THE re-mapping of England by the Geological Survey, giving the drift in its various divisions is steadily progressing, and in a short time a large part of Lancashire will be published. The quarter sheets, numbered by the survey 81 N.W., 88 S.W., 89 S.E., 90 S.E., 91 S.W. are engraved and in the hands of the colourist, and the work for 91 S.E., 90 N.E., 89 N.W. has been completed and the maps are in the engravers' hands. The sheet N.E. Somerset, and the London district have been ready some time. The old maps giving the rock mapping will continue on sale, for information that cannot be so readily gained in any other way arises from a comparison of the mapping of the rock with that of the surface drift.

ACCORDING to the Abbé David, the Chinese river Hangkiang, until lately almost unknown, is an important river of commerce, traversed by vessels of every size. A considerable portion, however, is difficult of navigation, owing to the existence of numerous rapids and many rocks.

THE death of Rev. John Bachman is announced as having taken place at Charleston on February 24. In the decease of this gentleman, Science loses one of the oldest of American naturalists, and one who has been quite prominent in the history of American zoology. He is well known from his association with Mr. Audubon in the preparation of the great work on the North American mammals, of which one edition was published, in folio, at 400 dols., and another, in quarto, at 40 dols. This, as far as its illustrations and biographies are concerned, still forms the standard treatise on the subject, although the systematic portion has been in a measure superseded by later and more critical investigations. It was, however, preceded by several monographic papers upon squirrels, hares, shrews, and other species, and also by papers upon the seasonal and other changes in colour in birds and mammals. Dr. Bachman's friends claimed for him the distinction of having been the first person in the United States to practise the art of artificial impregnation of fish, although this is stoutly contested by Dr. Garlick and other writers.

MR. R. B. WALKER writes from Corisco Bay, in Western Africa, in regard to a young gorilla which he had alive for some time, and hoped to forward to the Zoological Society of London. Contrary to the usual assumption in regard to this species, the specimen in question proved to be extremely docile and perfectly tame. When first purchased it was shy and suspicious, but not spiteful. At the expiration of about a week it was led around without resistance, and it ate whatever eatable thing it could lay its hands on, including a basin of condensed milk with a raw egg beaten up in it. It was quite tame, eating, sleeping, and playing with a large bull-terrier, the two animals being constantly together. It unfortunately disappeared one night, and was supposed to have fallen overboard.

THE forthcoming number of Petermann's *Mittheilungen* will contain the conclusion of the account of the return journey of Count Wiltschek's Arctic expedition through North-east Russia, and some remarks on the geognostic survey map of the coast of the Waigatt Strait in North Greenland, between Disco Island and the mainland, by M. Steenstrup. The number will also contain an account of Gosse and Warburton's travels through West Australia (recently referred to in NATURE), accompanied, of course, by an excellent map.

A ROMAN COMPANY, we learn from *La Nature*, proposes to lay a railway between Naples and Mount Vesuvius.

WE would direct the attention of our physiological readers to a short paper which has just appeared in the "Proceedings of the Royal Society," by Mr. E. A. Schäfer, on the Intracellular Development of Blood-Corpuscles in Mammalia, in which he shows, in the subcutaneous tissue of the new-born rat, how the red corpuscles, statically developed together with the primitive capillaries, become the dynamically circulating blood-discs of the older animal, as in the *area vasculosa* of the embryo chick.

WE are glad to see that the Leeds Naturalists' Field Club and Scientific Association has just concluded the most successful year of its existence, its operations during the past twelve months having been attended by most gratifying and steady progress. We have received the syllabus of a number of lectures (by Mr. L. C. Miall) and excursions to take place during the present and next months, illustrative of the geology of the West Riding. There will be four lectures, illustrated by seven excursions.

WE have received a short and carefully compiled sketch of the Geology of the County of Suffolk, written by Mr. J. E. Taylor, of the Ipswich Museum, a gentleman who, by the popularity of his lectures and the large audiences which he draws, is doing more than anyone to develop a genuine and lasting love for natural history in that part of the country.

