enlarge the meagre flora of the island are scarcely encouraging. Thus, although hopes are entertained that some kinds of maples may thrive in sheltered spots, conifers, from whose introduction great expectations were entertained, have not given promise of success, while poplars, oaks, apple and pear trees have without exception died. Common red- and black-currant bushes thrive so far as to set fruit, but this does not ripen except in the warmer summers. Potatoes, which would be invaluable to the islanders, have not yet been successfully cultivated, but turnips, rhubarb plants, and several of the hardier cabbages, together with lettuce and chamomile, do well. The great question, whether cereals can be cultivated, as would appear to have been the case in the times of the Sagas, does not seem to admit of a satisfactory solution, and, according to the writer, the present regular supply of corn from the mother-country by means of rapid steamers, no longer makes the attempt necessary or desirable from an economic point of view. An interesting list of the various plants introduced, with the times of sprouting, budding, &c., adds to the value of Herr Schierbeck's paper.

Revue d'Anthropologie, troisième série, tome ii., Paris.—Recapitulation, by M. Topinard, of the Society's instructions for noting the colour of the eyes and hair in France, with *fac-similes* of the printed papers distributed to intending observers, and directions how they should be filled up.—On a quinary nomenclature for the nasal index in the living subject, by Dr. Collignon. The writer, who considers a correct and systematically determined nasal index as the most important anthropometric determination, not excepting even the cephalic index, proposes to divide the ordinarily accepted nasal groups into hyper-leptorhinian, leptorhinian, mesorhinian, platyrhinian, and hyper-platyrhinian, including under the platyrhinian section all the black races, under the mesorhinian the yellow races generally, and under the leptorhinian most of the white races. The paper gives a clear and concise description of the instruments in general use, and of those best adapted for making the required measurements, which he regards as of paramount value in determining racial characteristics.—Contributions to the sociology of the Australian races, by Elie Reclus. This paper, which is principally concerned with the system of clanships and cousinships existing among these peoples, has comparatively little interest for English readers, who have long been familiar with the curious questions involved in the principles of inter-tribal relationship. Indeed, M. Reclus has drawn so largely from the writings of Brough-Smyth, Eyre, Howitt, Taplin, Morgan, McLennan, and other British writers, that this first part of his paper is a mere *résumé* of some of the more sensational details of information contained in their several works.—Anthropological observations in Guiana and Venezuela, by Dr. Ten Kate. These observations chiefly refer to the differences between the native Caribs, the so called "wood Negroes," and half-castes. The first of these present two distinct types, reminding the anthropologist of the Red Indians in some respects, and of the Mongolian races in others; the second are a specially vigorous black tribe, the descendants of runaway slaves domiciled in the forests of Surinam. Most of these men are of herculean strength and stature. Numerous anthropometric and other tables illustrate the paper.—On the depopulation of France, by M. de Lapouge. This subject, which has lately been attracting renewed attention through the appearance of the second edition of M. de Nadaillac's interesting pamphlet "On the Decline of the Birth-Rate in France," is considered by the author from an anthropological as well as a social and moral point of view. After drawing attention to the fact that while between 1770 and 1780 there were 380 births for every 10,000 of the population, this number has gradually fallen to 235 for the present decade, and is thus lower than that of Switzerland, which had been assumed to have the lowest birth-rate in Europe, and less than half that of Russia. According to the writer, the population of France has reached a stationary point, its annual increase of 80,000 admitting of no comparison with the hundreds of thousands, and even millions, annually added to the populations of Germany, Russia, the United States, and the British Empire, while, moreover, this slight increase is solely to be referred to the constantly increased immigration into France of foreigners, who now constitute one million of the population, and who predominate so largely at some points as to have reduced the French language to a secondary place in such districts. The writer discusses the various causes, such as the adoption of Malthusian principles, alcoholism, Catholicism, immorality, want of patriotism, self-interest, &c., to which the present low birth-rate has been referred. And rejecting these as inadequate, he insists that the main source of the increasing depopulation in France is the gradual obliteration since the great revolution of the blond dolichocephalic type, to which he considers most of the distinguished Frenchmen of earlier times belonged, while the representatives of the brachycephalic races, who have never distinguished themselves in science, art, or letters, have been able to take the lead through superiority of numbers. By their cupidity, narrow range of interests, and indifference to the traditions of family and national glory, he holds them responsible for the anomalous condition of the country, in which an unprecedented accumulation of wealth and great prosperity are associated with physical degeneration and diminished births. In the re-introduction of the dolichocephalic element through immigration the author sees the surest means of effecting a substitution of national type and the best prospects of securing renewed vitality to the French race.

