side of which is the collodionised plate which fits water-tight against the other sides by means of india-rubber packing. There is a tube passing into this box through which first the ordinary silver solution is poured, and then by laying the collodionised plate downwards it is covered by the solution and sensitised; this is then drawn off, and the box, which is contained in a suitable holder, placed on the telescope and exposed by drawing away the non-actinic glass cover in front. After exposure the coloured glass is replaced, the box removed and developed by pouring in the solution in the same manner as the silver, in the meantime watching the plate through the coloured glass; the washing is then proceeded with in the same manner.—Dr. Stein proposes to use this method for photographing the transit of Venus.—Prof. Schmidt contributes a paper on the rotation of Jupiter, in which he discusses all the old observations of Cassini and others. From his list we gain that these observers differed to the amount of 6^m, the minimum being $9^h\ 50^m$, and the maximum $9^h\ 56^m$. From Prof. Schmidt's observations in 1873, he obtains a period of $9^h\ 56^m\ 7{\cdot}2^s$.

Archives des Sciences Physiques et Naturelles, Dec. 15, 1873.—In this number a short opening notice of M. de la Rive is followed by an article by M. Wiedemann, being an extract from his recent work on elliptic polarisation of light, and its relations with the superficial colours of bodies. The author shows that superficial colours change considerably with the nature (indices of refraction) of the substances in contact with which they are produced; and colours the most strongly reflected present generally the most intense elliptic polarisation, provided the reflection occurs in air or in vacuo. The principal angles of incidence undergo the most rapid modifications for wave-lengths corresponding nearly to the bands of absorption. M. Wiedemann's work elucidates the connection between the phenomena of bodies with superficial colours and the principal angles of incidence and relations of amplitude.—Dr. Hermann Müller's recent interesting work on fertilisation of flowers by insects is reviewed in a paper which gives a succinct *résumé* of the principal results.—M. Plantamour furnishes an account of the proceedings of the Meteorological Congress held at Vienna in 1873, and the circumstances which led to it.—There is also a note on the early development of Geryonides, by M. Fol; and this is followed by the usual scientific summary.

Ocean Highways, February.—About one-third of this number is occupied by a paper by Captain R. F. Burton, describing "Two Trips on the Gold Coast," the first being to the Beaulah Gardens and Agrimanti Hills, and the second along the shore to the Volta River. The paper, which is written in Captain Burton's characteristic and attractive style, and illustrated by two maps, is full of information, and will no doubt prove interesting to many at the present time. An article on the Bengal Famine recounts the principal Indian famines from 1661 to the present time, and shows how much could be done to foresee and obviate the consequences of famine by a more scientific investigation of the laws which regulate meteorological phenomena. The article is accompanied by a map showing the extent of the famine districts. In a short article on "Wyche's Land," called by the Germans after King Karl of Wurtemburg, it is shown satisfactorily, we think, that the honour of the discovery, by right, belongs to Edge's expedition in 1617, and that the name then imposed should remain unchanged. Some interesting details are given of Richard Wyche or Wiche, the London merchant, who did much to encourage early discovery. Other articles are on "European Emigration to the Argentine Republic," and on the "Provindah Trade," or trade of the Lohani merchants, who are the channels of communication between India and Central Asia.

SOCIETIES AND ACADEMIES

Royal Society, Feb. 12.—"On the Division of Sound by a layer of flame or heated gas, into a reflected and a transmitted portion," by John Cottrell, Assistant in the Physical Laboratory of the Royal Institution; communicated by Prof. Tyndall, F.R.S.

A vibrating bell contained in a padded box was directed so as to propagate a sound-wave through a tin tube and its action rendered manifest by its causing a sensitive flame placed at a distance in the direction of the sound-wave to become violently agitated.

