACCORDING to a theory of crystallogenesis recently brought before the Bologna Academy by Signor Marangoni, the formation of crystals is due to composition of molecular vibrations. As vibrating plates give the symmetrical nodal lines of Chladni, so solid bodies, in their vibrations in three directions, produce nodal surfaces, which correspond to the cleavage surfaces of crystals. The author (confining himself to simple substances) considers a chemical molecule as one produced in general by union of two atoms rotating round one another; a physical, as arising from two chemical rotating round one another. If these motions do not occur in the same plane, we have motions of a pendular nature in the three directions of space. Where the times of vibration are in simple ratios to each other, crystals are formed; where, again, the relations are complicated or incommensurable, we have liquids; and in the gaseous state, the physical molecules break up into the chemical. If the ratios of the three motions are 1 : 1 : 2 we have 4 osculating planes, enclosing a tetrahedron. The common orientation of these planes in all molecules produces planes of cleavage. If the ratios are 1 : 1 : 3, there are 6 osculating planes and a rhombohedron. By means of a tuning-fork throwing a soap-bubble into vibration, the author illustrates his hypothesis. He deduces a number of crystallographic properties, further assuming that parallel-directed vibrations attract each other, while opposite repel.

A SERIES of experiments in spectrum-analytical comparison of gas, sun, day, and the electric light has been lately made by Herr Meyer (Carl's *Zeitsch. für angew. Electr.-Lehre*, 1, p. 320, 1879). He used both Vierordt's method and a method first suggested by Bohn; in the latter a Nicol prism is fixed before one-half of a slit and receives the light from one source; behind it is the Nicol, rotatable in a graduated circle of Wild's polaristrobometer. The light beam passing through both prisms strikes a rectangular glass prism, which reflects it into the spectrum apparatus. The second slit-half is illuminated either directly or through a second rectangular prism from the second light source. The numbers show that the brightness of the colours in the gas-spectrum, compared with that in sun or daylight and the electric light, steadily decreases from the red to the violet end of the spectrum. As sunlight is considerably brighter in the middle parts of the spectrum than the electric light, the latter should appear yellow with the former; and in a Ritchie photometer the surface illuminated by the electric light did indeed appear yellow like an orange, in comparison with that illuminated by the sun. Another interesting fact elicited is that in daylight there is comparatively more red and yellow, and less blue and violet light than in sunlight.

LAST year M. Van Rysselberghe devised a regulator rigorously isochronous in theory, that is, the movable masses of which were displaced exactly along a parabola. It was considered, however (in the Belgian Academy), that practically the number of articulations was too great to allow of the isochronism being realised. M. Van Rysselberghe has now hit upon a different and very simple combination, in which the articulations are reduced to a minimum, and which gives a very close approximation to the parabola, though not that figure rigorously. He has a model, the velocity of which is maintained constant to nearly $\frac{1}{1000}$, while the force transmitted to the vanes and absorbed by them, varies in the ratio of 1 to 200. He does not despair of pushing the precision to $\frac{1}{10000}$ (or less than a second a day). One special feature in the apparatus is a system of vanes designed to increase the resistance in a proportion slightly greater than that furnished by the increasing aperture of the moderator-lozenge. These vanes, on a straight horizontal axis, strike the air at different inclinations according to the resistance to be developed, being moved by suitable gearing, and automatically into various positions from the horizontal to the vertical. There is also a system of compensation for variations of temperature. This regulator is expected to be of great service in application to registering at a distance, to chromographs, to equatorial telescopes, to siderostats, to telegraphs, and to industrial motors. (It is described in the *Bulletin* of the Belgian Academy, No. 1, 1880.)

SOME experiments by Herr Reusch, with a view to determining the modulus of elasticity of ice, have been recently published (*Ann. der Phys.*, No. 2). Rectangular prismatic lamellæ of ice were obtained by pressing the edges of two heated plates of zinc, fixed parallel in a frame, into plates of ice, the ends being then cut with two other zinc plates in the frame. After careful measurement and weighing, the number of transverse vibrations of the tone given by the lamella supported near the outer fifth was determined by means of a Marloye sonometer (a monochord 1 m. long, with tuning-fork giving 256 vibrations per second). This was done, of course, in a room with the temperature below zero. Calculating according to the formula given by Seebeck, Herr Reusch found the arithmetic mean (from five experiments) of the modulus of elasticity E, in kilogrammes per square millimetre = 236·324. The only previous determination known to him is that of Frankenheim (in Mousson's "Physics"), where $E = 541$, a number which he therefore thinks more than twice too great.

IN a recent paper in the *Annalen der Physik* (No. 2), Herr Frohlich endeavours to prove that of the three electrodynamic fundamental laws enunciated by Clausius, Riemann, and Weber severally, as satisfying the principle of conservation of energy, that of Clausius—and, supposing unequal velocity of the two electricities in the galvanic current, the two others also—leads to theoretically unreliable and practically useless results.

