of the moa. The discovery of a large bird of the *Anser* family, but which could not fly adds another remarkable feature to New Zealand's extinct ornithology. Chief among the additions which have been made to the zoological literature of the colony during the past year is Dr. Buller's great work on the Birds of New Zealand, which is to be rendered more complete by the publication of additional plates. The President expressed a hope that a second edition might be called for in order to give Dr. Buller an opportunity of bringing up the information to a still later date. The enumeration of our whales and dolphins communicated to the Society by Dr. Hector has already called forth critical remarks from the veteran zoologist, Dr. J. E. Gray, of the British Museum. The President expressed his opinion that the fur seals frequenting the South Island all belong to one species, *Arctocephalus cinereus*, although skulls of a second species (*A. lobatus*) are found in caves and Maori ovens. Captain Hutton's valuable addition to the list of fishes was also referred to, as also the successful introduction of salmon during the past year. Dr. Hector expressed an opinion in favour of introducing ova not only of salmon but of trout, white fish, and other species, that inhabit the inland waters of British Columbia. The catalogues of the Marine Mollusca, and the Star Fish of our coasts, prepared by Captain Hutton, will be found invaluable by collectors, but the most interesting contribution to the Zoology of New Zealand is Captain H.'s essay on the Geographical Relations of the Fauna, which to a great extent bears out the hypothesis advanced by Dr. Hector in a previous address, that the peculiar insular characters of the forms of life in New Zealand have been present from a very remote period.

The President referred to the expected visit of the *Challenger* on a scientific exploration of the Southern Seas, and expressed a hope that it would add largely to our knowledge on this interesting subject. Referring to the great Southern Continent, which is full of interest with its active volcanoes amidst perpetual snows, he stated it was likely that the ensuing year will add greatly to our knowledge of that land, which is only 1,200 miles distant from New Zealand, on whose climate it probably exerts a marked influence. This little known land possesses large supplies of guano, and according to Sir James Ross, has a large and undisturbed whaling ground near it, in which whales of several different species abound. The President criticised Captain Hutton's paper on the Glacial period of New Zealand, and confirmed his dissent from the theory of a submergence of the New Zealand area on a grand scale during the post-pliocene or post-glacial period, and stated that unless palæontological evidence of recent date can be obtained from strata occupying valleys that were eroded during the last extension of the glaciers he must still adhere to his formerly expressed opinion, that the geological period previous to that which may be termed the recent period in New Zealand was characterised by a prolonged though perhaps not excessive elevation; and that especially in the South Island there is in consequence a marked absence of marine drifts and tills. The President commended the study of the subject of our soils, surface drifts, and beach rocks to the members of the Society. He also differed from Capt. Hutton, who underrates, he thought, the erosive power of existing glaciers, and referred to the recent changes reported to have taken place in the outline of the summit of Mount Cook, owing to a great avalanche having slipped from the ridge, leaving a conspicuous gap in the formerly even tent-like form of the apex.

After referring to the Geological reports for the progress made during the past year in the survey of the country, the President stated that descriptive catalogues of fossils from the tertiary formations, as also an illustrated work on the fossil plants from the different coal-bearing formations are nearly ready for publication. The development of the wonderful reptilian fauna in the upper secondary rocks will afford subject for several communications at the meetings of the Society during the present session. Already at least seven distinct forms belonging to the genera Plesiosaurus, &c., have been worked out from the blocks of matrix collected at the Amuri Bluff (Marlborough) and at the Waipara, and the description of these gigantic Saurians will be sure to excite great interest in the study of geological structure by exciting discussion at home, and indirectly to attract attention to the mineral and other resources of the colony. Mr. Skey's contributions were also favourably reviewed by the President, who concluded by thanking the members for the courtesy and support which he had received. He then vacated the Chair in favour of Dr. Knight, the President for the present year.

