BOTANY

Variegation of Leaves

M. EDOUARD MORREN attributes the variegation of leaves to a disease which is contagious and which may also be communicated from one species to another by inoculation, as by the grafting of a variegated plant on to a healthy stock, or even from the stock to a healthy graft. The discoloured or variegated portions of a leaf have lost their power of reducing carbonic acid, the plants are generally weaker and smaller, their flowers and fruit inferior, and they are more liable to be injured by cold. It is the sign of an organic disease produced by various causes, as the deterioration of the seeds, dampness of the ground, want of light, &c. None of the higher classes of plants can exist if entirely deprived of chlorophyll, except such as are parasitic. Some of our common variegated cultivated plants, such as *Pelargonium zonale* and *Hydrangea*, sometimes put out branches which are entirely colourless, but these only live a parasitic life on the rest of the plant. That the disease is an individual one is shown by the fact that it can be propagated by buds, layers, or grafts, even by the insertion of the petiole of an infected leaf beneath the bark; while the seeds of variegated individuals will generally produce healthy and fully-coloured plants. A. W. B.

Dimorphic Leaves of Water-plants

FOLLOWING out his observations on the leaves of *Marsilia* (see NATURE, No. 11 p. 293) Prof. Hildebrand finds that some other water plants exhibit a similar peculiarity, as, for instance, *Polygonum amphibium*, and the common arrow-head, *Sagittaria saggittifolia*, frequently producing, when growing in very deep water, floating leaves of a different form from the ordinary leaves, and exhibiting also differences in structure and in the arrangement of the stomata. In the latter species the floating-leaves are round and heart-shaped, similar to those of a water-lily, instead of arrow-shaped. A. W. B.

THE MARQUIS DE POMPIGNAN asserts that a remarkably fine quality of truffle is cultivated in the vicinity of the Garonne, on a district almost solely arenaceous.

PHYSICS

Phosphorescence of Gases

IT is a well-known fact, the discovery of which appears due to Geissler, of Bonn, that certain highly attenuated gases have the power of remaining luminous for a short time after the interruption of an electric current by which they have been traversed. M. Becquerel attributed this phenomena to the presence of oxygen, either free or combined; M. Morren has since denied that pure oxygen itself can exhibit the electric phosphorescence, but that it does so when mixed with other gases, more particularly nitrogen. Such being the state of the question, M. de la Rive requested M. Edouard Sarasin to execute a series of critical experiments, an account of which appears in the Archives des Sciences physiques et naturelles [135, p. 243] and is summarised in the following paragraphs.

The experiments were made in a large glass jar, 20 centimetres in diameter and 30 centimetres high, which was placed on the platinum plate of a Babinet's air-pump, capable of giving a vacuum of half a millimetre. The electrodes consisted of two brass stems, to the extremities of which were screwed two thin disks of either brass, platinum, or silver. One of them was fixed on the brass screw-plate in the centre of the platinum, the other occupied the middle of the flat glass cover of the jar. They were also connected with the two poles of a Ruhmkorff's coil of medium size, traversed by the current from four Grove's cells. The interior of the jar communicated with (1) a desiccating apparatus, through which the gases were introduced; (2) a manometer reading to 0·04 millimetre, and (3) a brass tube in which were placed chemically pure gases, contained in bulbs which could be broken in a vacuum.

A number of experiments were made with oxygen, both as prepared from potassium chlorate and as yielded by electrolysis. Closing his eyes during the intense and blinding glow of the continuous discharge, and suddenly opening them on the interruption of the current, the observer witnessed, in every case, a pale, whitish glimmer, directed, though but momentarily, over the path of the preceding display. At and below a pressure of three millimetres, but especially at two millimetres, this light fills the whole jar. Simultaneously with this occurrence, ozone is produced, as proved by testing with finely divided silver; whence, as might be expected, the phosphorescence is considerably diminished by employing electrodes of silver. No gas, other than oxygen, exhibits this property. Hydrogen, nitrogen, chlorine, iodine-vapour, ammonia, coal-gas, hydrogen chloride, and even atmospheric air, alike failed to produce it.

