

inspect and report upon the technical and scientific arrangements of the telegraphs in the United States. This is one result of the report of Dr. Lyon Playfair's Select Committee.

A BERNE observer has registered the number of days when the shade temperature had exceeded 20° C. in the last twenty-eight years (1849-1876). The number in each of the twenty-eight years is as follows:—31, 19, 22, 27, 22, 11, 17, 29, 30, 26, 47, 10, 37, 16, 34, 20, 30, 24, 31, 56, 31, 56, 31, 44, 38, 26, 40, 55. No regularity whatever is exhibited.

It is rumoured that the Colorado beetle is amongst us, and unfortunately not confined to the cabinets of collectors.

A BILL is being framed to be brought before Parliament next session for the incorporation of the Andersonian University, Glasgow. The Bill will provide for a change of name and several important modifications in the constitution.

THE progress of education in Russia has in recent years been very marked. In April 1866 the Czar appointed Count Tolstoy Minister of Education. In commemoration of his first ten years of official activity, this minister has recently published a "comparative map of the higher and middle educational institutions of the ministry of education in the years 1866 and 1876." The facts expressed by the map are given in tabular form, in a recent number of the *Russische Revue*, and the following extract will show, in general form, the increase in number of higher and middle educational institutions during the decennium in question:—

	1866	1876
Universities and other higher institutions ...	8	18
Gymnasia ... ..	101	133
Pro-gymnasia ... ..	7	69
Real-schulen and Real-gymnasia ... ..	11	53
Technical institutions ... ..	—	11
Seminaries for teachers ... ..	9	60
Girls' gymnasia and schools of first rank ...	39	66
Girls' pro-gymnasia and schools of second rank	55	148
	222	540

UNDER the title "L'Erborista Toscano," the eminent professor of botany at Pisa, Prof. Caruel, publishes an analytical key to the natural orders, genera, and species of Phanerogams and Vascular Cryptogams (or, as he terms them, Prothallogams) found wild in Tuscany.

UNDER the title "Contributions to the Flora of Iowa," Mr. J. C. Arthur prints a list of the flowering plants of the State, 979 in number, including varieties and introduced species, with critical notes on some of the species.

WE have before us the *Bulletins* of the Torrey Botanical Club of New York, Nos. 17-20 of vol. vi. They comprise a list of the Musci and Hepaticæ of Colorado collected by T. L. Brandegee in 1873-75, and determined by E. A. Rau; notes on some rare southern plants, by H. W. Ravenel; and several minor papers, chiefly of local interest.

WE have a useful contribution to botanical biography in a sketch by Prof. E. Morren, "Mathias de l'Obel (Lobelius), sa vie, et ses œuvres, 1538-1616."

THE additions to the Zoological Society's Gardens during the past week include five Perch (*Perca fluviatilis*) from British Fresh Waters, presented by Master B. L. Sclater; a Rüppell's Spurred Goose (*Plectropterus rüppelli*) from East Africa, a Grey Struthidea (*Struthidea cinerea*) from Australia, two Chinese Jay Thrushes (*Garrulax chinensis*) from China, deposited; four American Darters (*Plotos anhingæ*), two Boatbills (*Cancrona cochlearia*), a Sun Bittern (*Eurypyga helias*), two Black-faced Ibises (*Geronticus melanopsis*), a Silt Plover (*Himantopus nigricollis*), two Bahama Ducks (*Pacillonetta bahamensis*), a Red-billed Tree Duck (*Dendrocygna autumnalis*) from S. America, a Slaty-headed Parrakeet (*Palaornis schisticeps*) from India, purchased.

## SCIENTIFIC SERIALS

THE recent numbers of the *Journal of Botany*, Nos. 161-165 (now edited solely by Dr. H. Trimen), contain no one article of very special interest; but several interesting contributions to foreign and British botany of a more or less technical character, and strongly illustrating the present tendency of British botanists to devote themselves to systematic and nomenclatorial, to the almost entire exclusion of morphological and physiological work.—Dr. R. Spruce describes a new genus of Hepaticæ, and the Rev. M. J. Berkeley two new genera of Fungi, under the names respectively of *Anomoclada*, *Kalchbrennera*, and *Macowania*; and the Rev. J. M. Crombie some new Lichens from Rodriguez.—Mr. Hemsley and Dr. Hance add to our stock of information on the botanical products of China and Cambodia.—Dr. M. T. Masters identifies the pear recently discovered in Britain and described under the name of *Pyrus communis* var. *Briggii* with the well-known continental *P. cordata* of Desvaux.—Mr. J. G. Baker continues his useful work on the hitherto little-studied Iridæ, his contributions in the present number including the *Ixiæ* and the genera *Aristea* and *Sisyrrinchium*, with descriptions of a new *Xiphion* and *Crocus* from the Cilician Taurus.—There are many minor notes of much interest.