Rendiconti del Reale Istituto Lombardo, December 1886.—Obituary notice of the late honorary member of the Institute, Signor Marco Minghetti, by the Editor. Reference is made more especially to the illustrious statesman's great merits as a political economist and art critic.—On the liquors employed in the artificial cultivation of Bacteria and other minute organisms, by E. L. Maggi. The various gelatinous, albuminous, and other solutions now in general use are described, with remarks on the best means of preparing and rendering them sterile.—On the geometry of linear spaces in a space of n dimensions, by Prof. E. Bertini. The author's theorem for ordinary space of three dimensions—"A necessary and sufficient condition for three straight lines to exist in a plane is that all straight lines meeting two of them at arbitrary points shall also meet the third"—is here generalised for a linear space S of any number n dimensions.—Meteorological observations made at the Brera Observatory, Milan, during the months of October, November, and December, 1886.

Rivista Scientifico-Industriale, December 1886.—Determination of the weight of the mercury contained in a thermometer, by Dr. G. Gerosa. Clayden having recently determined the volume of the mercury contained in a thermometer (Proceedings of the Physical Society of London, vol. vii. p. 367, 1886), Dr. Gerosa here gives a determination of its weight, which he had already worked out in the Rendiconti of the R. Academia dei Lincei, vol. x., 1881.—On the electric transmission of force, by Dr. Gerosa. The paper gives a critical appreciation of the work done by M. Marcel Deprez at Creil and by M. Fontaine in the Atelier Gramme. He considers the latter experiments the more successful of the two, M. Fontaine showing that with more economic means the same results may be realised as were obtained in the experiments at Creil.—On the development of electricity in the condensation of aqueous vapour, by Dr. Franco Magrini. In reply to Prof. Costantino Rovelli the author again shows that there is no perceptible development of electricity during the condensation of the vapour of water. A description follows of M. A. Nodon's hygrometer, already reported in the *Journal de Physique* for October 1886.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 13.—"Supplementary Note on Remains of Polacanthus foxii." By J. W. Hulke, F.R.S.

In a paper published in the Phil. Trans. 1881 the author described some remains of a large Dinosaur, remarkable chiefly for its dermal armour, discovered some fifteen years previously in Brixton Bay by the late Rev. W. Fox, and then in his collection. These have since become national property; and the large shield, which, for facility of transport, had been broken up by its discoverer into innumerable small pieces, having been recently reconstructed in the workshop of the British Museum, the author now describes this singular armature, and also some parts of the pelvis formerly obscured by rock. The pieces, which, in their very fragmentary condition, had been thought scutes, are now seen to be parts of a continuous osseous shield which protected the rump and loins, having its anterior surface ornamented with closely-set tubercles, and in each lateral half four longitudinal rows of keeled eminences. The ischium has its long axis directed transversely to that of the trunk, and not roughly parallel to it as in the Iguanodonts.

January 20.—"A Study of the Thermal Properties of Methyl Alcohol." By William Ramsay, Ph.D., and Sydney Young, D.Sc.

The writers have investigated the properties of the above substance, and obtained numerical values for the expansion of the liquid, the vapour-pressure, and the compressibility of the vapour; and from these results the densities of the saturated vapour and the heats of vaporisation have been deduced. The range of temperature is from -15° to 240° C., and of pressure from 11 mm. to 60,000 mm. The apparent critical temperature is 240°, and the pressure 59,660 mm. The pressures were corrected by means of Amagat's results, and the temperatures are those of an air thermometer.

January 27.—"On a Perspective Microscope." By G. J. Burch.

In 1874, the author, while trying to devise means whereby the different planes of an object should be visible under the microscope without the adjustment of the focus to each, discovered that, when two lenses are separated by a distance equal to the sum of their focal lengths, the optical conditions are such that the magnitude of the image bears a constant ratio to that of the object, no matter where upon the optic axis it is situated—the ratio being that of the focal lengths of the two lenses; that a given displacement of the object along the axis causes a displacement of the image in the same direction, but in the square of the ratio.