The invisible heated layer immediately above the luminous portion of an ignited coal-gas flame issuing from an ordinary bat's-wing burner was allowed to stream upwards across the end of the tin tube, from which the sound-wave issues. A portion of the sound-wave, issuing from the latter, was reflected at the limiting surfaces of the heated layer; and a part being transmitted through it, was now only competent to slightly agitate the sensitive flame.

The heated layer was then placed at such an angle that the reflected portion of the sound-wave was sent through a second tin tube (of the same dimensions as the above), and its action rendered visible by its causing a second sensitive flame placed at the end of the tube to become violently affected. This action continued so long as the heated layer intervened; but upon its withdrawal the first-mentioned sensitive flame, receiving the whole of the direct pulse, became again violently agitated, and at the same moment the second sensitive flame, ceasing to be affected, resumed its former tranquillity.

Feb. 19.—"On the Number of Figures in the Period of the Reciprocal of every Prime Number below 17,000," by William Shanks, Houghton-le-Spring, Durham.

"On an Instrument for the Composition of the Harmonic Curves," by E. A. Donkin, Fellow of Exeter College, Oxford.

"On the Absorption of Carbonic Acid by Saline Solutions," by J. Y. Buchanan, chemist on board H.M.S. *Challenger*.

Linnean Society, Feb. 19.—J. Gwyn Jeffreys in the chair.—The chairman announced that a Special General Meeting of the Society would be held on Thursday, March 5, at 8 P.M., to consider alterations in the Bye-laws of the Society." The following papers were read:—Systematic list of the Spiders at present known to inhabit Great Britain and Ireland, by the Rev. O. P. Cambridge.—Some observations on the vegetable productions and rural economy of the province of Baghdad, by Surgeon-major W. H. Colvill.—Note on the Bracts of Crucifers, by Dr. M. T. Masters.

Zoological Society, Feb. 17.—George Busk, F.R.S. vice-president, in the chair. Mr. Busk exhibited some skulls of the tiger and leopard from China, procured by Mr. R. Swinhoe, and showed that those from the northern and southern provinces did not appear to be specifically distinct.—A communication was read from Mr. L. Taczanowski, Conservator of the Museum of Warsaw, containing the descriptions of twenty-four new birds, obtained by Mr. Constantine Jelski in Central Peru. Amongst these was a new Cotingine form, proposed to be called *Dolyornis sclateri*, and four new humming-birds named respectively *Metallura hedvigæ*, *Helianthea dichroura*, *Eriocnemis sapphiropygia* and *Lampraster branickii*.—A communication was read from Sir Victor Brooke, Bart., describing a new species of Gazelle, founded on two specimens living in the Society's Menagerie, which he proposed to call *Gazella muscatensis*.—A communication was read from Dr. T. Schomburgh, Director of the Botanic Gardens, Adelaide, containing an account of the habits of the Australian Coote (*Fulica australis*) as observed in the Gardens under his charge.—Mr. E. Ward exhibited the head of a supposed new species of Wild Sheep, from Ladak, which he proposed to name *Ovis brookei*, after Sir Victor Brooke.—Dr. J. E. Gray, F.R.S., communicated some notes on the Crocodile of Madagascar, which he proposed to distinguish from *Crocodilus vulgaris* of Continental Africa, and to call *Crocodilus madagascariensis*.—A communication was read from Mr. W. N. Lockington, of Humboldt County, California, containing some notes on the mammals and birds met with in that part of the State of California.

Mathematical Society, Feb. 12.—Dr. Hirst, F.R.S., president, in the chair.—Prof. Clifford gave in some detail a statement of the views advanced in his paper on the foundations of dynamics.—A discussion ensued, in which Messrs. Wilkinson, Moulton, Cayley, Roberts, and G. H. Lewes took part.—Mr. Clifford having answered questions and replied to objections, proceeded next to give an account of a paper on the free motion of a solid in elliptic space.—Owing to the lateness of the hour a paper by Mr. C. J. Monro, entitled "Note on the Inversion of Bernoulli's Theorem in Probabilities," was taken as read. Under the name of Bernoulli's Theorem are comprehended two theorems which, with a little licence, we may distinguish as the deductive and the inductive. The deductive theorem assumes the constant probability p of a given result on a single trial, and determines the probability P that on m trials the result will be produced from $mp - l$ to $mp + l$ times, or from $x - l$ to $x + l$, if x is the greatest integer in $mp + p$. The inductive theorem