SCIENTIFIC SERIALS

Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie, November 1873.—In order to give warning of approaching storms, an important determination is that of "barometric gradient" between two places, found by ascertaining the difference of atmospheric pressure, and dividing by the distance. But as the places may be at unequal heights above the sea level, the influence of this inequality on the barometric state must first be eliminated. This may be done by either of two methods; reduction to the sea level (the more common way), or determining the divergence of the observed barometric state from the average for several years. At the recent meeting of the International Congress of Meteorology at Vienna, the question came up, which method was preferable; and it was decided, that for stations not more than 300 metres above the sea, the method of reduction had advantages over the other. Dr. Hann here compares the two methods, and presents the grounds of the Congress's decision. Austria adopts, this year, the method recommended, in place of the other.—The paper is followed by one giving a sketch of the organisation for meteorological observations in France, under the direction of M. Le Verrier.—We further note some observations by M. Caloria, of Mailand (communicated to the Istituto Lombardo), comparing the number of sun-spots with the temperature and rainfall during the period 1763-1872. The tables indicate pretty clearly an increase of heat with decrease of spots; though anomalies occur. In rainfall the connection is less marked. Among the other notes will be found information as to the climate of the Philippines, statistics of earthquakes in Austria, meteorites, &c.

Bibliothèque Universelle et Revue Suisse for November 1873, commences with a paper by M. Rahn on the Origin of the Renaissance in Italy. He considers the essential character of the art of that period to have been, that the works produced were no longer the product of a collective activity, but the creation of such and such a master. He also shows from the Palais Pitti at Florence, and other edifices (as compared with the Gothic style), how the sense of harmony in proportion was developed.—M. I. Piccard communicates the second part of a paper entitled "Poisons and Counter Poisons," giving here a clear popular account of the three different methods of remedy in cases of poisoning—mechanical elimination of the unabsorbed poison, neutralising of the poison by substances forming with it a harmless compound, and symptomatic treatment, dealing with the effects produced.—Mdlle. Anneville, criticising the public instruction in the United States, thinks history and literature, and æsthetical studies, are too much ignored.—M. Glardon has a review of some English works on Patagonia. The remaining papers do not specially call for notice here.

Bulletin de L'Académie Royale de Belgique, Nos. 9 and 10. This issue contains some interesting observations by Dr. Nuel, of Utrecht, on the electrical phenomena of the heart. Electrodes being applied, one to the apex, the other to the lateral face of an intact, fresh heart, beating regularly, there is, *in diastole*, a small current from the former to the latter, increasing with distance between the points. If the heart is exposed to air, however, the current is soon reversed. Any wounded part is negative to every other point on the surface. The circuit being closed between an intact surface and a transverse section, there is a considerable current from the former to the latter (greater than in ordinary muscles); this diminishes rapidly, but increases again somewhat, when a contraction has been excited. As to the phenomena *during contraction*, the weak current at the surface of the intact and fresh heart does not change; but if a strong current is obtained from lesion, this is weakened or reversed during systole. The negative variation precedes contraction; it reaches a maximum at commencement of systole, and lasts to the end of the contraction. The same author has experimented on the influence of the vagus nerve on the heart; and finds that stimulation affects the auricular contraction differently from the ventricular, implying the presence of different nervous elements. The nerve also contains some fibres which excite, instead of retarding, the heart's movements. In an investigation of the orbits of comets, M. Houzeau shows that the greater axes have a decided tendency to place themselves parallel to the double heliocentric meridian 102° 20′ and 282° 20′, and this longitude differs little from that of the point in space, towards which the solar system is found to be moving.—M. Plateau describes a parasite of the Belgian Cheiroptera. There is a short account, by M. Quetelet, of the proceedings of the recent international Congress of Meteorology held at Vienna; and

M. Van Rysselberghe's "universal meteorographic system" (which we lately noticed), is here described in full, with illustrations, and deserves the attention of meteorologists.

