

ciable erosion by the waves and no visible accumulation of detritus, are to be found among the land-locked fjords or inlets of the west coast of Scotland. In these sheltered recesses the smoothed striated rocks of the Ice Age slip under the sea, with their characteristic glaciated surfaces still so fresh that it is hard to believe that a long lapse of ages has passed away since the glaciers left them.

The remarkable contrast between the scenery of the eastern and western coast-line of the British Islands arises partly from the preponderance of harder rocks on the west than on the east side, but probably in large measure upon the greater extent of the submergence of the western sea-board, whereby the sea has been allowed to penetrate far inland by fjords which were formerly glens and open valleys. The details of coast-scenery vary with the rock in which they are developed. Nowhere can the effects of each leading type of rock upon landscape be more instructively studied than along the sea-margin. As distinct types of coast-scenery, reference may be made to sea-cliffs and rocky shores of granite, gneiss, basalt, massive sandstone and flagstone, limestone, alternations of sandstone shale or other strata, and boulder-clay, and to the forms assumed by detrital accumulations such as sand-dunes, shingle-banks, and flats of sand or mud.

The concluding portion of the lecture was devoted to an indication of the connection between the scenery of a country and the history and temperament of the people. This subject was considered from four points of view, the influence of landscape and geological structure being traced in the distribution of races, in national history, in industrial and commercial progress, and in national temperament and literature.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE

OXFORD.—The proposal to allow women to enter for the same honours examinations as men met with less opposition in Congregation than was generally anticipated. By 100 votes to 46 the statute was passed by Congregation permitting women to enter for both Classical and Mathematical Moderations, and for the final Schools of History, Mathematics, and Natural Science. On March 11 the statute will come before Convocation, and will in all probability be passed.

In a Convocation held on March 4 a decree was passed authorising the Professors of Anatomy and Physiology to engage a table for the use of students of the University at the Zoological Station at Villefranche. The anti-vivisectionists were demonstrative, but did not divide the House.

The Professor of Medicine gives notice that the Testamurs for Chemistry and Physics in the Preliminary Honour Examination excuse candidates from the Chemistry and Physics Examination in the First M.B., but that the Testamurs for Chemistry and Physics in the Pass School are not recognised. Candidates may take up Chemistry and Physics separately from Anatomy and Physiology.

An examination will be held at Keble College on March 18 to elect a Scholar in Natural Science. Candidates may offer Chemistry and Biology.

CAMBRIDGE.—Plans have been obtained for the building of a new foundry and a temporary lecture-room and museum for the Department of Mechanism, suitable eventually for additional workshops. The cost is to be 450*l*. The number of pupils in this department has now increased to fifty-seven.

Plans have also been prepared for the new botanical classrooms for microscopic work, the estimated cost being 1065*l*.

Messrs. E. C. Ames, B.A., B. H. Bent, and J. H. Nicholl, B.A., have been appointed Demonstrators of Mechanism and Applied Mechanics.

The following Colleges hold Examinations for Open Scholarships in Natural Sciences on the respective dates mentioned:—Clare, March 18; Jesus, March 13; Downing, June 10; Cavendish, August 6. For particulars, application should be made to the tutors of the Colleges. A Clothworkers' Exhibition in Physical Science, tenable either at Oxford or at Cambridge, will be awarded in July. Information may be obtained from the Censor of Non-Collegiate Students, Cambridge.

#### SCIENTIFIC SERIALS

*Journal of Botany*.—The number for February commences with the first part of an important paper by Mr. Thomas Hick on protoplasmic continuity in the Florideæ. The connection of

protoplasm from cell to cell has now been established in a number of instances in the vegetable kingdom. It may be seen with very great ease, as described and drawn by Mr. Hick, in the frond of some of the red seaweeds, as *Polysiphonia* and *Callithamnion*, without any chemical reagent, except one that causes a slight contraction.—Mr. Carruthers contributes a useful paper on the mode of distinguishing the seed of the sweet vernal grass, *Anthoxanthum odoratum*, from that of *A. Puellii*, an annual species with which it is often adulterated by seed-growers.