MESSRS. LONGMANS & Co. have in the press a "Manual of Industrial Chemistry." It is a translation of Profs. Stohmann and Engler's German edition of Payen's "Précis de Chimie Industrielle," by Dr. J. D. Barry. It will be edited and supplemented with chapters on the chemistry of the metals, by Dr. B. H. Paul, and will be copiously illustrated. The same publishers also have nearly ready an "Introduction to Experimental Physics, Theoretical and Practical," by Adolf F. Weinhold, Professor in the Royal Technical School at Chemnitz, translated and edited by Benjamin Loewy, F.R.A.S.; it will also have a preface by Prof. G. C. Foster, F.R.S., and be illustrated with numerous woodcuts.

THE additions to the Zoological Society's Gardens during the past week include a Mourning Kangaroo (*Halmaturus luctuosus*) from the south of New Guinea, deposited by Signor L. M. D'Albertis; two Gold Pheasants (*Thaumalea picta*) from China, presented by the Rev. A. B. Frazer; a White-cheeked Flying Squirrel (*Pteromys leucogenys*) from Japan, presented by Mr. A. Gower, H.B.M. Consul at Kobe; a Common Fox (*Canis vulpes*) from Russia, presented by Mr. J. W. Ouchterlony; a Long-nosed Crocodile (*Crocodilus cataphractus*) from West Africa, presented by Mr. H. T. Cooper; and a Red Kangaroo (*Macropus rufus*), born in the Gardens.

SCIENTIFIC SERIALS

THE *Geographical Magazine*, No. 1, April.—Such is the title of the successor to *Ocean Highways*, which a "Notice" informs us, "has been discontinued," Mr. C. R. Markham, C.B., F.R.S., "having taken the editorship of the *Geographical Magazine*, issued under new proprietorship." We certainly prefer the outside appearance of the new magazine to that of its predecessor, the cover being much more tasteful and business-like; it has made an excellent start also as to contents. The first article, accompanied by a map, is on "The Basin of the Helmund," which includes all the streams that flow down into the great lake or swamp of Sistan, and lies athwart the line of advance from the north towards India. A large part of this area is still entirely unknown, and the article gives an account of the existing materials whence a knowledge of the region can be obtained. The next article gives an interesting account of the Russian Staff-Captain N. M. Prshevalski's Travels in Mongolia in 1870–73. Captain Prshevalski "has acquired most valuable scientific information which, combined with the map he intends shortly to publish, will shed a flood of light on the geography, zoology, and botany of Mongolia and Northern Thibet." This is succeeded by an article on "The Hydrographical Department of the Admiralty," giving a brief history of this most important department of the naval service, and a sketch of its labours. The article contains some valuable hints as to how the department might be made more efficient than it is if Government would only be a little more wisely liberal. An article on the Island of Hormuz, by Lieut. A. W. Stiffe, gives an account of the present state of the island and of the remains of its ancient grandeur. We can only name the other original

articles:—"A Highway to Bolivia," by Mr. Alfred A. Geary; "The Kashgar Mission," of Mr. Forsyth and party; "Dr. Beccari's Travels," in which Prof. H. H. Giglioli gives the latest news of the Italian traveller and naturalist, who has left Makassar for Kandari, an unexplored region of S.E. Celebes, where he hopes to secure specimens of the great Anoan antelope (*Anoa depressicornis*); "Geographical Progress in India in 1873;" and "the Products of West Africa," by M. W. Robinson. There are, besides the usual Reviews, Correspondence, Proceedings of Societies, &c.