When highly concentrated hydrogen sulphate was placed in a capsule on the platinum plate, and nitrogen, air, nitrous oxide, carbon moxide or dioxide was admitted under the usual conditions, a phosphorescence was obtained of greater intensity and larger duration than in any of the other experiments. Here, also, ozone was formed. The presence of silver diminished, the presence of hydrogen entirely obliterated the phenomenon.

Sulphur dioxide gave a feeble but decided phosphorescence. Hydrogen nitrate and nitrogen peroxide showed a weak effect. Carbon monoxide and dioxide were very perceptibly phosphorescent, and still more on the introduction of hydroge sulphate. It was noticed that the addition of this sulphate invariably diminished the conductibility of the gas.

The most curious results were observed with nitrous oxide. During the passage of the spark, at ten millimetres (and even higher) pressure, a narrow jet appears, of a bright rose colour, and exhibiting fine clear striæ. Surrounding the jet is a sheath of the most brilliant yellow mist of eight to ten millimetres in thickness, and perfectly defined. As the jet grows with diminishing pressure, this sheath loses its brilliancy, advances farther in the jar, and, at two millimetres, fills it entirely. At half a millimetre, there is a large rosy jet, with enormous striæ extending to the walls of the jar, all the interstices being filled with yellowish mist. Nitrous oxide shows a phosphorescence at all pressures below ten millimetres. At first this is very bright but only instantaneous, occupying exactly the place previously assumed by the yellow sheath. As the vacuum improves, the phosphorescence becomes more permanent; and ultimately, at one millimetre, and after the interruption of the spark, a yellow mist is visible for three seconds, and is bright enough at first to illuminate surrounding objects very evidently.

The preceding experiments lead the author to infer that oxygen is the sole cause of the phosphorescence in question, which is also and necessarily produced by most oxygenated gases.

SCIENTIFIC SERIALS

Berg-und huttenmannische Zeitung. The last number of this journal contains the following account of a new locality for the mineral Knebelite, by L. J. Igelström, of Filipstadt. For some time Knebelite was only known as occurring at Ilmenau and then it was afterwards discovered at Danemora. During a journey in the year 1866 he discovered it at the Hilläng iron mine in the parish of Ludovika, province of Dalarne, Sweden. It is found there in great quantities, sometimes in masses twelve feet thick. It occurs in the hälleflinta, the ore-bearing rock, in connection with magnetic iron limestone and traces of magnetic pyrites, with all of which it is impregnated. The mineral from Ilmessau and Danemora has a pretty constant composition, containing 30—32 silica, 32—34 protoxide of iron, and 34—35 protoxide of manganese (*vide* Dana, 1868). The composition of the Knebelite from Hilläng, which is somewhat different, is as follows:—

Silica	33·14	with	16·74	Oxygen
Protoxide of iron .	40·96	,, 9·09	15·38	,,
Protoxide of manganese	19·35	,, 4·42		,,
Lime	6·55	,, 1·87		,,
	100·00			

This difference may, perhaps, have been caused by the mineral not being entirely free from intermixed magnetic iron. There is, nevertheless, no doubt whatever, if one compares the external characters, that the Hillängs mineral is the same as that of Danemora, and, indeed, it was this identity of external appearance which occasioned its discovery at Hillängs. Both varieties of the mineral have the characteristic of gelatinising with hydrochloric acid.

IN *The Journal of the Quekett Microscopical Club* for April, is the commencement of an article by Mr. M. C. Cooke, on Microscopic Moulds, restricting the term "moulds" to the *Hyphomycetes*, and including all those filamentous fungi which bear

naked spores (sporiferous, in contradistinction to sporidüferous) at the apex of simple or branched threads. It promises to contain much valuable information. Other interesting papers are by Dr. Braithwaite, on the Geographical Distribution of Mosses; M. de Brebisson, on French Diatomaceæ; and Mr. B. T. Lowne, on the Cornea of the Bee.

