SOCIETIES AND ACADEMIES

LONDON

Royal Society, Jan. 8.—"On the Brom-Iodides," by Dr. Maxwell Simpson, F.R.S., Professor of Chemistry, Queen's College, Cork.

"Contributions to the History of the Orcins.—No. IV. On the Iodo-derivatives of the Orcins," by Dr. John Stenhouse, F.R.S.

"A Memoir on the Transformation of Elliptic Functions," by Prof. Cayley, F.R.S.

"On Electro-torsion," by George Gore, F.R.S.

This communication contains an account of a new phenomenon, of rods and wires of iron becoming twisted whilst under the influence of electric currents; and a full description of the conditions under which it occurs, the necessary apparatus, and the methods of using it.

The phenomenon of torsion thus produced is not a microscopic one, but may be made to exceed in some cases a twist of a quarter of a circle, the end of a suitable index moving through a space of 80 centimetres (= 31 in.). It is always attended by emission of sound.

The torsions are produced by the combined influence of heliacal and axial electric currents, one current passing through a long copper-wire coil surrounding the bar or wire, and the other, in an axial direction, through the iron itself. The cause of them is the combined influence of magnetism in the ordinary longitudinal direction induced in the bar by the coil-current, and transverse magnetism induced in it by the axial one.

The torsions are remarkably symmetrical, and are as definitely related in direction to electric currents as magnetism itself. The chief law of them is—*A current flowing from a north to a south pole produces left-handed torsion, and a reverse one right-handed torsion, i.e.* in the direction of an ordinary screw. Although each current alone will produce its own magnetic effect, sound, and internal molecular movement, neither alone will twist the bar, unless the bar has been previously magnetised by the other. Successive coil-currents alone in opposite directions will not produce torsion, neither will successive and opposite axial ones.

Signs of electro-torsion were obtained with a bar of nickel, but not with wires of platinum, silver, copper, lead, tin, cadmium, zinc, magnesium, aluminium, brass, or German-silver, nor with a thick rod of zinc, or a cord of gutta-percha.

Zoological Society, Jan. 6.—Dr. A. Günther, F.R.S., vice-president, in the chair.—Dr. A. Leith Adams exhibited and made remarks on the horns of a feral race of *Capra hircus*, from the Old Head of Kinsale. The horns were very remarkable for their large size and very close resemblance to those of *Capra ægagrus*.—Mr. P. L. Sclater, F.R.S., read a synopsis on the species of the genus *Synallaxis*, of the family *Deudrocolaptidæ*. The specimens of this difficult group in nearly all the principal collections of Europe and America had been examined, and the existence of 58 species ascertained, beside three of which the types were not accessible, and which were considered to be doubtful.—Mr. George Busk, F.R.S., read a paper on a new British Polyzoon, proposed to be called *Hippuria egertoni*, after Sir Philip Egerton, who had discovered it growing upon the carapace of a specimen of *Gonoplax angulatus*, dredged up at Berehaven in the course of last summer.—Mr. Alfred Sanders read a series of notes on the myology of *Phrynosoma coronatum*.—A communication was read from Dr. J. E. Gray, F.R.S., containing a description of the Steppe-cat of Bokhara, which he proposed to designate *Chaus caudatus*.—Sir Victor Brooke, Bart., read a paper on Sclater's Muntjac and other species of the genus *Cervulus*. In pointing out the distinctions which characterise the three existing species, *Cervulus muntjac*, *C. sclateri*, and *C. reevesii*, the author showed *C. sclateri*, the species of most northern range, to be intermediate in specific characters and size between the two others. Sir Victor pointed out an advance in the specialisation of the tarsus of *Cervulus* not hitherto observed. In this genus the navicular, cuboid and second and third cuneiform bones were anchylosed together and formed one single bone, the first cuneiform being represented by a very small and separate bone.—A second paper by Sir Victor Brooke contained the description of a new species of deer from Persia, a pair of horns of which he had received from Major Jones, H.B.M. Consul at Tabreez in Persia, and which he proposed to call *Cervus mesopotamicus*.—Major H. H. Godwin Austin read a paper on some birds obtained by him in 1872-73 along the main water-shed of the Brahmaputra and Irrawaddy Rivers. Of these ten were considered as new to Science, viz.:—*Sitta Nagensis*, *Garrulax galbanus*, *G. albosuperciliaris*, *Trochalopteron cinereaceum*, *T. virgatum*, *Actinodura waldeni*, *Layardia robiginosa*, *Prinia rufula*, *Cisticola munipurensis*, *Munia subundulata*.—Mr. Garrod made some remarks upon the morbid symptoms presented by the Indian rhinoceros that had lately died in the Society's Gardens, and upon certain points in its anatomy.—Mr. Edwin C. Reed communicated a paper on the Chilian species of the Coleopterous families *Cicindelidæ* and *Carabidæ*.