Bulletin de l'Academie Royale de Belgique, No. 2, 1874.—The principal paper in this number is one by M. Montigny, in which it is sought to show that "the frequency of variations of the colours of stars in scintillation is generally in relation with the constitution of their light, according to spectral analysis." The author's observations embrace two distinct periods—one from Oct. 1870 to end of March 1871 (47 nights of observation), and the other from June to Dec. 1873 (19 nights). After referring to Secchi's three types of star-spectra, he gives a table of the stars observed, indicating the type of spectrum, the scintillations observed in a second at 60° zenith distance, the size, &c. It is found (1) that the stars scintillating most belong to the first type, or those with four spectral lines, while the stars showing weak scintillation are generally in the third group or type of nebulous bands and dark lines; (2) that the average, 86 (scintillations per second), of the first type exceeds considerably that of the third, which is 56. The average of the second group (the spectra resembling that of the sun) is 69, and thus intermediate, though a little nearer that of the third; (3) while some stars little differing in size resemble each other also in numerical intensities of scintillation (especially in the first type), no marked connection appears between the frequency of scintillation and the order of size of the stars; the last two types even present equal mean sizes, though their scintillations differ considerably. The average scintillations of the three types are in proportion of the numbers 14, 11, and 9. The author points out how his researches not only confirm M. Dufour's law that the red stars scintillate less than the white ones, but affords an explanation of it. The more frequent scintillation of the white stars is due to the fact, that, with equal distance of the observer, the total separation of the coloured bundles of rays, dispersed by the atmosphere, and which have emanated from a white star, is greater than in the case of a red star; the original rays of the white star being more numerous and more exposed to undergo frequent interception by the passage of aerial waves.—M. d'Omalius d'Halloy contributes a note on the Devonian system, and MM. Quetelet and Terby give accounts of auroræ boreales observed in January and February.

Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie, March 1.—This number opens with the concluding part of a paper by M. Mühry in orographic meteorology. The author adduces evidence from hygrometric phenomena, that the permanent equatorial ascending-current forms the transition of the polar, into the returning anti-polar, current; he also proposes a new classification of clouds, according to ascent or descent. Some particulars are furnished, in a note, as to the climate in southern parts of Europe—Gibraltar, Tarifa, and San Francisco: and M. Jelinek translates a paper by Mr. Kingston of Canada, treating of the most suitable arrangement of thermometers in determining the temperature of the air.

March 15.—The beneficial effect of Alpine health-resorts has been attributed to the greater abundance of ozone in the mountain air. Dr. Haller here communicated the result of observations on the subject in July 1872 and 1873, made at Fusch Bad, in the Alps, at a height of 1,179 metres. Comparing data obtained at the meteorological central observatory of Vienna (194 metres), it appears, that in the bright and warm July of 1873, the ozone-contents of the air at Fusch Bad were considerably greater; by night about 2°·3, and by day 2°·6. In July of 1872, which was cold and rainy, the average of ozone was by night somewhat less (0·6) at Fusch Bad than at Vienna; by day, however, it was 2° greater. It seemed likely that, on further ascent, an increase of ozone would be met with, but after climbing to 23,000 metres, there was no marked difference.—This paper is followed by an account of M. Poey's recent observations (French Academy), on the relation between sun-spots and cyclones in the Antilles.—From a study of meteorological phenomena at St. Louis, Dr. Wislizenus finds that the electricity of the atmosphere shows a three-fold periodicity, daily, yearly, and secular (or cyclical). As to the second, the quantity of positive electricity increases in the colder months, reaches its maximum in January, and diminishes with increase of temperature to a minimum in July. The cyclical periodicity is probably one of ten years.—Among other subjects treated in this number are the formation of rain-stations in Bohemia, the inadequacy of the ozonometer at present in use, the decrease of water in springs, rivers, and streams.