THE last part (vol. iii, heft 3) of Cohn's *Beiträge zur Biologie der Pflanzen* contains two important cryptogamic papers: one by E. Eidam, on the development of the Ascomycetes, in which two new forms are described; the other, by M. Franke, describing an interesting new genus of parasitic algae, *Endoclonium*, dimorphic, and growing on decaying fronds of *Lennea gibba*.

*Journal of the Russian Chemical and Physical Society*, vol. xv, fasc. 9.—On the action of the hydrocarbons of the acetylene series upon oxide of mercury and its salts, by M. Kutscheroff.—Thermic data of pyrosulphuryl, by D. Konovaloff. The heat of formation of a molecule of  $S_2O_5Cl_2$  from its elements in a gaseous state is equal to 180.6 calories.—On a hydrate of silicium obtained from cast iron, by G. Zabudsky.—On the characters of the infra-molecular force, by M. Bardsky (second article).—On electrolytic light, by N. Sloughinoff, being an experimental and mathematical inquiry into the light disengaged during the electrolysis of liquids at one of the electrodes; historical sketch of the subject; instruments employed; the laws of the extra-currents of Edlund; light disengaged in a water solution of sulphuric acid, and dependence of it upon the number of elements in the battery; oscillations of the force of the current; experiments with a rotating glass; wearing of the electrodes; spectrum; light in the acid solutions of salts; on the resistance, the electro-spheroidal state, and the heat disengaged; the oscillating currents.—On the theory of the curved nets, by A. Sokoloff.

*Atti della R. Accademia dei Lincei*, Rome, October 18 and 19, 1883.—On the alterations undergone by the red globules of the blood in malarious infections, by Prof. Ettore Marchiafava.—Meteorological observations made at the Royal Observatory of the Campidoglio during the months of August, September, and October, 1883.

December 2.—Remarks on Dr. F. Mercanti's memoir on the ciliary muscle in reptiles, by Signor Moriggia.—On the alterations in the red globules of the blood in malarious infections, by S. Todaro.—Report on Prof. E. Millosevich's memoir on the diameter of Uranus, by S. Respighi.—On the molecular velocities of gaseous bodies, by A. Violi.—Note on fluorbenzene and fluorotoluene, by P. Emanuele and O. Vincenzo.—A new series of compounds of titanium, by A. Piccini.—On the transformation of the fluorbenzoic acids in the animal organism, by F. Coppola.—A study of the resins of *Thapsia garganica*, by Fr. Canzoneri.—On a new species of *Salpa* (*S. dolicosoma*), by Fr. Todaro.—Observations on the Pons-Brooks comet, by Pietro Tacchini.—On the unipolar induced electric current and nervous excitement, by G. Magini.—Archæological discoveries at Angera, Peschiera, Viterbo, Rome, Sulmona, and in other parts of Italy, from June to October, 1883.—S. Sella and S. Mamiani were elected president and vice-president for the ensuing four years, 1884-7.

*Rivista Scientifico-Industriale*, Florence, November 15-30, 1883.—Further applications of the nephoscope invented by Filippo Cecchi (four illustrations).—Description of a new electromagnet recently exhibited before the Society of Natural and Economical Sciences at Palermo, by Prof. A. Riccò.—An account of some of the important results already obtained in the Acclimatisation Garden established ten years ago by General Vincenzo Ricasoli at Portercole, by G. Arcangeli. Amongst the exotics here successfully reared are *Cocos flexuosa*, *Calorica borbonica*, *Phoenix reclinata*, *Boldea fragrans*, *Citharexylon reticulatum*, *Casuarina quadrivalvis*, *Edwardia grandiflora*, *Eugenia australis*, *Ficus elastica*, *Picconia fragrans*, besides numerous species of *Bignonia*, *Agave*, *Acacia*, and *Eucalyptus*, and other Australian plants.

