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."