Gazetta Chimica Italiana. Fasc. I. e II. 1874. These numbers contain the following papers:—Studies in Toxological Chemistry. I. Search for solanine in cases of poisoning. II. Extraction of the alkaloids from the viscera, and search for nicotine, brucine, and strychnine. III. Detection of hydrocyanic acid in cases of poisoning, by Prof. F. Selmi.—Old and new Reactions of ordinary Phenol, by E. Pollaci.—A product of condensation of Oxalic Aldehyde, by H. Schiff. The substance obtained is formed according to the equation $6C_2H_2O_2 + H_2O = C_{12}H_{14}O_{13}$.—Action of Amides upon the Phenols, by Dr. J. Guareschi. The author has tried the following reactions:—paracresol and benzamide, methyl salicylate and benzamide, and ethyl salicylate and benzamide.—Concerning the action of Sulphur upon Calcium Carbonate, by Prof. A. Cossa.—Reduction of Silver Chloride by means of Sodium Hydrosulphite, by G. Scurati Manzoni. The chloride is reduced according to the equation $Na_2SO_2 + 2AgCl = 2Ag + 2NaCl + SO_2$.—On the Expansion of Fused Sulphur, by G. Pisati.—Upon the Reactions of Phenol, by G. Tasca-Lanza. The remainder of these numbers is principally devoted to abstracts from foreign journals. There is also a complete translation of Prof. Clerk-Maxwell's lecture on molecules, which has already appeared in our columns.

Journal de Physique, March.—This number commences with a paper by M. Bertrand, in which several known theorems relating to static electricity are demonstrated in a new and simple manner, which reduces them to a common principle.—M. Chautard describes an improvement on Mayer's acoustic pyrometer.—M. Lespiault calls attention to a new method proposed by M. Galle for estimating the height of the corona of aurora borealis. As applied to the aurora of February 1872, it gave 56 geographical miles (or 415 kilometres) for the absolute height. The agreement between results obtained from four different stations appears to confirm the principle on which M. Galle's method is based.—An ingenious mode of sending signals in opposite directions simultaneously, in a telegraphic apparatus of compressed air, is described by M. Deprez.—M. Gripon gives an account of some experiments made with a tuning-fork; referring to movement of cords or wires connected with it, vibration of wires in liquids, movement of liquid in a tube vibrated by fork, &c.—We further note a useful summary, by M. Violle, of MM. Favre and Valson's recent researches in crystalline dissociation, and an account of Prof. Tyndall's investigation as to acoustic transparency and opacity of the atmosphere.

Reale Istituto Lombardo di Scienze e Lettere. Rendiconti: t. vii. Fasc. iv.—In this number we find the continuation of Prof. Lombroso's researches on anthropometry and physiognomy of criminals. The results arrived at, from an extensive range of observation, are worthy of study. Among other things, the author concludes that criminals have, in general, a greater stature and weight, more ample chest, and darker hair than the normal; that they present a series of sub-microcephali (53 to 51) double the normal; that the index of the cranium tends to the brachicephalic, especially in assassins; that there is frequent cranial asymmetry; that, tested by the dynamometer, criminals show less force than the normal, but greater than lunatics; that, more often than in sane people, the eyes are chestnut or dark, and the hair is thick and black (especially in murderers); that incendiaries, and, still more, thieves, have very often the iris grey, and always a stature, weight, muscular force, and cranial capacity less than assassins or homicides. In concluding his paper, Prof. Lombroso remarks that prognathism, abundance and curliness of hair, scarcity of beard, frequent dark colour of skin, oxycephalus, obliquity of the eyes, smallness of cranium, development of jaws, retiring forehead, large size of ear, similarity of the two sexes, and scant muscular force, are points of resemblance between the European criminal and the Austral or Mongolian man.—Dr. Polli traces the recent progress of the doctrine of zymotic disease, and of the treatment of it with sulphurised preparations. Figures are given which show the largely increased production of sulphite of magnesia and sulphite of soda by certain chemical works in Italy, for medicinal purposes alone, within the last ten years.—MM. Bizzozero and Manfredi contribute a note in patho-

logical anatomy, On the Development of Contagious Molluscum.—The Architecture of Ants forms the subject of a communication from Prof. Maggi, who has been studying the habits of *Formica fuliginosa* Lat.—M. Tessori furnishes a geometrical demonstration of the error of representations given in many treatises on physics, as to deviation of the plane of oscillation of the pendulum.—In the department of moral and political science, Prof. Bucellati has a paper on central military prisons.