*Rendiconti del R. Istituto Lombardo*, Milan, December 13, 1883.—On the distinctions observed in criminal law between the authors and accomplices in a felony, by Prof. A. Buccellati.—Inquiry into the nature of the underground disturbances that

occurred at Ischia on July 28, 1883, by Prof. A. Serpieri.—On numbers irreducible by complex numbers, by Prof. C. Formenti.—On some forms of right lines produced by two reciprocal stars, by Prof. F. Aschieri.—Meteorological observations made at the Brera Observatory, Milan, during the months of October and November, 1883.

## SOCIETIES AND ACADEMIES

### LONDON

**Royal Society, February 14.**—"On a New Reflecting Galvanometer of Great Sensibility, and on New Forms of Astatic Galvanometers." By Thomas Gray, B.Sc., F.R.S.E., and Andrew Gray, M.A., F.R.S.E. Communicated by Sir William Thomson, F.R.S.

The paper describes first a very sensitive galvanometer, of novel construction, which the authors have had made, with aid from the Government Research Fund, for their experiments on the electric resistance of glass and allied substances. It consists of two pairs of coils with hollow cores, arranged so that the axes of each pair are parallel and in a vertical plane, which act on a needle-system, consisting of two horse-shoe magnets of thin steel wire connected by a very light frame of aluminium, and hung with their planes vertical, so that a horse-shoe corresponds to each pair of coils and has its poles within the hollow cores. In the instrument constructed each pair of coils is carried by a vertical brass plate, and these two plates are set so as to make an angle with one another of about 106°. A line drawn from the suspension thread (a single fibre of silk) to a point near a pole of either of the needles, when the needles are at the same distance within both pairs of coils, is nearly at right angles to the axis of the coil, and the motion of the needle for small deflections is nearly along the axis. The needles enter the coils from the same side, and the current is usually sent through the coils, so that one pair cause their horse-shoe to move outwards and the other pair their horse-shoe to move inwards, thus turning the needle-system round the suspension fibre. A mirror fixed to the aluminium connecting-bar gives a measure of the deflection in the ordinary manner. This system of needles, when rightly adjusted, is practically astatic in a magnetic field of uniform intensity.

A magnet (or system of magnets) is generally arranged to give a differential field at the upper and lower ends of the needles, which are usually placed with unlike poles turned in similar directions; but any magnetic system may be employed to give directive force in the proper manner and degree for a particular purpose or arrangement.

Another form of the instrument is described in which the coils are all in one plane, and the connecting aluminium bar carrying the horse-shoe needles passes through the plate in which the coils are set from one side to the other, so that one horse-shoe enters its pair of coils from one side, and the other horse-shoe from the other side. When the needle-system is deflected thus, both needles are pushed out of the coils or both pulled in.

By the method of arranging the needles and coils adopted in these instruments the current is made, when the hollow cores are made small, to act very advantageously on the needles, and hence in great measure their high sensibility. By attaching to the suspended system a small needle to give directive force in a uniform field, the great magnetic moment and leverage of the horse-shoes may be taken advantage of.

The paper then describes a new and very compact form of distributing plate, by means of which a multiple coil galvanometer, or one in which the coil is wound in sections, may be connected in any desired manner to vary its resistance or its sensibility.

Finally, two forms of instrument are described, in which two perfectly vertical and straight needles connected together rigidly by bars of aluminium are used to give a perfectly astatic system, not disturbed by the magnetising or demagnetising action of neighbouring magnets, a result the authors think practically unattainable in any arrangement of horizontal needles. Two vertical needles, with their upper ends in the position occupied by the upper needle of a so-called astatic galvanometer, and their lower ends in the position of the lower needle, experience, if their like poles are turned in dissimilar directions, a similar electromagnetism action to that in the horizontal needles; and the authors propose when convenient to use such an arrangement instead of the ordinary needle system.