THE *Nuovo Giornale Botanico Italiano*, edited by Prof. Caruel, has increased its number of pages in each part; but, with its increase in quantity, has suffered no deterioration in quality. Indeed, the Italian botanical journal is now among the most important of European serial publications in botany. In the two numbers before us, the second and third for the present year, the articles of interest are so numerous that we can only glance at some of the most important, at the risk of doing scant justice to the remainder. The longest article is one which extends over the two numbers, on the alimentations of cellular plants, by G. Cugini. The result evidently of great labour and research, it is impossible even to give an abstract of the conclusions at which the writer arrives. With regard to the relative importance of the various elementary substances of which the food of plants is composed, he differs somewhat from the results arrived at by Sachs and detailed in his "Text-book," especially in considering potassium, calcium, magnesium, and iron as of nearly equal value in the vegetable economy. He thinks that potassium has a somewhat similar relationship to the carbohydrates to that which phosphorus bears to albuminoids. Signor Cugini's list of the essential food-materials of plants comprises organic carbonaceous substances, water, ammoniacal salts, sulphates of potassium and iron, phosphate of magnesium, and an alkaline silicate; and that of non-essential ingredients, in the order of their importance, the chloride, iodide, or bromide of sodium or potassium, the phosphate, nitrate, or sulphate of calcium, and salts of zinc, manganese, and aluminium.—Prof. Delpino contributes a paper on dichogamy and homogamy in plants, which is of great interest in view of Mr. Darwin's promised work on cross-fertilisation and self-fertilisation. After classifying plants into homogamic and dichogamic, he further subdivides the former class into homoclinic, in which the pollen fertilises the ovules in the same individual hermaphrodite flower; homocephalic, in which it fertilises ovules in flowers belonging to the same inflorescence; and monœcious, in which fertilisation is effected on ovules contained in flowers on a totally different part of the same individual. A series of experiments indicated that the fecundity resulting from pollination was in an inverse order to that given above.—Dr. G. Gibelli has made a careful examination of the infolded leaves of *Empetrum nigrum*, a common plant on our mountain heaths, and finds a striking resemblance, on a miniature scale, to the pitchers of *Nepenthes*, *Sarracenia*, &c., suggesting also an analogy of function. The paper is illustrated by two well-executed plates.—Cryptogamic botany comes in for its full share of attention.—In addition to papers on the Bacteria parasitic on fungi, by Dr. Lauzi, on the structure of *Pilularia globulifera* and *Salvinia natans*, by G. Arcangeli, and on *Isoetes Duriei*, by A. Piccone, there are others on the fungi of Venetia, on the Hepaticæ of Borneo, on new Italian fungi, and on the mosses of Liguria.

*Der Naturforscher*, April-July.—In the numbers we note an account, by M. Hoffmann, of a singular phenomenon in an orchard near the village of Heuchelheim. A large fire occurred in the village in the beginning of September, and four weeks after it numerous trees in the orchard (pears and damsons, &c.) that had been singed by the fire began to vegetate anew, putting forth tender green leaves and blossoms, often by the side of fruits