GEOGRAPHICAL NOTES

LETTERS have been received from Prof. J. B. Balfour, announcing that he had been safely landed by H.M.S. *Seagull* in Golbourn Bay, at the west end of Socotra, on February 11, weather not permitting the vessel to go round to the principal port, Samarida. Prof. Balfour had formed pretty high expectations of the island from what he had heard, but these were greatly exceeded by the reality. The flora was found to be rich and varied, and 150 species of plants, some of great interest, had been obtained in a few days. Birds were numerous, as also reptiles and insects. There was plenty of water, and some splendid *Dytisci*. The geology was very perplexing, granite, limestone, and dioritic rocks being mixed up in an extraordinary manner.

WE are glad to see that the Geographical Society is doing its best to show honour to Prof. Nordenskjöld and to give him a hearty welcome to this country. A distinguished deputation awaited his arrival at Portsmouth on Monday, but unfortunately the *Vega* did not appear, though by this time she has, most probably, arrived. The highest British mark of honour awaits the explorer—a dinner at Willis's Rooms, at which, we are glad to learn, the Prince of Wales will be present. We have said so much concerning the work of Prof. Nordenskjöld that scarcely anything new is left to say either concerning himself or concerning his services to science in the voyage he has so successfully accomplished. Commerce is sure to follow up the pioneer work of the *Vega*, and we hope that very soon the region explored will be garrisoned, as the *Times* puts it, by meteorologists who will "watch the winds where they are born."

AT the meeting of the Geographical Society on Monday evening it was announced that Prof. Nordenskjold, who is already a Gold Medallist, had been elected an Honorary Corresponding Member. Mr. E. Hutchinson afterwards read a paper on the ascent of the Binué branch of the Niger in 1879 by Ashcroft, an agent of the Church Missionary Society, in the little steamer *Henry Venn*. The party left Lokoja, at the confluence with the main river, on July 8, and on August 28 arrived opposite Yola in N. lat. 9° 16′ and E. long. 12° 31′, some 364 miles to the eastward in a straight line. From Yola they proceeded past the junction of the Faro tributary, where Dr. Barth crossed in 1851, and for about forty miles higher up, anchoring on September 4 off the town of Garawa, which lies some distance from the river bank. This place is situated in N. lat. 9° 28′ 45″ and E. long. 13° 26′. As the river was falling fast, Mr. Ashcroft only ventured to go a few miles further up in a steam launch. The distance traversed by the *Henry Venn* Expedition, which had never been previously explored, is probably not far short of 150 miles, and of this an exceedingly good chart has been made by Mr. Flegel, a German who, in his anxiety to join in the exploration, accompanied the party as ship's clerk. It is satisfactory to learn that the natives, except at one spot, showed themselves particularly well-disposed.

Mr. Hutchinson also made some interesting remarks, partly of a speculative nature, on the river systems of the Binue and the Shari, and their possible connection near Lake Chad.

MR. J. W. MOIR, of the Central Africa Trading Company, has just sent home from Livingstonia some notes of an expedition from the Mombera country, near the northern end of Lake Nyassa, to the north-west portion of the great basin of the Loangwa, which falls into the Zambesi at Zumbo, above the Kebrabasa rapids. Crossing the Kasitu river he marched a little north of west through an uninhabited, undulating forest-land, scantily supplied with water. No game was seen, but the *tsetse* fly was very abundant in several swampy valleys. Mr. Moir then crossed the Rukuru river, and after a march of twenty miles further west and north-west, passed over a low sandy watershed into the Loangwa basin. The country was that of the Basenga, whose chief village is in the bend of a very small stream which flows at the bottom of a deep broad course, probably well filled in the rainy season by the neighbouring Palaosenga hills. In this part water was very seldom to be had, except by digging in the watercourses, but the soil appeared fertile. Mr. Moir was able to get very little information about the surrounding country, as the people professed that they had never dared to leave their villages owing to their dread of the Mangoni. On the return journey the party passed through an uninhabited tract, chiefly covered with rather scrubby forest, to the Mombero country. In the Basenga country the first chief met with was Tembwe, who, it is interesting to note, saw Livingstone, probably in 1863, in the Tumbuka country further to the south; he has a large village, and there are generally some Arabs there. The principal chief of the Basenga, Kambombo, lives at the first-mentioned village, which is strongly stockaded. Here an Arab caravan had settled down for a time, having come from Zanzibar *viâ* Ujiji.

WE regret to learn that fears are entertained in St. Petersburg of the safety of Col. Prejevalsky, who at the last news was attempting to make his way into Thibet from China. It is stated that the German embassy at Pekin has received a letter from Count Szecheny, who was following the Russian expedition, saying he intended to return, not wishing to share the same fate as befel Col. Prejevalsky, whatever that may be. Disquieting rumours also come from Russian Turkestan as to the traveller's safety. One guide returning from Chardini reports that while he was searching for a road that had been lost, Prejevalsky and his comrades disappeared, and he was obliged to turn back. We earnestly hope these rumours may turn out to be unfounded; Col. Prejevalsky's loss would be a severe one to scientific exploration.

TWO Austrian travellers, the *Times* Calcutta correspondent telegraphs, March 21, have arrived at Rangoon from China by the overland route through Yunnan and Bhamo. They attempted to enter Thibet, but were prevented by Chinese officials. No doubt this is the party of Count Szecheny referred to above.

