Fauna.—Rabbit, identical with that of Porto Santo, described by Darwin as having acquired specific characters in shortened length, and colour of skin. *Sea-birds* breeding at Bugio: *Sternus hirundo, Thallassidroma bulwerii*, and many others. *Procellaria anglorum* dominant to the exclusion of *P. major* and *P. obscura*. Influence of birds in migration of plants and mollusks. *Testacea*: Distribution and affinities—*Helix crystallina*, affinities of; *H. erubescens*, distribution of; *H. punctulata*, modification of; *H. Leonina*, area of, and relations; *H. vulgata*, dwarfed example of; *H. polymorpha*, distinct races of; connections of *H. tiarella, H. coronula*, and *H. grabhami*. *Coleopterous Deucalion*, isolated species, now related to a Salvagic form.

Summary.—Showing the difficulties attending the determination of the origin and migration of species to be equally great in the component rocks of a group of islands as in the archipelago itself. Agency of man, chiefly in extinction and destruction, illustrated by introduction of opposing or contaminating forms; ravages of Eupatoria and *Phylloxera vastatrix* in Madeira; surviving vigour of Miocene plants. Author's paper only meant to be indicative of those branches and details which might singly occupy the attention of the Section.

The Multiplication and Vitality of certain Micro-organisms, Pathogenic and otherwise, by Percy F. Frankland, Ph.D., B.Sc., F.C.S., F.T.C., Assoc.Roy.Sch.Mines.—In this paper the author records a number of experiments which he has carried out on the multiplication of the micro-organisms present in natural waters, and also on the vitality of certain pathogenic organisms when purposely introduced into similar media. These phenomena have been studied by aid of the method of gelatine-plate cultivation, originally devised by Koch. The first part of the paper treats of the influence of storage in sterilised vessels, upon the number of micro-organisms present in the unfiltered water of the Rivers Thames and Lea, in the waters of these rivers after sand filtration by the companies supplying the metropolis, and in deep-well water obtained from the chalk. Of these three different kinds of water, at the time of collection the unfiltered river-waters are the richest in micro-organisms, containing, as they do, several thousand microbes, capable of being revealed by plate-cultivation, in 1 cubic centimetre of water, whilst the filtered river-waters have this number generally reduced by about 95 per cent., and the number present in the deep-well water rarely exceeds ten per cubic centimetre. On storage in sterilised vessels at 20° C., however, a great change in the relationship of these numbers soon takes place, for whilst the number of organisms in the crude river-water undergoes but little change, or even suffers diminution, that in the filtered river-water exhibits very rapid multiplication, and this increase is even still more marked in the case of the deep-well water. The author suggests that the differences in the rate of multiplication exhibited by these three kinds of water is dependent upon the number of different varieties of micro-organisms which they contain. Thus in the unfiltered river-waters the organisms belong to a number of different kinds; the filtered river-waters exhibit fewer varieties; whilst in the deep-well water the number of varieties is still more limited, the gelatine-plates having generally the appearance of almost pure cultivations. The microbes in the deep-well water will thus be less hampered in their multiplication by hostile competitors than those in the filtered river-waters, and these again less than those in the crude river-waters, in which an equilibrium must have already been established between the various competitors. When the waters were exposed to a temperature of 35° C., the multiplication was in all cases very much more rapid, but both at 20° C., as well as at 35° C., the multiplication was, on prolonged storage, followed by reduction. The pathogenic forms which have been studied by the author are: (1) Koch's "*Comma*" *spirillum* of Asiatic cholera, (2) Finkler-Prior's "*Comma*" *spirillum* of European cholera, and (3) the *Bacillus pyocyaneus*, which produces the greenish-blue colouring-matter frequently present in abscesses. The vitality of these organisms has been studied by introducing minute quantities of their cultivations into sterilised distilled water, deep-well water, filtered Thames water, and London sewage. In these media they present some very striking differences. Thus the *Bacillus pyocyaneus* was found to flourish in all; even in distilled water it was present in largely multipled numbers after fifty-three days. Koch's "*Comma*" *spirillum*, on the orher hand, when introduced into deep-well water was no longer demonstrable after the ninth day, whilst in sewage it was still found in enormously multiplied numbers after twenty-nine days. Finkler-Prior's "*Comma*" *spirillum*, although showing such far greater vital activity than Koch's in gelatine cultures, possesses far less vitality than the latter when introduced into water. Thus in the above-mentioned media it was in no case demonstrable after the first day.