Archives des Sciences Physiques et Naturelles, March 15.—This number commences with a *resumé* of spectroscopic observations of the sun, made at Geneva, by M. Emile Gautier during the last three years. The results of this work (carried on under much less favourable climatic conditions than in Italy), are mainly a confirmation of those got by other observers. The protuberantial phenomena are classed under three heads; eruptions, exhalations, and detached formations; all of which the author illustrates with drawings. Like P. Secchi he was often struck by the fact (which has been doubted), that when a protuberance is observed near a pole, there is generally one symmetrical with it, at the other end of the corresponding solar diameter, and near the opposite pole. The decrease in the number and dimensions of protuberances appeared during these years (from 1869) to precede and exceed that of the spots. M. Gautier adheres to the hypothesis of spots being formed by scorial matters resulting from cooling of the surface by radiation.—In the next paper M. Humbert gives a useful summary of what has hitherto been done by the *Challenger* expedition.—The *Bulletin Scientifique*, which follows, is larger than usual. Among other notes in it, we find an account of some instructive researches by Dr. Macaluso, on polarisation of electrodes, by chlorine and hydrogen. There is also a notice of an important geological map of the Austro-Hungarian Empire, recently completed by M. de Hauer, whose name it bears. The publication, directed by Heidenhain from 1850 till 1863, represents at least twenty years' labour (under considerable difficulties), of a large number of eminent geologists. Each plate is accompanied with detailed explanations. We further note a *résumé* of some recent researches on the minute structure of the eye; and another paper on physiological antagonism of poisons, in which are described some observations by MM. Martin-Damourette, Rossbach and Fröhlich, and others, with regard to the effects of physostigmine, the active principle of Calabar bean, and atropine.