Further, that a picture drawn with the camera lucida under these conditions has the perspective of an object magnified in the square of the ratio, when it is brought within the proper distance of the eye.

The field of view of the perspective microscope is small, but may be increased by using more than two lenses, and the author's researches gave him reason to believe that, with glasses of wide angle specially constructed, a high power, with sufficiently large field, might be obtained. Several uses, other than microscopic, were indicated, to which the instrument can be applied.

The paper was accompanied by diagrams showing, in two different ways, the changes of position of the principal foci and principal points, &c., of a system of two lenses as the distance between them is varied.

A piece of moss was shown under the instrument, in magnified perspective.

"On the Thermo-dynamic Properties of Substances whose Intrinsic Equation is a Linear Function of the Pressure and Temperature." By Geo. Fras. Fitzgerald, F.R.S.

Prof. Ramsay and Mr. Young have found that within wide limits several substances in the liquid and gaseous states have the following relation connecting their pressure (p), temperature (T), and specific volume (v),

$$p = a\mathrm{T} + b,$$

where a and b are functions of v only.

Now in this case the following are the forms that the thermodynamic equations assume: T is temperature, and ϕ is entropy, and I is the internal energy.

Then $$\mathrm{I} = \gamma + \lambda,$$

where γ is a function of temperature only, and λ a function of volume only.

Also $$\phi = \Gamma + \alpha,$$

where Γ is a function of temperature and α of volume only.

Also, the specific heat at a constant volume is a function of the temperature only.

It would be most important if by some method, König's for instance, or by inserting a small microphone into a tube, the velocity of sound in substances in various states could be accurately determined, as that would enable us to determine separately the specific heats at constant pressure and constant volume.

Linnean Society, January 20.—W. Carruthers, F.R.S., President, in the chair.—Mr. J. Benbow and Mr. F. S. J. Cornwallis were elected Fellows of the Society.—It was announced from the chair that H.R.H. the Prince of Wales had officially entered his name on the roll of the Society.—The President made the presentation of an oil-portrait of Francis Masson, F.L.S., elected 1796.—Prof. Bayley Balfour exhibited specimens and showed the microscopic structure of the "ginger-beer plant." He pointed out that, although well known and used by many people as a means of manufacturing an acid drink out of sugar solution and ginger, yet no scientific account of the organism had appeared except a short note by Worthington Smith in the *Gardener's Chronicle*. It has the appearance of a white No toc, and is composed of a Bacterium (passing through all forms of rods, coils, and filaments), which apparently constitutes its greater part; and associated with this is a sprouting fungus. Judging from descriptions and figures by Kern of the "Kephir," used in the Caucasus to induce fermentation in milk, the ginger-beer plant closely resembles this; but there are many points of difference. The plant is said to have been introduced into Britain by soldiers from the Crimea.—A letter was read from Mr. Benj. Lowne referring to an exhibition by him of photographs from microscopical specimens of the retina of insects. One section represented the retinal layer detached from the opticon; other sections showed the basilar layer: thus practically affording evidence that the nerves terminate in end organs, rods placed in groups beneath the opticon—a view promulgated by Mr. Lowne in his memoir published in the Society's Transactions.—Mr. J. W. Waller exhibited a block of wood, part of an oak grown in Sussex containing an excavated tunnel and live larva of the longicorn beetle *Prionus coriarius*.—Mr. Thiselton Dyer showed and made remarks on two sheets of Arctic Alpine plants from Corea.—Mr. F. Darwin and Miss A. Bateson read a paper on the effects of stimuli on turgescent vegetable tissues, of which we hope to give an abstract in an early issue.—Mr. J. R. Vaizey read a paper on the morphology of the sporophore in mosses. According to his researches, the seta of mosses consists of an outer sclerenchyma, within which is parenchymatous tissue, and in the middle the "central strand"; this latter being surrounded by a single layer of cells, forming the endoderm, derived from the outer meristem of the growing apex. It consists of two forms of tissue, one being of thin-walled prosenchymatous cells destitute of protoplasm, their function being to conduct water: this the author terms *proxylem*. Surrounding this is a second cylinder of elongated cells with thickened walls, containing granular protoplasm; this tissue he terms *prophloëm*. On tracing the proxylem downwards, it is found that it gradually encroaches on the other tissues by the "foot," until it takes on the character of conducting tissue. The stomata on the theca are confined to the hypophysis: the form of stomata in which the guard-cells communicate is internally typical only of Polytrichaceæ and *Funaria*. In the young sporagonium five distinct meristems occur with different laws of cell-division; one form with an axial solid cylinder he terms "endomeristem." It gives rise to the central strand in the seta, and in the theca to so much of the tissue of the columella as lies within the sporagenous zone, the cells round this being derived from the "epomeristem," whilst the sporagonium layer is itself derived from the endomeristem. The hypophysis is an absorbing and assimilating organ, and performs all the functions of a leaf, and should be classed as a phyllome. The water-conducting tissue of the sporagonium only differs from the xylem of Vasculares in the absence of spiral thickening and lignification of the cells. The prophloëm differs even less from the phloëm of some Vasculares, and though no sieve-like tubes have been made out, yet they are wanting also in some Vasculares, *e.g. Selaginella*. The author compares the development of the sporagonium in some respects to certain parasitic plants; and he draws the conclusion that the Muscineæ are descended from an ancestor common to them and Vasculars, similar to the Anthoceratheæ, finally hoping in a future paper to deal with their phylogeny, specially referring to the vascular system and its homologue, the central strand of the Musci.