Royal Microscopical Society, Jan. 7.—Chas. Brooke, F.R.S., in the chair.—Mr. Chas. Stewart gave an interesting *résumé* of a paper contributed by Dr. H. D. Schmidt of New Orleans on the origin and development of red blood-corpuscles in the human embryo, and illustrated his remarks by black-board diagrams enlarged from a number of most beautifully executed drawings which accompanied the paper.—A discussion followed, in which Dr. Lawson, Dr. Matthews, Mr. Stewart, and the president took part.—A paper was also read by Mr. Alfred Sanders on the Zoosperms of crustacea and other invertebrata.—The secretary read a paper by the Rev. W. H. Dallinger, giving a description of his method of preparing drawings of microscopical objects for class illustration, &c.—Mr. Richards exhibited a new arrangement for a tank microscope for the examination of objects under water to a depth of eight inches; and some beautiful slides of diatoms were shown under the society's instruments sent up by Capt. John Perry of Liverpool, containing the following species, viz.:—*Aulacodiscus formosus*, *Aulacodiscus margaritaceus*, and *Auliscus racemosus*, all recent.

Society of Biblical Archæology, Jan. 6.—Dr. Birch, F.S.A., president, in the chair. The following papers were read:—"The Sallier Papyrus containing the Wars of Rameses Meriamun with the Khita," translated with Annotations by Prof. Lushington.—This well-known text was supplemented by a fragment from the Raifet Collection; it contains perhaps the most vivid picture of a pre-Homeric battle extant: the king himself, the chief actor, frequently speaking in the first person. The two finest passages, the prayer of Rameses to his father Amun, and the defeat of the Hittites, possessing peculiar beauty, in addition to the interest attaching itself to a people who, about 1,200 B.C. were formidable enemies to the Egyptians themselves.—"On some illustrations of the Book of Daniel from the Assyrian Inscriptions," by H. Fox Talbot, F.R.S.

MANCHESTER

Literary and Philosophical Society, Dec. 16, 1873.—"On the Destruction of Sound by Fog and the Inertness of a Heterogeneous Fluid," by Prof. Osborne Reynolds, M.A. The paper commences—That sound does not readily penetrate a fog is a matter of common observation. The bells and horns of ships are not heard so far during a fog as when the air is clear. In a London fog the noise of the wheels is much diminished, so that they seem to be at a distance when they are really close by. On one occasion during the launch of the *Great Eastern* the fog was reported so dense that the workmen could neither see nor *hear*. It has also been observed that mist in air or steam renders them very dull as regards motion. This is observed particularly in the pipes and passages in a steam engine. Mr. D. K. Clark found in his experiments that it required from 3 to 5 times as much back pressure to expel misty steam from a cylinder as when the steam was dry. The author then proceeds to explain these phenomena and to show that the particles of water do not, as it has sometimes been supposed, break up the waves of sound by small reflections in the same way as they scatter the waves of light, but that the destruction of sound is due, like the dulness of motion, to the fact that when foggy air is accelerated or retarded the drops of water move through the air and expend energy in fluid friction. He points out, as a well-known fact, that when foggy air is at rest under the action of gravity the drops of water are not at rest, but descend through the air with a velocity proportional to the square root of their diameters, and that consequently the energy destroyed in a given time is proportional to the square root of the diameters of the drops. He then shows that exactly the same is the case when the fog is subjected to a uniform acceleration and a somewhat similar effect when the acceleration is irregular or alternating. He says, This then fully explains the dulness with which foggy air acquires motion. In the passages of a steam engine the steam is subjected to continual accelerations and retardations each of which requires more force in the manner