which the fire had spared. Examining the wood with a microscope he found the starch contents of the cells transformed into a pulpy mass; sugar was present both in the singed and the unsinged trees. M. Hoffmann tried to reproduce the above phenomenon artificially, but failed, doubtless through not hitting the right temperature.—In another botanical paper M. Pringsheim maintains that the red in *Floridaea* is a modification of the green in these plants, and not an immediate modification of the chlorophyll of phanerogams.—There is an instructive abstract in the May number of M. Suess' recent work on the origin of the Alps. He considers the members of the Alpine chain to have been formed not through a pressure from below upwards, in the middle, but by a horizontal force acting towards the north or north-east and capable of being deflected by obstacles in its superficial action. In North America and in great part from the Pacific Ocean to the Caspian the same direction of force appears; but further east, *e.g.*, in the Red Sea and Indian Valley the direction is different; in the highlands of Central Asia the prevailing movement is towards the south and south-west. M. Suess specifies various forms of mountain-formation.—We note an interesting lecture by M. Jäger on the significance of gill-slits in taking of food. They permit rapid escape of the water sucked in (but not of the morsel) and in a backward direction, not interfering with advance of the fish. In fish that chase their prey the gills open widely. In flowing water fishes have in general wider gill-slits than in still. Gill-less amphibia get their food mostly in the air or on the surface. Tritons take food under water awkwardly as compared with fishes, and they prefer large bites that the outflow of the water may be facilitated.—In a paper on conceptions of the arrangement of atoms, M. t'Hoff denotes as an "unsymmetrical carbon-atom" one which is combined with four different elements or radicals. He affirms that every compound containing such an atom must be able to exist in at least two isomeric modifications. Further, the optical activity of an organic substance is caused by the presence of an unsymmetrical carbon atom.—We find in the June number a brief account of Dr. Bessel's observations on the intensity of heat radiation from the sun in high latitudes. This, it appears, increases with the altitude of the pole.—M. Sanson has been making observations on the excretion of carbonic acid in the larger domestic animals. Genus and species have influence on the respiration; thus, *Equidæ* excrete more  $\text{CO}_2$  than *Bovidæ*. Males excrete more than females; young animals more than old. Food, so long as it maintains the normal state, has no influence on the breathing functions, nor muscular exertion when ended. The excretion of  $\text{CO}_2$  is directly proportional to rise of atmospheric temperature, and is inversely as the barometric pressure—these two influences compensate each other.—It is shown by M. Gassend that plants lose in weight under coloured glass.—From experimenting on the phenomena of affinity in slow oxidation of hydrogen and carbonic oxide through platinum, M. v. Meyer concludes that carbonic oxide is much more strongly attracted by the platinum molecules than hydrogen, and forms an envelope round these, hindering access of the hydrogen molecules to the platinum, and only permitting it when a great part of the carbonic oxide is oxidised.—July.—Some observations by M. Serpieri lead him to an explanation of the zodiacal light as an electrical aurora.—The passage of electricity through gases forms the subject of an investigation by M. Oberbeck.

*Journal de Physique*, May—August.—In studying the propagation of heat in crystalline and schistous bodies, M. Jannettaz has improved on Senarmont's method by applying to the (larded) surface a small sphere or truncated cone of platinum, which is heated by means of a battery current. In minerals the heat is propagated less easily in the direction perpendicular to a plane of cleavage than parallelly to this plane; in matters of schistous texture less easily in the normal direction than in directions parallel to the laminae, both cases being included under the general rule that heat is propagated most easily between the surfaces that have most cohesion together. Planes of stratification (unlike planes of schistosity), have no influence on the position of the axes of the curves of fusion. M. Jannettaz describes the plan by which he finds the orientation of the axes of the thermal ellipses relatively to certain guiding lines; he utilises the doubling of the curve by means of a birefringent prism.—M. Mannheim points out some new optical properties deduced from a geometrical study of the surface of the wave, and M. Mouton describes a rapid means of determining the interior resistance of a battery.—A new manometer for measurement of high pres-

ures is described by M. Cailletet; it is based on the observed fact that a cylindrical glass reservoir is diminished in volume proportionally to the pressure on it, up to a point near that of rupture, and that this deformation is not permanent. Such a cylinder, with spherical calottes and a capillary tube, is filled with coloured liquid and screwed by means of a copper adjustage into the top of a strong steel cylinder in which the pressure is to be produced, the capillary tube projecting. The pressure sends the liquid up in the latter.—M. Marey describes an apparatus for showing the velocity of a ship at any instant, and which is an improvement on the methods of Pitot and Darcy. Two vertical tubes have their lower ends bent at right angles; the orifice of the one is turned forwards, that of the other backwards (in the water). The tubes are continued upwards and enter two capsules (like those of aneroids) placed opposite each other. The inner opposed faces of these are connected by a bar toothed on its upper edge, which catches in the toothed wheel of a dial pointer. Two caoutchouc tubes above connect the capsules with a T tube, by which water is first sucked up so as to fill the apparatus. The variations of pressure produced by the ship's motion are now revealed on the dial through expansion and contraction of the capsules. The advantage of the method is that no change in depth of immersion through pitching, &c., affects the position of the pointer, but any change in the ship's velocity is at once indicated.—It is shown by M. Mercadier that the duration of the period of a tuning-fork depends on the amplitude and the temperature, and that, using the instrument as chronograph or interrupter, identical results at different times will only be had if the temperature and the amplitude be the same. If, as is usual, complete identity and large amplitudes be not required, then, so long as an amplitude of 3 mm. to 4 mm. is not exceeded, and the temperatures are little different, one is certain of having the same number of periods per second to nearly 0.0001.—M. Gernez writes on determination of the temperature of solidification of liquids, particularly of sulphur; M. Duboscq describes, with figures, his improved apparatus for projection of bodies placed horizontally (*e.g.*, the magnetic curves) and his transparent projection-galvanometer; and M. Lippmann gives a *résumé* of theories of the radiometer.—M. Terquem having sought some alcohol varnish which would cover glass with an almost invisible layer, on which one might write or draw, recommends one composed of alcohol 100 cubic centimetres, mastic 7, sandarach 3.—M. Becquerel gives an account of his experimental researches on rotatory magnetic polarisation (which he has described to the Paris Academy).—M. Jannettaz has observed that in the process of piercing a crystal normally to the plane of symmetry, the air interposed between the deformed and the traversed lamina gives rise to elliptical coloured rings similar to ellipses of conductivity, and he has investigated the value of the coefficients of elasticity according to the radii vectors of those curves. He determined the coefficients of elasticity of flexure of gypsum plates in different direction, especially those parallel to the axes of the ellipses. Comparing their relations with those of the axes of conductivity, he found the former to be represented by the cubes of the second (the numbers being 1.939 and 1.247).