Anthropological Institute, January 25.—Anniversary Meeting.—Mr. Francis Galton, F.R.S., President, in the chair.—The following were elected Officers and Council for the ensuing year:—President: Francis Galton, F.R.S. Vice-Presidents: Hyde Clarke, J. G. Garson, M.D., Prof. A. H. Keane. Secretary: F. W. Rudler. Treasurer: A. L. Lewis. Council: G. M. Atkinson, Sir W. Bowman, Bart., E. W. Brabrook, Sir George Campbell, M.P., C. H. E. Carmichael, A. W. Franks, F.R.S. Lieut.-Colonel H. H. Godwin-Austen, F.R.S., Colonel J. A. Grant, C.B., T. V. Holmes, Prof. A. Macalister, F.R.S., R. Biddulph Martin, Prof. Meldola, F.R.S., Prof. Moseley, F.R.S., C. Peek, F G. H. Price, Charles H. Read, Lord Arthur Russell, H. Seebohm, Prof. G. D. Thane, M. J. Walhouse.

Chemical Society, December 16, 1886.—Dr. Hugo Müller, F.R.S., President, in the chair.—The following were duly elected Fellows of the Society:—Messrs. Horace Edward

Brothers, Francis J. H. Coutts, Tamemasa Haga, Henry John Hardy, Michitada Kawakita, Walter Leach, Stephen James Pentecost, Henry Joshua Phillips, P. Yeshwant Sheshadri, Tetsukichi Shimidzu, Joseph Stapleton, William Phillips Thomson, Hikorokuro Yoshida.—The following papers were read :—Researches on the constitution of azo- and diazo-derivatives ; (1) Diazoamido-compounds, by R. Meldola, F.R.S., and F. W. Streatfeild.—The influence of silicon on the properties of iron and steel, part 1, by Thomas Turner.—The distribution of nitrifying organisms in the soil, by R. Warington, F.R.S.—Isomeric change in the phenol series ; the action of bromine on the dibromonitrophenols, by A. R. Ling.—Some azines, by Francis R. Japp, F.R.S., and Cosmo Innes Burton.

January 20.—Dr. Hugo Müller, F.R.S., President, in the chair.—The following papers were read :—Some silicon compounds and their derivatives, by J. Emerson Reynolds, M.D., F.R.S.—Chromo-organic acids ; part 1, certain chromoxalates, by Emil A. Werner.—Note on the constitution of the double chromic oxalates, by W. N. Hartley, F.R.S.—Remarks on recent papers by A. Baeyer and J. Thomsen on the constitution of benzene, by Alex. K. Miller, Ph.D.