described with misty than with dry steam, and at each of which the particles of water moving through the steam destroy energy in creating eddies. Although not so obvious, the same is true in the case of sound. The effect of waves of sound traversing a portion of air is first to accelerate and then to retard it. And if there are any drops of water in the air these will not take up the motion of the air so readily as the air itself. They will allow the air to move backwards and forwards past them, and so cause friction and diminish the effect of the wave as it proceeds, just as a loose cargo will diminish the rolling of a ship. He then proceeds to examine the relation between the size of the drops and their effects, always supposing the same quantity of water to be present. He says—I do not know that it has ever been noticed whether a fine or a coarse mist produces the most effect on sound; it does not appear, however, that rain produces the same effect as fog, and considering rain as a coarse fog we must come to the conclusion that a certain degree of fineness is necessary. If we examine theoretically into the relation between the size of the drops and the effect they produce, always assuming the same quantity of water in the air, we find in the first place that if the air is subjected to a uniform acceleration, which acts for a sufficient time for the drops to acquire their maximum velocity through the air, the effect of the drops in a given time—that is to say, the energy dissipated in a given time—is proportional to the square root of the diameters of the drops. This appears from the action of gravity. As previously stated, the maximum downward motion of the drops, and hence the distance they will have fallen in a given time and the energy destroyed, is proportional to the square root of their diameters. Hence where the acceleration acts continuously for some time, as would be the case in a steam-pipe, the effect will increase with the size of the drops. This effect may be represented by a parabolic curve in which distances measured from the vertex along the axis represent the size of the drops and the corresponding ordinates represent their effect in destroying energy. If on the other hand the acceleration alternates very rapidly then there will not be time for the drop to acquire its maximum velocity, and if the time be very short the drop will practically stand still, in which case the effect of the drops will be proportional to the aggregate surface which they expose. And this will increase as the diameter diminishes, always supposing the same quantity of water to be present. This latter is somewhat the condition when a fog is traversed by waves of sound, so long as the drops are above a certain size; when, however, they are very small, compared with the length of the waves, there will be time for them to acquire their maximum velocity. So that starting from drops the size of rain, their effect will increase as their size diminishes, at first in the direct proportion, then more and more slowly until a certain minuteness is reached, after which, as the drops become still smaller, their effect will begin to diminish, at first slowly, but in an increasing ratio tending towards that of the square root of the diameter of the drops. This effect may be represented by a curve which coincides with the previously described parabola at the vertex, but which turns off towards the axis, which it finally approaches as a straight line. This completes the investigation so far as I have been able to carry it. The complete mathematical solution of the equations of motion does not appear to be possible, as they are of a form that has not as yet been integrated. However, so far it appears to me to afford a complete explanation of the two phenomena, and further to show, a fact not hitherto noticed, that for any note of waves of sound there is a certain size of drop with which a fog will produce the greatest effect.