THE *Journal of the Ethnological Society* for April contains a valuable report by Lieut. Oliver, R.A., illustrated by several very beautiful lithographs, on the present state and condition of Pre-historic Remains in the Channel Islands. Notwithstanding the wholesale and wanton destruction of these monuments in the Channel Islands within the last half-century, there are nevertheless few localities, Brittany excepted, in which the sepulchral stone structures of the neolithic period can be studied with greater advantage. Lieut. Oliver describes in detail the monuments still remaining in Guernsey, Herm, Serk, Jersey, and Alderney; and notes the remarkable resemblance borne by them to the monoliths and stone tombs of Madagascar, erected by the hill-tribes of Hovas even at this very day. Mr. C. T. Gardner contributes an essay on the Chinese Race, their Language, Government, Social Institutions, and Religion; Mr. G. Busk, a description of, and remarks upon, an ancient *Calvaria* from China, which had been supposed to be that of Confucius; and Mr. H. H. Howorth, a continuation of his article on the Westerly Drifting of Nomades, from the fifth to the nineteenth century.

Geological Magazine, vol. vii. No. 4, April 1870.—This number opens with the first of a series of notices of eminent living geologists, and the editor's choice has worthily fallen upon the veteran Professor Sedgwick. Professor Huxley has a paper, illustrated with a plate, on the milk-dentition of *Palæotherium magnum*. From Professor Rupert Jones we have a series of notes on the Tertiary Entomostraca, containing supplementary remarks and corrections to his monograph of those minute fossils published by the Palæontographical Society in 1856, and including a revised list of the species. The other papers are, an article on the superficial deposits of Belgium, illustrated with a map prepared by Mr. H. M. Jenkins for his paper on Belgian agriculture, published by the Agricultural Society; a notice of the Basaltic Rocks of the Midland Coalfields, by Mr. S. Allport; a note on the Middle Drift-beds in Cheshire, by Mr. J. E. Taylor; and an extract from a letter of Mr. F. B. Meek to Dr. Bigsby, giving an account of the fossils found in some silver-bearing rocks near Central Nevada, which appear to be of Devonian age. The number contains the usual notices, reviews, reports, and miscellaneous matter.

THE *Revue des Cours Scientifiques* for April 9th is occupied by a sketch of the biological labours of the late Prof. Sars, by Emile Blanchard; a translation of Mr. Andrews' paper, read before the Royal Society, on the continuity of the liquid and gaseous states of matter. The number for April 16th contains a translation of the Anniversary Address before the Hunterian Society by H. J. Fotherby; and a report of a lecture by Claude Bernard on Blood and its General Properties.

IN the *Monthly Microscopical Journal* for April we find a description (with illustrations) by Dr. Carpenter of some peculiar fish's ova, the peculiarities having reference to the shape of the ova, the mode of their attachment to the surface of the shell, and the position and remarkable distinctness of the micropyle; and a description (with plate), by Mr. C. A. Barrett, of a new tube-dwelling stentor, found on a piece of weed taken from the Thames at Moulsford; an article on the polymorphic character of the products of development of Monas lens, by M. Johnson, with others of less importance.

THE *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, vol. 5, section 1, contains several very interesting papers of travel. An Ascent of the Peak of Teneriffe, by E. Häckel, Sketches of a Journey from Chartum to the Gazelle River, by G. Schweinfurth, both these articles being abundantly full of valuable natural-historical details; a report of the Western-Australian Expedition, by Mr. Forrest, in search of traces of Leichardt; an account of Dr. Nachtigall's Journey to Tibesti, and other shorter articles.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, April 7.—"On supraannual cycles of temperature in the earth's surface-crust." By Prof. C. Piazzi Smyth, F.R.S. The author presents and discusses here the completely reduced observations, from 1837 to 1869 inclusive, of the four great earth-thermometers sunk into the rock of the Calton Hill, at the Royal Observatory, Edinburgh, by the late Principal Forbes, pursuant to a vote by the British Association for the Advancement of Science. Leaving on one side the several Natural-Philosophy data which have been investigated from smaller portions of the same series of observations both by Principal Forbes and Sir William Thomson, the author applies himself solely to trace the existence of other cycles than the ordinary annual one, in the rise and fall of the different thermometers. Of such cycles, and of more than one year's duration, he considers that he has discovered three; and of these the most marked has a period of 11·1 years, or practically the same as Schwabe's numbers for new groups of solar spots. Several numerical circumstances, however, which the author details, show that the sun-spots cannot be the actual cause of the observed waves of terrestrial temperature, and he suggests what may be; concluding with two examples of the practical use to which a knowledge of the temperature cycles, as observed, may at once be turned, no matter to what cosmical origin their existence may be owing.