IN its last summary of colonial intelligence the *Colonies and India* furnishes a curious piece of news from New South Wales, which recalls to memory a sad incident in Australian exploration. A few years ago, we are told, a man named Hume, who had penetrated very far into the interior, stated that there was a white man living with the blacks in the far west, who, he was confident, was a survivor of Leichhardt's expedition. This assertion was at the time mostly disbelieved, but information has now been received which leads to the impression that Hume's statement was true, and that the white man in question died about November, 1876, when making an attempt to leave the black tribe with which he had been living, and to reach the camp of some white explorers.

FROM the Hongkong papers we learn that Commander Salmond, in H.M.'s Gunboat *Midge*, has recently paid a visit to Sandakan Bay, in Northern Borneo, where he found Mr. Pryor, the agent of the English Association, holding, as we have before recorded, a large concession from the Sultan, diligently prosecuting his work of inquiring into the resources of the country. The natives are reported to be quite content with his system of administration.

THE current number of *Les Missions Catholiques* contains the first instalment of Père Janvier Martini's account of his journey from Khartûm to Gardaref, as well as much information respecting the late Abbé Debaize, who died at Ujiji on December 12. Under the title of "Captivité et Deliverance," Pere Deguette also commences the narrative of his misfortunes in Corea.

THE *Presse* of Vienna announces that Capt. Weyprecht is making, in conjunction with Count Wilczek, the final arrangements for a new Polar expedition. Many Dalmatian sailors have already offered to take part in the expedition. Count Wilczek and Capt. Weyprecht will shortly visit Hamburg to confer with representatives of various European Societies.

ACCORDING to the *Times* Candahar correspondent Mr. Giesbach, geologist, has, at the Sirdar s special request, been appointed by the Indian Government to report on the mineral capabilities of the Candahar district. Major Leach, R.E., has also been specially deputed for survey purposes in that district under Col. St. John's orders.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The number of failures to pass the Local Examinations continues very large; possibly this may be traced to defective teaching of science subjects, and the relation of the elements of the theoretical to the concrete aspects of geometry and physics. Four senior girls and twenty three senior boys obtained a first class. None of the former are distinguished in the physical science subjects. Thirty-six junior girls and 215 junior boys obtain a first class. More than one-third of these junior girls have distinguished themselves in one or more subjects of physical science.

PROFESSORS PAGET, Stokes, Liveing, C. C. Babington, and Dewar will lecture in the coming term; also Mr. W. J. Sell (Chemistry), Mr. Sedgwick (Demonstrations in Mammalia).

SOME new cases for the Bird Room, and apparatus for the Chemical Laboratories has been voted.

THE late Dr. Andrew Vans Dunlop of Edinburgh has left the University of that City the residue of his estate, amounting to about 50,000*l.* Of this sum, 30,000*l.* will, it is understood, be paid to the University authorities; while the remaining 20,000*l.* will ultimately accrue to the Uuiversity. 3,000*l.* is to be added to the general fund of the University; and the remainder of the 50,000*l.* is to be employed in founding sixteen "Vans Dunlop Scholarships," of the annual value of 100*l.* each, tenable for three years. It is also provided by the will that the first six scholarships created shall be for students of medicine, while the others are to be equally divided amongst students of the classes of chemistry, English literature, classics, political economy, logic and moral philosophy, natural philosophy, mathematics, natural history and engineering.

SCIENTIFIC SERIALS

THE *Proceedings of the Linnæan Society of New South Wales*, vol. iv., parts 1 and 2 (Sydney, 1879).—Part 1. Rev. J. E. T. Woods, on some tertiary fossils; describes a large number of fossil shells from the tertiary (probably miocene) beds of Muddy Creek, Western Victoria; figures of all the species are given. On some new marine shells from Port Jackson (three new species described and figured). On some freshwater shells from New Guinea (three new species of Melania, with figures).—On some new marine shells from Moreton Bay (three new species). On *Araujа albens* (notice of its appearance at Moreton Bay).—F. M. Bailey, on some of the introduced plants of Queensland. On a new species of Asplenium from Trinity Bay Range.—W. A. Haswell, M.A., on the Australian species of Penæus (six species described as new). A contribution to a monograph of the Australian Leucosiidæ; adds twelve new species to the list of Australian forms, *i.e.*, four new species of Leucosia, two of Myra, one of Myrodes, three of Phlyxia, one of Lithadia, one of Arcania, nearly all of which are figured.—Wm. Macleay, on some fishes from the Solomon Islands; gives a list of fifteen species, not one of which is mentioned in the fishes of this group as given in the "Voyage of the *Curaçoa*," and describes a new species of Mesoprion.—E. P. Ramsay, on the zoology of the Solomon Islands (enumerates forty-five species of birds). Contributions to the zoology of New Guinea; parts iv. and v. On Mr. Goldie's collections, with a list showing the distribution of the species of birds.—N. de Miklucho-Maclay, the proposed zoological station at Sydney.—E. Meyrick, on a micro-lepidopteron destructive to the potato (*Lita solanella*).—Dr. Cox, on two new species of Helix from the Louisiade group.—Part 2.