assumes that the given result is produced mp times on m trials, which give a constant facility for its production (that is, are made under definable circumstances, which, if defined, would give a constant probability for the same), and determines P′, the probability that this facility lies between $p \pm \frac{l}{m}$. In the deductive theorem it is supposed that $\frac{1}{m}$ may be neglected; and in the inductive $\frac{1}{\sqrt{m}}$. (The author here refers to Mr. Todhunter's "History," p. 555, and to Mr. De Morgan's treatise in the "Enc. Metr.," § 77.) The object of the paper was to show, first that there is an oversight in Laplace's statement of the inversion (see Todhr., § 997), the correction of which removes the inconsistency of the results; and secondly, that upon the hypothesis of equally probable values within equal ranges, the inversion is so far legitimate that either theorem may be inferred from the other with little calculation, and in particular without the approximate evaluation of a general integral, and accordingly that the two solutions are identical in principle.

Chemical Society, Feb. 19.—Prof. Odling, F.R.S., president, in the chair.—Mr. James Bell delivered his lecture "On the Detection and Estimation of Adulteration in Articles of Food and Drink." The lecturer, after some preliminary remarks on the fiscal regulations with regard to adulteration, began with a description of the microscopic appearance of the various kinds of starch, as many of them, from their cheapness, are largely employed for the purposes of adulteration; he then considered the characters of pure coffee and of the various substances used to adulterate it, pointing out the most convenient methods for their detection. Tea, pepper, and mustard, were afterwards treated of in the same way. Owing to want of time, Mr. Bell was unable to complete the lecture, so that the adulteration of cocoa, tobacco, and beer was not touched upon. This admirable and instructive lecture was copiously illustrated by the most beautifully executed drawings of the structure of the various substances as exhibited under the microscope. After the lecture many of the Fellows availed themselves of the opportunity afforded them of looking over the extensive collection of microscopic preparations connected with the subject.

Entomological Society, Feb. 2.—Mr. J. W. Dunning, vice-president, in the chair.—Mr. Müller exhibited a blind Myriapod and others found in a limestone cave in the Jurassian Mountains; he believed them to be the first found in the caves of Switzerland.—Mr. Kirby exhibited *Lycæna phœbe* from Australia, which had been described by the Rev. R. P. Murray.—Specimens were exhibited of *Monohammus leuconotus*, a Longicorn beetle which was very destructive to the coffee plantations in Natal. The only remedy that appeared to have been tried was the application of Stockholm tar to the roots of the trees; but handpicking was suggested on the first appearance of the insect in the imago state. This was the practice usually adopted on the continent of Europe with regard to *Melolontha*. Also it was desirable to protect the insectivorous birds, which were frequently shot for the sake of their plumage.—Mr. Butler forwarded some corrections of the synonymy with regard to *Apatura herse* and *A. lycaon* of Scudder and Riley, which were equivalent to *A. clyton* and *A. celtis*, Boisduval; whereas *A. herse* and *A. lycaon*, Fabricius, were sexes of one species=*A. alicia*, Edwards.—A paper was communicated by Mr. Herbert Druce, entitled "Descriptions of fifteen species of Diurnal Lepidoptera, chiefly from South America."