EDINBURGH

Botanical Society, Jan. 8.—The following communications were read:—Obituary Notice of Dr. J. Lindsay Stewart, by Dr. Cleghorn.—Note on a Station for *Primula veris* in Coldingham Bay, Berwickshire, by Sir Robert Christison, Bart.—Notes of a visit to Messrs. Dickson and Turnbull's Nurseries, Perth, with remarks on arboricultural subjects, by James M'Nab, V.P.—Note on the destruction by frost of seedling ash trees in Mr. Robertson's nursery ground, near Fettes College, in May 1873, by Alexander Buchan, M.A.—Notice of botanical excursions in 1873, by Prof. Balfour.—Notes on some British fungi, by Prof. Dickson and Mr. John Sadler. Specimens were exhibited.

VICTORIA

Microscopical Society, Oct. 30, 1873.—Mr. W. H. Archer, the president, occupied the chair.—Mr. T. S. Ralph addressed the society relative to a fungus affecting the rye-grass, which has been brought before the notice of the society. He regarded its botanical position as uncertain, but was inclined to think it belonged to a lower form of fungus than *Clavaria*. In a specimen which he had prepared, the mycelium or network of the thread of the fungus would be observed penetrating the cells of the rye-grass, thus robbing the cells of the materials intended for the nourishment of the plant. These mycelial threads travelled through the cells, and ultimately coming to the surface of the leaf, produced the peculiarly reddish film which attracted the eye of the observer, besides the withering of the leaf of the plant.—Mr. F. Barnard exhibited some foraminifera, collected from various parts of the colony and in Queensland, some of which were unnamed and new to recent observers.—The President (Mr. Archer) brought forward living specimens of the polyp *Tyrcha viridis*, and of some freshwater polyzoa, the latter being apparently a new species, and allied to Fredericella, of which he had found species in a pool on the banks of the Yarra.

PARIS

Academy of Sciences, Jan. 5—M. Bertrand in the chair. This being the first meeting of the year the members proceeded to elect a vice-president. [See NOTES.] M. de Quatrefages, the retiring president, then read his report, after which the Academy proceeded with its usual business—the following papers were read.—On the conductibility of magnetic tensions, by M. Jamin.—On a new and simple form of the pro-embryo of echinoderms Stelleridæ (*Asteriscus verruculatus*), by M. H. de Lacaze-Duthiers. A mechanical interpretation of the laws of Dulong and Petit, and Wœstyn on specific atomic heats, by M. A. Ledieu. This paper contained a number of mathematical data in relation to the recent papers of MM. Lockyer, Dumas, and Berthelot.—Remarks on the relations between specific heats and atomic weights in simple and compound bodies, by M. A. Pissis. The author states that these relations tend to show that there is no distinction really existing between simple and compound bodies, but that on the contrary the so-called elements behave to a certain extent like binary compounds.—On ammoniacal urine, its dangers, and the means of preventing it, by MM. Gosselin and Robin. M. Pasteur observed in connection with this subject, that it would be of great importance to ascertain if this characteristic of urine is not connected with the presence of an organised ferment.—The perpetual secretary read a note from M. Poey on the connection between sun-spots, earthquakes in the Antilles and Mexico, and volcanic eruptions throughout the world.—Researches on the conditions under which a conoid of a given curve exhibits a contact of a determinate order, by M. Painvin.—An answer to M. Faye's remarks on terrestrial waterspouts, by M. Th. Reye. M. Faye made some remarks in reply.—On the variable period in the closing of a voltaic circuit, by M. A. Cazin. This was an answer to M. Blaserna's remarks.—On the conditions necessary for the formation of octahedral borax, by M. de Gernez.—On the geological conditions of the islands adjacent to the African shore from Morocco to Tunis.—On a Marine Carboniferous flora discovered in the neighbourhood of l'Ardoissière in the valley of Lichon (Forez).—On the geographical distribution of the ferns of New Caledonia, by M. Eng. Fournier.—On the pluvial law of the torrid zone, in the basin of the Atlantic Ocean, by M. V. Raulin.

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ERRATUM.—Vol. ix. p. 132, 1st col. line 19, for "Mr. J. D. Painter" read "Mr. J. D. Sainter."