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, April 9.—Prof. Cayley, vice-president, in the chair.—Mr. G. H. Darwin read a paper On Probable Error in Statistics. He stated that he had been at work at a statistical inquiry, and was desirous of forming some idea of what degree of accuracy he had a right to expect from the collection of a given number of cases. He put the problem into the following form:—A bag is known to contain a very large number of black balls and white balls, mixed at hazard; on drawing a large handfull of n balls, I find p are white and the rest black. What is the probable error in asserting that $\frac{p}{n}$ of all the balls in the bag, are white? n and p, though large numbers, are supposed to be small compared to the number of balls in the bag. Mr. Darwin then made some further remarks On the Combination of Statistics. The question he considered was the following:—If X and Y are measurements or estimations of quantities such that the errors are distributed according to the exponential law, what is the "probable error" of XY and $\frac{X}{Y}$ in terms of the moduli c and c' of X and Y respectively? M. J. W. L. Glaisher made some remarks on the papers, drawing the author's attention to the fact that the two questions had been treated of by Laplace and De Morgan.—Mr. Merrifield then gave a sketch of his paper entitled Determination of the Form of the Dome of Uniform Stress. He remarked that the general question of the equilibrium-figure of a thin dome is indeterminate, even when the law of thickness or density is given, and it thus differs from the question of the arch, by requiring the assumption of a further condition in order to render its form determinable. If the two following conditions are introduced simultaneously into the general equations, he stated that a very remarkable simplification occurs in the analysis:—(1) that the thrust along a meridian hall equal the thrust along the parallel per unit of area at every point; (2) that the normal thickness shall vary in such a manner that the area under compression shall be proportional to the thrust. These seem to be the conditions necessary to the economical use of building materials of homogeneous character, for the maximum stretch is evidently least when the stress is equally distributed through the whole of the material. The form obtained bears a general resemblance to the upper half of a claret bottle, and the dome evidently required a heavy lantern.—Mr. A. J. Ellis gave an explanation of his theory that ordinary (commutative) algebra is the calculus of similar triangles upon one plane. Taking two fixed points O and I, any third point A determines a triangle, so that if B be a fourth point, it is immediately possible to find a fifth point C, such that the triangle BOC shall be similar to the triangle IOA, and have the angles thus named turned in the same direction. Marking this operation by a, as being determined by the position of the point A, and terming it a *clinant*, he showed that clinants obey every law of commutative algebra, so that it was possible to consider any and every existing algebraical expression as a clinant, and hence as determining a point in a plane. Clinants thus embraced not only the integers and fractions of ordinary arithmetical algebra, but incommensurables, negatives, and imaginaries. Hence also if x and y be any clinants, and $f(xy) = o$, if x be determined by taking X anywhere, a corresponding point Y would be determined. Hence arose a complete calculus of the correspondence of points in a plane, which Mr. Ellis calls *stigmatic geometry*, and which he showed comprehended under one set of equations and greatly generalised, not only the algebraical geometries of Descartes and Plücker, but the homographic geometry of Chasles, and from a single general principle gave a perfect geometrical representation of all the imaginary cases as part of one conception with the real cases. The actual algebraical work, though having the old form and obeying the old laws of operation, is greatly simplified by the clinant signification attached to the symbols, and in especial the expression and determination of direction is rendered easy and certain. (A more detailed explanation will be given, the speaker said, in his "Algebra Identified with Geometry," at the present time in the printer's hands.)—Prof. H. J. S. Smith made a short further communication in reference to his former paper On the Higher Singularities of Plane Curves.—A paper by Mr. H. M. Taylor, On Inversion, with special Reference to the Inversion of an Anchor-ring, was taken as read. Some of the properties given in the paper have been already given by Maxwell (Quart. Journ. Math., vol. ix.) where excellent stereoscopic views of four species of cyclides are given, and by Cayley in the same journal, vol. xii., and in a paper in the Phil. Trans. by Casey. The novelty of the paper consisted in the point of view from which the properties of the cyclides are investigated, viz. as the inverse figures of the anchor-ring, many of whose geometrical properties are as easily seen as those of the circle.

Linnean Society, April 16.—H. Trimen, M.B., in the chair.—A number of papers were read, being Nos. 3-14 of the series of contributions to the botany of H.M.S. *Challenger* Expedition, as follows:—Notes on Freshwater Algæ collected in the boiling springs at Furnas, St. Michael's, Azores, and their neighbourhood, by H. N. Moseley.—Note on the foregoing communication, by Prof. Thiselton Dyer.—Notes on some collections made at Furnas, by M. Archer. The diatoms belong to species of most frequent occurrence in fresh water, and appear to be in no way affected by the high temperature. The other Algæ are mostly common species, several of them British, belonging to the genera *Spirogyra*, *Mesocarpus*, *Bulbochæte*, *Œdogonium*, &c.—Notes on plants collected at St. Vincent, Cape de Verdes, by H. N. Moseley—Enumeration of Algæ collected by Mr. Moseley at the Cape de Verdes, by Dr. G. Dickie.—Enumeration of the fungi collected during the expedition of H.M.S. *Challenger*, Feb.-May 1873, by the Rev. M. J. Berkeley.—Note on plants collected at St. Paul's Rock, by H. N. Moseley. The only aërial plant found on the island was a *Chlorococcus*.—Enumeration of the Algæ collected by Mr. Moseley at St. Paul's Rock, by Dr. G. Dickie.—Notes on plants collected at Fernando Noronha, Cape de Verdes, by H. N. Moseley.—Enumeration of Algæ collected by Mr. Moseley at Fernando Noronha, by Dr. G. Dickie.—Enumeration of Algæ collected by Mr. Moseley in 30 fathoms of water at Barra Granda, Pernambuco, by Dr. G. Dickie.—Enumeration of Algæ collected by Mr. Moseley at Bahia, by Dr. G. Dickie.

Chemical Society, April 16.—Prof. Odling, F.R.S., presi-