Royal Microscopical Society, January 12.—Rev. Dr Dallinger, F.R.S., President, in the chair.—Mr. J. Mayall, Jun., directed the attention of the meeting to eleven photo-micrographs sent by Dr. van Heurck, and which the latter thought showed results of exceptional merit. The one of *A. pellucida* by transmitted light was rather striking; it showed apparently two series of lines which were resolved into dots, and, so far as he was aware, this was the best of the kind which he had yet seen. But Dr. van Heurck did not say whether it was taken from a specimen mounted in a dense medium or not, and he thought also that several important questions of technique were omitted which it would have been very useful to have had mentioned. In the pamphlet which accompanied the photographs, Dr. Royston-Pigott was quoted to the effect that they were quite free from what used to be called "diffraction-spectra," which now here have no existence whatever ; but on examination, unless he was much mistaken, they had been painted out, or otherwise blotted out, from the negative, so that Dr. Royston-Pigott, in his remarks upon this supposed fact, had made what the French called a *boulette*. If it was desired to give each photograph a real value, the background should not be interfered with, and each impression should have the particulars as to magnification, mounting, and other data for identifying the object, the possession of which was essential in order to form any reliable opinion. As regards the longitudinal lines of *A. pellucida*, as shown in the untouched negatives of these photographs, Dr. van Heurck said he had submitted them to Prof. Abbe, who replied that, as they appeared closer than the diffraction-lines, that was a satisfactory demonstration of their existence in the object. As to the photograph of *P. angulatum*, in which a central spot was shown, all who were familiar with the object were aware that they could get the appearance of a central spot or not, according to how they looked at it: it was a question of change of focus. *Surirella gemma*, he thought, was not better shown than in Dr. Woodward's photographs. Then there were photographs of Nobert's lines, which were said to be of the 18th and 19th bands ; but here again there was nothing to enable one to identify them or to say that they were not the 14th and 15th bands.—Mr. M. Pillischer exhibited his new "Kosmos" microscope.—Mr. T. Charters White read a note on tartar from teeth of the Stone Age.—Mr. Crisp exhibited a cylinder of glass, which, though it had plane ends, acted as a concave lens, and solved some of the questions which had been raised as to the images formed in insects' eyes. He also explained Prof. Exner's method of preparing similar cylinders from celloidin and gelatine, when the effect of convex lenses was obtained.—Mr. Crisp directed the attention of the meeting to the figures of enormous microscopes in Schott's "Magia Naturalis," 1657. These had long puzzled microscopists, who were at a loss to understand what could be the object in making microscopes of the large size which was indicated by the comparison with the observers as looking through them. In Traber's "Nervus Opticus," what was undoubtedly meant for drawings of the same microscopes, the mystery was solved, for if Schott's figures were rubbed out, and single eyes were substituted for them, as Traber did in his drawings, the scale of the microscope represented was, of course, strikingly altered, and it was seen that they were small hand microscopes after all.—Mr. J. Medland exhibited and described his portable cabinet for microscopic slides.—Mr. Crisp exhibited Stein's electric microscope.—Mr. A. W. Bennett gave a *résumé* of his paper on freshwater Algæ (including chlorophyllaceous Protophyta of North Cornwall), with descriptions of six new species, illustrated by coloured diagrams.—Mr. J. Mayall, Jun., gave a very interesting account of a recent visit to Jena, where he had been afforded every facility for examining all the processes of manufacture as carried out in the factories of Dr. Zeiss. He also described his interviews with Prof. Abbe, and the way in which they had together tested numerous objectives which he had taken for the purpose.—Dr. A. C. Stokes's paper, on some new American freshwater Infusoria, was read.—The nominations for the new Council were read, and auditors appointed.