*Archives des Sciences Physiques et Naturelles*, April—August.—These numbers contain several useful papers. There is a review of Swiss geology for 1875.—The origin of the *Tchernozem*, or black earth covering the upper parts of the southern plain of Russia, from the Carpathian to the Oural, has been much discussed. M. Bogdanow finds in his researches on the subject, that the deposit consists, and continues to be formed, of the remains of vegetation both of steppes and of forests; its thickness, colour, and composition vary with the subsoil; the thickest layers are 1.8 m (Murchison said 6 m.), and indicate that the region has long since emerged. The *Tchernozem* has been met with in other countries, Transylvania, Moravia, North America, &c. M. Bogdanow traces the history of the plains of Russia and of their fauna.—M. Demole studies the action of bromine on ethylenic chlorhydrine, and a new simplification of the fundamental electro-dynamic law, viewed in relation to the principle of conservation of energy, is furnished in a note by M. Clausius.—In reply to the question: Has the age of a tree influence on the mean epoch of its foliation? M. de Candolle states that in only some few species, as the vine, the foliation is retarded by age. Young trees are often earlier than those of twenty, thirty, or forty years of the same species; but this may be due to nearness to the ground, or to other local circumstances, independent of age. Similar reasons will account for buds in the

upper part of a tree opening later than those below; and in any case the influence of age on foliation is nil, or small, compared with the influences of climate.—M. Ebray contributes a paper on the impossibility of establishing the limits of geological formations, and discusses some other geological principles.—The July number is mainly occupied with a *coup d'œil* over the principal publications on vegetable physiology in 1875, by M. Micheli.—M. Wiedemann communicates two short notes on the specific heat of gases, and on the changes of the co-efficients of friction of gases with the temperature.—M. Hagenbach, in the August number, studies the equilibrium of a sphere on a jet of water. There are two cases of the phenomena. In one of these, the jet, divided into drops, strikes the sphere laterally at about 50° from the lowest point, and makes it turn rapidly about a horizontal axis. The sphere also often moves round the jet, sometimes in one direction, sometimes in the other. The water follows the sphere in its movement, flies off in a series of tangents, some of it, however, returning to the point of initial impact. The other case is that in which the sphere receives a homogeneous jet at the same point, and does not rotate about it, but passes to-and-fro across the jet between the two corresponding positions. It turns about the horizontal axis, now in one direction, now in the other. M. Hagenbach gives an explanation of these results.—M. Schmanke-witsch replies to some criticism of his researches on the changes of *Artemia salina* in water of varying saltness.