SCIENTIFIC SERIALS

American Journal of Science, September.—A post-Tertiary elevation of the Sierra Nevada, shown by the river-beds, by Joseph Le Conte. In further elucidation of his already published speculations regarding an upheaval of the Sierra Nevada towards the close of the Tertiary epoch, the author here brings forward much additional evidence, also correlating this movement with a contemporaneous elevation in other parts of the western half of the continent. He endeavours to show that the upward movement, which seems to have affected all high latitude regions at that time, but which was oscillatory and therefore temporary on the eastern side of North America and in Europe, on the Pacific slope was permanent, and has largely determined the orographic structure of that region.—The strain effect of sudden cooling, as exhibited by glass and by steel (second paper), by C. Barus and V. Strouhal. In their first communication the authors compared the strains experienced by glass and steel on sudden cooling, by aid of the density variations observed when the bodies carrying strain were annealed, *as a whole*. Here they seek to confirm their earlier inference relative to the temper-strain of glass. They also investigated the density-relations of consecutive similar shells of the Prince Rupert drop, and the optical character of the successive cores. In general it is shown that the optical effect of the temper-strain in glass may be regarded as the analogue of the electrical effect of the temper-strain in steel. In a further communication a more specific inquiry will be made into the causes of hardness itself, with a view to throwing some light on the mysterious transformations of carbon.—Devonian Lamellibranchiata and species-making, by Henry S. Williams. In connection with the publication of Prof. James Hall's monograph on Devonian Lamellibranchs, completing vol. v. part 1 of the "Palæontology of New York," it is pointed out that fossil species, and even genera, are unduly multiplied on totally inadequate data. Species and genera cannot be regarded as established so long as the author himself is unable to distribute the typical specimens, twice alike, without reference to the original labels.—Note on the composition of certain "Pliocene sandstones" from Montana and Idaho, by George P. Merrill. While lately classifying the rocks collected in Montana and Idaho by Dr. A. C. Peale in 1871, the author's attention was called to some fragments labelled as "Pliocene" sandstones. A glance, however, showed that they strongly resembled compacted volcanic dust and sand, and a microscopic examination made it evident that the stones consisted very largely of minute flakes of pumiceous glass sufficiently compacted to be readily broken out into hard specimens, but extremely friable. The specimens are fully described and some speculations offered as to their probable origin. It is added that in Kansas and Nebraska these dusts are collected and sold as "diamond polishing powder," or used in the preparation of the so-called "geyserite" scouring-soap.—Contributions to mineralogy, by W. Earl Hidden, with crystallographic notes by A. Des Cloizeaux. The paper deals with the ipodumene, black tourmaline, xenotime, and twin crystals of monazite from North Carolina; a remarkable crystal of herderite found in 1884 near Stoneham, Maine; a twin crystal of molybdenite from Renfrew, Canada; and the phenacite from Florissant, El Paso County, Colorado.—Turquois from New Mexico, by F. W. Clarke and J. S. Diller. A full analysis and microscopic study is given of some specimens from the turquois mines of Los Cerillos, New Mexico, about 22 miles south-west of Santa Fé. The turquois-bearing rock appears to be eruptive, and probably of Tertiary age, while the small size of the veins and their limited distribution show that the turquois is of local origin, possibly the result of alteration of some other mineral.—On the electrical resistance of soft carbon under pressure, by T. C. Mendenhall. In reply to Prof. Sylvanus P. Thompson's objections, the author describes some fresh experiments fully confirming his views regarding the change in the resistance of carbon due to change of pressure. In the form of compressed lampblack the electrical resistance of carbon varies greatly with the pressure to which it is subjected, and the variation is mainly due to a real change in the resistance of the carbon itself.—Comparison of maps of the ultra-violet spectrum, by Edward C. Pickering. Prof. Rowland's recently published photograph of the solar spectrum is compared with Draper's map of the ultra-violet portion of the spectrum prepared in 1873, with which it is shown to agree very closely. The mean difference for the seventy-six lines compared was 0·012, corresponding to about 1/800 inch upon the Draper map. It may therefore be assumed that the probable error of a wave-length derived from this map will not exceed 1/100 unit if the correction here given be first applied.—On two hitherto undescribed meteoric stones, by Edward S. Dana and Samuel L. Penfield. One of these meteorites was found, in 1869, between Salt Lake City and Echo, Utah; the other, in 1846, near Cape Girardeau, South-West Missouri. Olivine is the most prominent constituent of the former, while the latter is a light gray chondrite.