Meteorological Society, February 18.—The papers read were:—"General Remarks on the West Indian Cyclones, particularly those from the 9th to the 21st Sept., 1872," by Mr. F. H. Jahncke, harbour-master of St. Thomas; "New Forms of Alcohol Thermometers," and "An Improved Vacuum Solar Radiation Thermometer," both by Mr. James J. Hicks; and "Note on a Waterspout which burst on the Mountain of Ben Resipol, in Argyleshire, in August, 1873," by Mr. Robert H. Scott, F.R.S. A very interesting discussion followed the reading of each paper. That upon Mr. Jahncke's led to expressions of opinion on the origin, form, tracks, and general characteristics of West Indian Hurricanes, and of the best means of improving and increasing the records of weather phenomena in those parts. The special feature in Mr. Hicks's second paper was the application of an electric current as a test for the perfection of the vacuum, which principle was very beautifully illustrated by experiments.

EDINBURGH

Scottish Meteorological Society, Jan. 29.—Mr. M. Home, of Wedderburn, in the chair.—From the report of the council it appears that two new stations, viz., Broadlands, Peebleshire, and Ochtertyre, Crieff, have been added to the society's stations, and that Kettisis and Cairndow have ceased to be stations. Thus the number of stations in connection with the society is the same as at last meeting, viz., 92 in Scotland, 5 in England, 4 on the Continent, 2 in Iceland, 1 in Faro, and 1 in South America. Observations have also been begun to be made for the society at Melstad, in the north of Iceland, and at Fairlie Plains, Paroo River, near the northern watershed of the River Darling, Australia. The council had had offers of many more stations, some in most eligible districts; but the establishment of these would have entailed additional expenditure which the society's funds would not justify. Teachers of several schools had also made known their wish to observe for the society, provided they were furnished with instruments, at the same time proposing to introduce into their schools some instruction in meteorology. The council, however, had been obliged to decline these applications for want of funds. The membership of the society is at present 560. In room of the three members of council who retired, Prof. Alexander Dickson, Dr. J. Robson-Scott, and Mr. George Hope, of Broadlands, were elected.—An application has been made to the council by Mr. Colin McVean on behalf of the Government of Japan for advice regarding the establishment of a system of meteorological observations in Japan. In answer to this application, the council has forwarded a memorandum regarding suitable instruments, their position, hours of observation, the establishment of a central observatory, inspection of stations, publications, and special observations of storms.—Mr. Buchan submitted a second report of the committee appointed to carry out the Marquis of Tweeddale's proposal to investigate the relations of the herring-fisheries to meteorology. The committee had, with the assistance of the Hon. Bouverie F. Primrose, of the Fishery Board, obtained complete returns of the daily catch of herrings and state of the weather from all the fishing districts of Scotland during the past season. Thirty-five weather maps at 9 P.M., specially constructed with reference to this question, and showing the number of boats out fishing in each district each day and the average catch of each boat, were shown to the meeting. Some interesting relations between the catches of the different districts and the prevailing weather were pointed out; and as these were in general accordance with the results stated in the first report, presented in July last, it is highly probable that when the statistics of three or four years' fishings similar to the very satisfactory returns of the past year have been collected, valuable conclusions will be arrived at.—Mr. Thomas Stevenson, in bringing before the meeting a proposed inquiry regarding storms, remarked that the barometric gradients hitherto ascertained having been deduced from readings at stations many miles apart, necessarily could not give more than a rough approximative gradient. What is wanted in order to get a formula for computing the velocity of the wind due to a given gradient is, as he (Mr. Stevenson) suggested in NATURE, vol. ix. p. 103, to have a string of stations at short distances apart. It is now proposed to establish such storm stations, arranged in lines radiating from Edinburgh for a distance of about twenty miles, and it is believed that in addition to the existing stations of the Scottish Society many farmers and others possess good barometers, which could be compared with the society's standard. It is proposed that observations of the instruments and of the weather should be limited to the periods during which storms last, and a special schedule for the observations had been prepared.—Mr. Buchan gave an account of the proceedings of the Meteorological Congress held at Vienna in September last, to which he and Mr. Scott, of the Meteorological Office, London, had been sent as delegates from the British Government.