Also a pair of vertical needles may be used instead of the horse-shoe needles described above, the coils being so placed as

to act advantageously, and give a convenient arrangement of the parts of the instrument.

**Geological Society, February 15.**—Annual General Meeting.—J. W. Hulke, F.R.S., president, in the chair.—The Secretaries read the Reports of the Council and of the Library and Museum Committee for the year 1883. In the former the Council congratulated the Fellows upon an improvement in the state of the Society's affairs since the date of their last Report, the income of the Society having been greater, and its expenditure less, in 1883 than in 1882, while, although the removal from the list of the names of twelve Fellows whose addresses were unknown, and whose election dated back before the incorporation of the Society in 1826, had produced an apparent loss of three Fellows during the year, the Society might really be regarded as having received an increase of nine Fellows. The increase in the number of contributing Fellows was twenty-two. The Council's Report further announced the awards of the various Medals and of the proceeds of the Donation Funds in the gift of the Society.

In presenting the Wollaston Gold Medal to Prof. A. Gaudry, F.M.G.S., the President addressed him as follows:—"Prof. A. Gaudry,—The Council of the Geological Society has awarded you the Wollaston Medal in recognition of the value of your palæontological researches and the important scientific generalisations you have deduced from long and laborious observations. The numerous papers on topographical geology and on palæontology you have contributed during the past thirty years, your important 'Recherches Scientifiques en Orient entreprises par les ordres du Gouvernement pendant les années 1853-1854,' your 'Animaux fossiles et géologie de l'Attique,' and, lastly, your work 'Les Enchaînements du monde animal dans les temps géologiques,' have made your name so familiar, wherever our branch of natural science is cultivated, that in receiving you we feel we are not receiving a stranger, but a scientific brother, and one who, by his labours and singleness of aim, has achieved a position as a palæontologist such as few can hope to attain. Personally it affords me great and sincere pleasure that it has fallen to my lot to hand you this medal, which, by the consent of all, has never been more worthily bestowed."

The President then presented the balance of the proceeds of the Wollaston Donation Fund to Mr. E. Tully Newton, F.G.S., and addressed him as follows:—"Mr. Newton,—The Council has voted you the balance of the proceeds of the Wollaston Donation Fund, in recognition of the value of your researches amongst the Pleistocene Mammalia of Great Britain, and to assist you in the prosecution of further investigations. Your memoirs published by the Geological Survey of England and Wales, 'On the Vertebrata of the Forest-bed Series of Norfolk and Suffolk,' and on 'The Chimæroid Fishes of the Cretaceous Rocks,' and your papers published in our *Journal* are considered by the Council to evince great merit; they regard them as a bright earnest of future work which they hope may be promoted by this award."

In presenting the Murchison Medal to Dr. Henry Woodward, F.R.S., the President said: "Dr. Henry Woodward,—The Council has awarded you the Murchison Medal and a grant of ten guineas in recognition of your valuable researches into the structure and classification of the fossil Crustacea, especially of the Merostomata and Trilobita, and your services to the progress of geology in Great Britain by your conduct of the *Geological Magazine* for nearly twenty years. Your monograph on the 'Merostomata,' published by the Palæontographical Society, and your 'Catalogue of British Fossil Crustacea, with their synonyms and the range in time of each genus and order,' will long continue to be works of reference indispensable to every student of these interesting life-forms. But valuable as are these written records, they discover but a small part of the services you have rendered in the advancement of our science. How much more you have done by the assistance you have so freely given to all who have sought your help at the Museum in deciphering some difficult matters in palæontology will never be fully known."

The President then handed the balance of the proceeds of the Murchison Geological Fund to Mr. R. Etheridge, F.R.S., for transmission to Mr. Martin Simpson, of Whitby, and addressed him as follows: "Mr. Etheridge,—The balance of the proceeds of the Murchison Donation Fund has been awarded by the Council to Mr. M. Simpson, Curator of the Whitby Museum. He has devoted much attention to the fossils of that district, and he is the author of two books descriptive of them. The Council