PARIS

Academy of Sciences, January 31.—M. Gosselin, President, in the chair.—On the commensurability of the mean movements in the solar system, by M. F. Tisserand. The object of this paper is to throw some light on the delicate question, how far exact commensurability is compatible with the stability of two or more bodies revolving round a common centre, as maintained by Gauss, and more recently by Gyldén and Harzer, and denied by W. Meyer in his memoir on "The System of Saturn," Geneva, 1884.—Metals and minerals from ancient Chaldæa : on the sources of tin in the Old World, by M. Berthelot. The analysis of certain metallic remains from the Palace of Sargon at Khorsabad and from Tello in Babylonia, combined with recent reports of tin mines now being worked in various parts of Khorassan, suggests the question whether tin may not have been derived from that region by the Assyrians and Chaldæans long before its arrival from the more remote Sunda Islands and Malay Peninsula in the East, or from Cornwall and one or two other parts of Europe in the West.—Experiments on the effects of transfusions of blood in the head of decapitated animals, by MM. G. Hayem and G. Barrier. The results are described of experiments on the head of dogs immediately, and some time after separation from the trunk, such as those studied some thirty years ago by M. Brown-Séquard, but not since renewed by physiologists. The authors conclude generally that the extinction of feeling and will is extremely rapid, if not instantaneous, after decapitation ; that conscious life may be sustained by the immediate injection of arterial blood from any animal of the same, or even of a different species ; and that such transfusion, made after some minutes' delay, may stimulate certain automatic and multiple reflex movements, but is powerless to re-awaken either sense or will.—Observations of the new comets of Brooks and Barnard, made at the Paris Observatory (equatorial of the West Tower), by M. G. Bigourdan.—Observations of the same comets made at the Observatory of Bordeaux with the 0·38 m. equatorial, by MM. G. Rayet and Courty.—On a method for determining the constant of aberration, by M. J. C. Houzeau. The author points out that the fundamental principle of this method, as recently submitted to the Academy by M. Lœwy, had already been indicated by him in a paper on the study of the movements of the stars, published in 1871, in vol. xxxviii. of the Mémoires of the Belgian Academy.—On the mean periodicity of the spots in Jupiter, by Dom Lamey. By a careful study of older maps of this planet (which is still in a state of incandescence analogous to that of the sun), combined with more recent observations at the Observatory of Grignon, the author deduces a mean periodicity of 5·43 ± 0·07 years for its spots.—On the theory of algebraic forms with p variables, by M. R. Perrin.—Researches on the transmission of electricity of feeble tension through the medium of hot air, by M. R. Blondlot. This is a summary of the author's researches on the transmission of an electric current through heated air, which form the subject of a memoir presented by him to the Academy. It is shown that hot air has, properly speaking, no resisting power, and he feels inclined to attribute the phenomenon to the principle of *convection*, as described by Faraday.—On the variable period of the currents in the case of circuits containing an electro-magnet, by M. Leduc.—On a halo accompanied by parhelia, observed at Fontainebleau on January 28, by M. A. Bouisson. This phenomenon, observed between 9.30 and 10 a.m , presented the appearance of a luminous circle, with a radius of about 23°, concentric with the sun, passing from a light brown in the centre to a greyish-yellow on the periphery. A second luminous circle, concentric with the preceding, with a radius of about 47°, showed in its upper segment the colours of the rainbow, red on the inner side. Tangential to both circles were vividly coloured arcs, the brilliancy of the latter decreasing

rapidly towards the extremity, while a luminous horizontal band passing through the centre of the sun stretched across the firmament, showing three parhelia—two very bright on the small, one faintly illumined on the large, circle.—Combinations of the glycerinates of soda with the monatomic alcohols, by M. de Forcrand. This paper deals with the glycerinates of methylic, ethylic, propylic, isobutylic, and amylic soda.—On the comparative actions of solar heat and light, by M. E. Duclaux. It is shown that all the effects of combustion produced by heat may also be produced by light; but the reverse does not hold, there being a large number of reactions, which light alone seems capable of determining. All these reactions are resumed in the displacement of the primitive molecule, which becomes decomposed in a few simpler elements, such as the formic, acetic, and butyric acids, the methylic and ethylic alcohols, &c.—On the properties of inosite, by M. Maquenne. Continuing his study of this substance, the author shows that in its transformation it may give rise to several well-defined aromatic compounds. Its other properties, he considers, may now be anticipated theoretically.—On a combination of paratoluidine and chloride of copper, by M. E. Pomey.—On the composition of the grains of *Holcus sorgho*, and their application to the agricultural industry in the south of France, by M. Bordas. The analysis of this grain shows a mean of 42 per cent. of starch, 100 kilogrammes yielding 26 litres of good alcohol at 33° above proof.—On the jugal and pterygoid stems in the vertebrates, by M. A. Lavocat.—On the heterogamy of *Ascaris dactyluris*, by M. Macé.—Reply to M. Balbiani on the subject of *Leucophrys patula*, by M. E. Maupas. The author shows that he has in no way exaggerated the novelty and interest of his observations on the various reproductive processes of this organism, as asserted by M. Balbiani.—On diurnal and nocturnal physiological variations of the cerebral pulse, by MM. Rummo and Ferrannini. The authors' observations establish a complete cycle or periodicity in these variations, from which they hope to deduce the biological theory of normal sleep.—On the secreting ducts and aquiferous apparatus of *Calophyllum*, by M. J. Vesque.—On certain phenomena of linear corrosion in the limestone formations of Couzon, Rhone Valley, by M. Ferdinand Gonnard.—On the epoch when the submerged valleys of the Gulf of Genoa were formed, by M. A. Issel. All these riverain valleys along the coast of Liguria appear to have been submerged towards the close of the Messinian and during the Astian epoch.