Geological Society, Feb. 12.—A paper was read by Mr. John Horne, of the Geological Survey of Scotland, on "The Geology of the Isle of Man." The chief points of interest in the paper were the correlation of the red sandstones and Breccias with the Lower Carboniferous series of Scotland, and the proofs adduced that the volcanic rocks were probably on the same horizon as the upper limestone shales of England. Detailed evidence was given to show that the Isle was glaciated by a confluent ice-sheet from the north-west of England, south of Scotland, and the north-east of Ireland. The two submarine

hollows lying between the Portpatrick coast and the north-east of Ireland, and between Anglesea and the coast south of Dublin, were attributed to the increased erosive action of the ice-sheets due to the narrowness of the channel at these points.—Mr. Andrew Taylor gave a description of the course of the River Almond, near Edinburgh, and stated that that river followed, at various places, which he specified, lines of "faults."

MANCHESTER

Literary and Philosophical Society, Feb. 3—*Physical and Mathematical Section.*—Alfred Brothers, F.R.A.S., President of the Section, in the chair.—"On the Theory of the Tides," by David Winstanley.

Feb. 10.—R. A. Smith, F.R.S., V.P., in the chair.—"The Northern Range of the Basques," by W. Boyd Dawkins, F.R.S. The northern extension of the Basque race from their present boundary, in ancient times, is demonstrated by the convergent testimony of history, ethnology, and the researches into caves and tombs. In the Iberian peninsula the Basque populations (Vascones) of the west are defined from the Celtic of the east by the Celtiberi inhabiting modern Castille. In Cæsar's time, the Aquitani were surrounded on every side, except the south, by the Celtæ, extending as far north as the Seine, as far to the east as Switzerland and the plains of Lombardy, and southwards, through the valley of the Rhone and the region of the Volscæ, over the Eastern Pyrenees into Spain. The district round the Phocæan colony of Marseilles was inhabited by Ligurian tribes, who held the region between the river Po and the Gulf of Genoa, as far as the western boundary of Etruria, and who probably extended to the west along the coast of Southern Gaul as far as the Pyrenees. The ancient population of Sardinia is stated by Pausanias to be of Libyan extraction, while that of Corsica is described by Seneca as Ligurian and Iberian. The Basques, or Ligurians, are the oldest inhabitants, in their respective districts, known to the historian; while the Celts appear as invaders. We may be tolerably certain that the Basques held France and Spain before the invasion of the Celts, and that the non-Aryan peoples were cut asunder, and certain parts of them left—Ligurians, Sikani, and in part Sardinians and Corsicans—as ethnological islands, marking, so to speak, an ancient Basque non-Aryan continent which had been submerged by the Celtic populations advancing steadily westwards. The Celtic and Belgic invasion of Gaul repeated itself, as might be expected, in Britain. Just as the Celts pushed back the Iberian population of Gaul as far south as Aquitania, and swept round it into Spain, so they crossed over the Channel and overran the greater portion of Britain, until the Silures, identified by Tacitus with the Iberians, were left onlyin those fastnesses that formed subsequently a bulwark for the Brit-Welsh against the English invaders. The Basque non-Aryan blood is still to be traced in the dark-haired, black-eyed, small, oval-featured peoples in our own country in the region of the Silures, where the hills have afforded shelter to the Basque populations from the invaders. The small swarthy Welshman of Denbighshire is, in every respect, except dress and language, identical with the Basque peasant of the Western Pyrenees, at Bagnéres de Bigorre. The small dark-haired people of Ireland, and especially those to the west of the Shannon, according to Dr. Thurnam and Professor Huxley, are also of Iberian derivation, and, singularly enough, there is a legendary connection between that island and Spain. The human remains from the chambered tombs as well as the river-beds prove that the non-Aryan population spread over the whole of Ireland as well as the whole of Britain. The evidence offered by an appeal to history and ethnology, as to the former northern extent of the Basque peoples, is confirmed by an examination of the human remains in the Neolithic caves and tombs, scattered throughout the area under consideration. The discoveries in the caves of Gibraltar and of the Spanish mainland prove that a small long-headed race, with delicate features and orthognathic profile identical with the Basques who buried their dead in the modern cemetery of Guipuscoa, ranged throughout the Peninsula, using with indifference caves and chambered tumuli for their tombs. And on the same grounds their former range through France, Britain, and Ireland is demonstrated, and as far to the east as Belgium. At the present time the Basque blood asserts itself in the physique of certain isolated populations, and within the historic period is demonstrated to have been more strongly defined, and to have occupied larger areas, and lastly in the prehistoric period to have formed one continuous race from the Pillars of Hercules, as far north as Scotland, and as far to the east as Belgium.