"On the Constituent Minerals of the Granites of Scotland, as compared with those of Donegal." By the Rev. Samuel Haughton, M.D., Dubl., D.C.L. Oxon., Fellow of Trinity College, Dublin. This paper contains analysis of Orthoclase from the following localities:—

No. 1. Stirling Hill, Peterhead. Occurs in an eruptive Granite, in veins, in well-developed reddish pink opaque crystals, encrusted with crystals of Albite.—No. 2. Rubislaw, Aberdeen. Large beautiful reddish pink opaque crystals, in veins, associated with white Mica. The Granite of Rubislaw is of metamorphic origin, and different in character from the eruptive Granite of Peterhead. No Albite has been found in it.—No. 3. Peterculter, Aberdeen. In Metamorphic Granite; white, translucent, large crystals.—No. 4. Callernish, extreme west of Lewis. In Metamorphic Granite; in large grey crystals, with a slight shade of pink, translucent.—The Granites of central and western Scotland are metamorphic rocks, like those of Donegal and Norway, with which they are geologically identical; and truly eruptive Granite occurs at only a few localities, as, for example, near Peterhead. The second felspar, associated with Orthoclase in the Metamorphic Granites, is Oligoclase, as in Donegal; while the second felspar associated with Orthoclase in the eruptive Granites, is Albite, as in Mourne, Leinster, and Cornwall. The fact thus indicated by the Scotch Granites is completely in accordance with the mode of occurrence of Oligoclase and Albite in the Irish Granites. (Then follow analyses of two Oligoclases.)—No. 1. This Oligoclase occurs in the Granite of Craigie Buckler, near Aberdeen; it is white and opaque, and so much resembles Cleavelandite in appearance as to have been mistaken for that variety of Albite; its analysis proves it to be Oligoclase. The crystals do not exhibit striation.—No. 2. From the Granite of Rhiconich, in the west of Sutherlandshire; it is greyish white, semitranslucent, in large striated crystals, and resembles the Oligoclase of Ytterby, in Sweden.—Analysis of an Albite which occurs at Stirling Hill, near Peterhead, in eruptive Granite, and is found associated with red Orthoclase in veins. It encrusts the large crystals of Orthoclase, and is semitranslucent; and is generally stained on the surface by peroxide of iron. This mineral is evidently a typical albite. There are two kinds of mica found in the Scotch granites, and both micas resemble very closely the corresponding minerals of the Donegal granites. The specimen of mica analysed came from veins in the granite quarry of Rubislaw, near Aberdeen, and occurs in large plates, associated with red orthoclase. It was carefully examined for lithia, but no trace of this alkali could be found in it. The angles of the rhombic plates were 60° and 120° exactly, and the angle between its optic axes was found to be 70° 30′. The black mica, in large crystals, is very rare, but it seems abundantly disseminated, in minute scales, through most of the Scotch granites. An analysis was made on specimens found near Aberdeen by Professor Nicol, and kindly forwarded to me by him, for the purposes of this paper. This mica was carefully examined for fluorine, and found not to contain any.

Researches on Vanadium. Part III.—Preliminary Notice. By Henry E. Roscoe, B.A., F.R.S.—I.—Metallic Vanadium.—II.—Vanadium and Bromine.—1.—Vanadium Tribromide, VBr_3, molec. wt. = 291.3.—2—Vanadium Oxytribromide, or Vanadyl Tribromide, $VOBr_3$, molec. wt. = 307·3.—The specific