BERLIN

Meteorological Society, December 7, 1886.—Prof. von Bezold in the chair.—Dr. Hellmann stated that he had examined the observations of the County Fire Insurance Society in Schleswig-Holstein for the years 1874-83 for the purpose of investigating the question of lightning flashes in this province, and communicated the results of that investigation. As is the case in every other locality in which investigations of this description had been carried out, it was shown that generally over the whole province of Schleswig-Holstein there is an increase in the amount of damage wrought by lightning for the decade in question. On a comparison, however, of the different districts, it was found that the territory to the south of the Eider had experienced an abatement of damage by lightning, while to the north of the Eider, along the North Sea, and especially in the marshes, there had been a considerable increase. A computation of damage from lightning for one year demonstrated a very decided maximum in August in the continental, southern, and south-eastern districts, whereas in the north and west a summer maximum of less intensity and two still weaker maxima in May and October became apparent. In respect of a daily period it appeared that in the case of the first group of districts a maximum appeared in the hours from noon to 3 in the afternoon, while in the remaining part of the province the maximum was attained from midnight to 3 in the morning. This night maximum was specially characteristic of winter. The frequency of thunderstorms had no relation to the danger from lightning. The number of destructive lightnings depended in large part on the way in which the houses were roofed. The number was considerably greater in the case of soft than of hard roofs. In the case of churches the danger from lightning was 39 times, in the case of windmills 52 times, as great as in the case of houses having hard roofs. In regard to the cause of the different degrees of danger from lightning in the different districts, investigation indicated two points as determinative: first, the way in which the ground was built upon, and second, the geological nature of the ground. Whilst in the west, which was very liable to destructive strokes of lightning, the farmsteads were detached and scattered over the whole land; in the east and south they were grouped together into villages, and the danger from lightning was always considerably less for larger collections of houses than for scattered houses forming the only prominent objects throughout wide spaces. In point of fact, the danger from lightning was everywhere considerably less for towns than for rural districts. With reference to the geological bearings of the question, the danger from lightning was least for calcareous sand and greatest for clay. Dr. Hellmann had likewise discussed the statistics of lightning for Baden and Hesse Darmstadt, with the result that he found during the period investigated a considerable increase of damage by lightning for the southern part of Baden, and a decrease for the north of Baden and for Darmstadt. Besides a confirmation of the results arrived at for Schleswig-Holstein there appeared in the Baden-Darmstadt region a decided preponderance of danger from lightning in the Rhine plain as contrasted with a very low degree of danger in the mountains.

BOOKS AND PAMPHLETS RECEIVED

Notes of a Naturalist in South America: J. Ball (Kegan Paul and Co.).—United States Commission of Fish and Fisheries, Report, 1884: (Washington).—Berichte von dem Erzbischöflich-Haynaldschen Observatorium zu Kalocsa in Ungarn: C. Braun (Münster).—The Steam-Engine: G. C. V. Holmes (Longmans).—The Esclepiad, No. 13, vol. iv. (Longmans).—Quarterly Journal of Microscopical Science, January (Churchill).—Brain, January (Macmillan and Co.).—Journal of the Statistical Society, December (Stanford).

CONTENTS