NEW HAVEN, U.S.

Connecticut Academy, Dec. 17, 1873.—Prof. Lyman, president, in the chair.—Prof. Marsh, of Yale College, gave an account of the explorations of his party in the Rocky Mountains and on the Pacific Coast during the past season. The first explorations this year were made in the Pliocene deposits near the Niobrara River. Owing to hostile Indians, the explorations of the party here were attended with much difficulty and danger, but were on the whole quite successful. Many new animals were discovered, and ample material secured for a full investigation of those previously known from that region. A second expedition was made in August from Fort Bridger, Wyoming, and large collections of Eocene fossil vertebrates were obtained, especially of the *Dinocerata*, *Quadrumana*, and *Chiroptera*, which had first been brought to light by the researches of the party in previous years. A third trip was made in September to the tertiary beds of Idaho and Oregon, where some interesting discoveries were made.

PARIS

Academy of Sciences, Feb. 16.—M. Bertrand in the chair.—The following papers were read:—On the acid waters which flow from the volcanoes of the Cordilleras, by M. Boussingault.—On a mechanical equation corresponding to the equation $\int \frac{d\,Q}{T} = 0$, by M. R. Clausius. This was a paper relating to those of M. A. Ledieu on the same subject which have recently been read.—Report on a memoir, by M. Marey, on the point of action of a wing on the air, M. Tresca, reporter.—Experiments to determine whether all the vascular nerves have their focus of origin and their vaso-motor centre in the rachidian bulb, by M. A. Vulpian.—New topographical chart of Mont Blanc on a scale of $\frac{1}{40,000}$, by M. E. Violiet-Leduc.—M. Ad. Chatin advanced his paper On androgenesis compared with organogenesis another stage.—On the action of soft waters on metallic lead, by MM. Mayençon and Bergeret. Electrolysis was used by the authors to detect the lead, as they considered sulphuretted hydrogen not sufficiently delicate. They found galena slightly soluble in water by long boiling.—On the preservation of wood by means of cupric sulphate, by M. Boucherie.—Facts illustrating the history of yeast, by M. P. Schutzenberger.—On a transformation of Taylor's formula, by M. Jourgon.—On a method of determining vapour densities, by M. Croullebois. This method is a modification of that which depends on observing the tension of the vapour in a barometer tube.—Observations on the efflorescence of the two hydrates of sodic sulphates, by Dr. L. C. de Coppet. This was an answer to a late paper by M. Gernez.—On the "antifermentescible" and antiputrid properties of solutions of chloral hydrate, by MM. Dujardin-Beaumetz and Hirne.—On the method of respiration in certain fish having a labyrinthiform pharynx, by M. Carbonnier.—On the fossils brought from Cape Verde Islands by M. de Cessac, by M. P. Fischer.—On the movements of the chlorophyll in the *Selaginaceæ*, by M. Ed. Prillieux.—On the relations between thermo-electric properties and crystalline form, by M. C. Friedel.—On a method of quickly re-forming vineyards threatened by phylloxera by the introduction of American vines, by M. H. Bouschet.—On anesthesia produced by the injection of chloral, by M. Oré.

CONTENTS