SOCIETIES AND ACADEMIES

Paris

Academy of Sciences, September 20.—M. Fizeau in the chair.—Kinematic analysis of human motion, by M. Marey. In the figure accompanying this paper are represented the successive attitudes of the lower right limb while describing a complete step. This action is shown to be divided into two periods, a rest and a rise, which are again subdivided into four unequal phases, of which the last three belong to the period of rise. The simultaneous movements of ankle, knee, and hip are explained, and it is pointed out that, whatever be the velocity of the pace, the form of the various trajectories here described is maintained in their salient features. But, the more rapid the motion, the more is the tendency of the centre of gravity to approach a straight line parallel with the surface of the ground.—"Modern Kinetics and the Dynamism of the Future," by M. G. A. Hirn. This is the title of a new work, which the author presents to the Academy with some remarks explaining its general purpose. After replying to the various objections raised against his general principles, he deals with the arguments which, as he maintains, render henceforth indefensible the kinetic theory of the gases, referring to molecular movements most of the properties of these bodies. Three arguments are advanced of such a nature that he believes future physicists will wonder how this kinetic theory could ever have been accepted for a single moment. Even were it correct, it would not follow that light, radiant heat, electricity, magnetic attraction and repulsion, and gravitation were due to movements of ponderable matter, far less that thought itself was nothing more than a molecular movement. But the reverse is not true, so that with the collapse of the kinetic theory of the gases fall the kinetic theories in general, which claim to explain all possible phenomena of the universe by invisible movements of matter. The doctrine here substituted for kinetic force, he thinks, explains quite as easily, and much more rationally, the universal phenomena of the physical world. He does not, however, hope at once to convince all minds of what they should have long ago been themselves convinced. Interpretations formulated *a priori*, and apart from experience and observation, have unfortunately more vitality than truths gained to science by the patient study of Nature.—Observations of Winnecke's comet made at the Observatory of Nice (Gautier equatorial), by MM. Perrotin and Charlois. The results of these observations, which extend over the four days from August 27 to September 1, are embodied in tables showing the positions of the stars 25339 Lalande, 25588 Lalande, 4989 Schjellerup, 5004 Schjellerup, and the apparent positions of the comet.—On the transformation of algebraic surfaces in themselves, by M. Emile Picard. A proposition analogous to that of Schwarz is thus formulated: Algebraic surfaces capable of being transformed in themselves by a bi-rational substitution, including two arbitrary parameters, are of the genus zero, or one.—On a class of differential non-linear equations, by M. Roger Liouville.—Historical note on a series whose general term is of the form $A_n (x - a_1)(x - a_2) \ldots (x - a_n)$, by M. G. Eneström.—Researches on the structure of the nerve-centres in the Arachnidæ, by M. G. Saint-Remy. Having in a previous communication dealt with the structure of the brain of the scorpion, the author here extends his observations to the spider family, and more particularly to *Tegenaria domestica*, *Epeira diadema*, and *Phalangium opilio*. In these groups he shows that the brain offers the same plan of organisation as that of the Scorpionidæ.—Fresh researches on the configuration and extent of the Carmaux Coal-measures, by MM. Alfred Caraven-Cachin and Grand. In this basin, which extends for nearly six miles from Rozières to Saint-Quentin, there are in some districts three successive coal-deposits with a joint thickness of over 31 metres underlying Tertiary formations 156 metres thick. They appear to have been deposited horizontally, always in shallow water, the land subsiding sometimes slowly, sometimes intermittently, during the whole period of their formation.—Note on the affinities of the Oolitic floras in the West of France and in England, by M. L. Crié. In this paper the author communicates the first results of his studies of the Oolitic floras of these regions. The conifers are represented at Mamers (Sarthe) and at Scarborough (Yorkshire) by traces of Brachyphyllum, which present a remarkable identity. Certain imprints at Scarborough also show a strong resemblance, in the disposition of the foliage, and especially in the veinous system, to *Otozamites marginatus*, Sap., which is so characteristic of the Mamers flora. About the middle of the Oolitic period this group must have covered certain upheaved tracts in the Venetian Alps, in the neighbourhood of Mamers, and at Scarborough.—The waterspout of September 14 at Marseilles, by M. Barthelet.

BOOKS AND PAMPHLETS RECEIVED

"How Readest Thou? or the First Two Chapters of Genesis," by E. Dingle (Partridge and Co.).—"The Chalk and Flint Formation," by W. B. Galloway (Low and Co.).—"Life-History of Plants," by Prof. D. M'Alpine (Sonnenschein).—"Tobacco: a Farmer's Plant," by P. M. Taylor (Stanford).—"Therapeutics founded upon Organopathy and Antipraxy," by W. Sharp, M.D. (Bell and Sons).—"Report of the Iowa Weather Service, January to April 1883," by Dr. G. Hinrichs.—"Scientific Romances: No. v. Casting out the Self," by C. H. Hinton (Sonnenschein).—"Lessons in Elementary Dynamics," by H. G. Madan (Chambers).—"Studies in Ancient History," N.E., by J. F. McLellan (Macmillan).—"Manual of the New Zealand Coleoptera," parts 3 and 4, by Capt. T. Brown (Didsbury, Wellington).—"School of Forest Engineers in Spain," by Dr. J. C. Brown (Oliver and Boyd).—"Hand-book of Mineralogy," by J. C. Foyr (Van Nostrand, N.Y.).—"Monographs U.S. Survey," vol. ix. (Washington).—"Hommage à M. Chevreul, à l'Occasion de son Centenaire" (Alcan, Paris).—"The Handy Natural History," by J. G. Wood (Religious Tract Society).—"General Report on the Operations of the Survey of India Department," 1884-85, by Col. G. De Prée (Calcutta).—"Notes on the Bones of a Species of Sphenodon," by W. Colenso.—"The Economical Aspects of Agricultural Chemistry," by H. W. Wiley (Wilson, Camb., Mass.)—"Report on the Decapod Crustacea of the *Albatross* Dredgings off the Coast of the United States," by S. I. Smith (Washington).—"Metodo per Misurare la Dilatazione Termica dei Corpi Solidi: Memoria di F. Artimini (Firenze).—"The Cause of Electricity, with Remarks on Chemical Equivalents," by G. T. Carruthers (Benares).

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