## SOCIETIES AND ACADEMIES

### PARIS

Academy of Sciences, September 18.—Vice-Admiral Paris in the chair.—The following papers were read:—Examination of observations presented at various epochs regarding the transit of an intra-mercurial planet over the disc of the sun, by M. Leverrier. He cites eleven of these, comprised between 1761 and 1820 (the paper to be continued).—Theorems relating to systems of three segments having a constant product, by M. Chasles.—Note on the period of the exponential  $e^x$ , by M. Yvon Villarceau.—Lighting by means of products extracted from resinous trees, by M. Guillemare. Distillation of oil of turpentine resting on an equal volume of slightly alkaline water, removal of it by steam, and direct and prolonged action of concentrated solutions of alkaline carbonates on oils of resin, produces complete separation of the colophony and naphthalene these liquids contain; this effect is proved if ammonia no longer affects their limpidity. To utilise the large percentage of carbon for light, two lamelliform currents are arranged round the wick; the exterior, by means of a cone 8 centimetres in height, the other, interior, with a movable conical nipple. The draught is effected with a glass chimney, which has to be ground at the base, so intense is the light. This light is recommended for ships' lanterns and photo-telegraphic apparatus.—On a mode of treatment of phylloxerised vines with lime, by M. Pignède.—M. Lucan presented an instrument employed by the negroes in Congo for capturing serpents. This is a tube, the walls of which are made of pieces of reed interlaced; when the serpent enters they contract through the very efforts which he makes to escape.—On the capture of rattlesnakes, and the supposed association of these serpents with a small owl and a small dormouse, by M. Trécul. Travelling, in 1848, in the region west of Arkansas, he caught snakes by passing over them, when erect, a loop with running knot attached to his ramrod; they remained quite straight and were easily killed. The "villages of little dogs," or dormice, are sometimes pretty large, e.g., half a kilometre in diameter. One was in a fertile district covered with high herbs, but the ground of the village was entirely denuded by the animals, and little earthworks thrown up, with holes in them, and communicating together. The dormouse takes a survey from the top of these eminences, with only his head thrust out. In coming out, which they do most cautiously, they give a small sharp bark. In another village the author saw a little owl issue from one of the burrows, which was also, evidently frequented by dormice; and in another burrow was a rattlesnake, but this burrow had evidently been long deserted by the other animals.—Symbolic formula giving the degree of the position of points, the distances of which from given algebraic curves verify a given relation, by M. Fouret.—On the physical properties of gallium, by M. Lecoq de Boisbaudran. This subject is noted elsewhere in connection with the *Journal de Physique*. We here note that the density the author formerly obtained (4.7 at 15°) was different from that

to which M. Mendeleef's theoretical views pointed (5.9), for a body between indium and aluminium to which gallium otherwise closely corresponded. Having lately, however, treated some gallium by keeping it half an hour at 60°-70° in nitric acid, diluted with its volume of water, washed, heated strongly, then solidified it in dry air, he obtained the number 5.956, which agrees with that of M. Mendeleef.—Anatomical and morphological researches on the nervous system of hymenopterous insects, by M. Brandt. He studies the metamorphoses which occur in the ganglionic chain in passage from the larval to the adult state.—Experiments and observations on vitreous rocks, by M. Meunier. He concludes (1) That vitreous rocks do not represent the product of a vitrification of crystalline rocks, but the latter are derived from the former by way of devitrification. (2) The direct devitrification of obsidian, gallinace, retinite, &c., cannot be produced, and the presence of gases and vapours in the vitreous rocks seems to be the opposing obstacle. (3) This devitrification becomes possible when the rocks, by fusion, are freed from their volatile elements.

### ROME

R. Accademia dei Lincei, June 4.—On the specific rotatory power of asparagine, by M. Cossa. He extended the researches of Pasteur on this subject, varying the proportion of asparagine to the solvent and experimenting with other acid solutions. He refers the specific rotatory power (which, for most of the liquids experimented with, might be considered as a constant) to the yellow rays of the spectrum.—On the rotatory power of santonin, metasantonin, and hydro-santonin acid in various solvents, by M. Cannizzaro.—On the electrical state of bodies, by M. Volpicelli. The electricity manifested in bodies through the condenser is to be attributed to the electricity of the atmosphere, since it follows in quantity and quality the phases of that.—M. Volpicelli replied to memoir of M. Pisati, entitled "Defence of the Old Theory of Electrostatic Induction;" also to a note by M. Cantoni on a pretended reform of the theory of electrostatic induction: also to a letter of Maxwell's in NATURE (vol. xiv. p. 27).—Studies on microscopic images of medullary nerve-fibres, by M. Boll. He studies the alterations produced by a variety of chemical agents—sodic chloride, osmic acid, glycerine, ether, chloroform, &c. He finds that the myaline does not form a continuous sheath within the axis cylinder. The medullary sheath is composed of a series of segments placed one above another (in the sciatic nerve of a frog he counted twenty to twenty-five of these segments).—Duration of vitality of the *macula germinativa*, by M. Colasanti. Experimenting with hen's eggs, he found that in the first twenty days after the egg is deposited, development of a chicken may take place, but after that epoch development is not the rule but the exception. But the germinal spots which did not produce chickens always showed some development, though incomplete. This shows that the evolution is not the result of a force which exists or does not exist in a germ, but rather of a force subjected to quantitative modification, and which expires gradually.

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