SOCIETIES AND ACADEMIES

EDINBURGH

Royal Society, Dec. 22, 1873.—Sir W. Thomson, president, in the chair. At the request of the Council, Dr. Andrews gave an address on ozone. After giving a full *résumé* of the history of the discovery of the more important properties and relations of ozone, Dr. Andrews showed a number of beautiful experiments. Especially remarkable among these was a class-illustration of the contraction of oxygen by the silent electrical discharge. By the use of a new form of apparatus a diminution of volume was obtained, exceeding any hitherto recorded. Among the more remarkable of the new experiments shown was one quite recently made by the lecturer, proving that coarsely pounded glass, shaken in a vessel containing electrolytic oxygen, rapidly destroys the ozone reactions. This experiment forms a new link between a purely mechanical action and a chemical change, closer than any hitherto observed. The chairman, thanking the lecturer in the name of the Society, pointed out how very large a portion of all that we know about ozone is due entirely to the exquisite researches of Dr. Andrews.

Royal Physical Society, Dec. 17, 1873.—Dr. James M'Bain, R.N., president, in the chair.—The communications read were the following :—On a deposit of magnetic iron ore on the shores of Bute, by James Middleton, M.B. (with exhibition of specimens.) It seems that some time ago Mr. Cameron, of Rothesay, had noticed some remarkable kind of black sand on the beach at Bogany Point, at the entrance to Rothesay Bay. Being interested in it, he carried home a specimen, dried it, and made an examination of it, the result being that he found the sand to consist of almost pure magnetic iron-ore. Bogany Point is not the only part of Bute where it has been found, as it occurs at Kilmichael in the Kyles of Bute. An interesting circumstance, probably connected with this deposit, is that captains of small coasters in the neighbourhood say that they have noticed a divergence of the compass near the point where the principal deposit lies.—Experiments regarding the rate of deposition of sediment from fresh and salt water, by David Robertson, F.G.S. A simple way to illustrate the experiment of the precipitation in fresh and sea water is to take two small glass jars of equal size. Fill the two about four-fifths full, the one with sea and the other with fresh water ; then fill both up with clay dissolved in fresh water—say about the consistence of cream—and stir both well up. Set the jars side by side to settle, and in a very short time the precipitation in the jar containing the sea-water will be seen to be going on rapidly, while in the jar with the fresh water little or no change will be observable. From these results, we can easily understand that whatever changes may have taken place relatively to land and sea from other causes, it does not appear that deposits from fresh water currents can be carried far seaward.—Note on the deposition of mud from various solutions, by Joseph Sommerville.

MANCHESTER

Literary and Philosophical Society, Dec. 16, 1873.—E. W. Binney, F.R.S., vice-president, in the chair.—"Method of Construction of a New Barometer," by Dr. J. P. Joule, F.R.S., president. The condition of the instrument placed on March 18 in the Society's Hall proves that it is possible to use sulphuric acid on the top of the mercurial column without chemical action taking place. I have therefore proceeded to prepare other tubes with a view to test, by practical work, the merits of the new contrivance. A tube of about $\frac{3}{16}$ inch bore is selected. It is first cleaned by drawing a knotted string through it. It is then bent to the siphon shape ; and near the longer end it is drawn to a capillary tube. It is then washed with nitric acid ; afterwards with sulphuric acid. The sulphuric acid is then drained off. Mercury is then poured into the short limb. The end of the longer limb is then attached to my mercurial exhauster. On working this the mercury rises in the tube, and, being replenished by pouring it into the short limb, soon arrives at the height due to the atmospheric pressure. It carries with it the acid left adhering to its sides, so that after a few hours half, or, what is better, one third of an inch of acid stands above the mercury. Small bubbles of air are seen to arise ; but by leaving the tube in connection with the exhauster for a day or two these finally cease. Mercury is then poured into the short limb until that in the longer rises nearly to the capillary part of the tube. This is then sealed and detached from the exhauster. Mercury is then removed from the shorter limb until it stands in the long one at a convenient height. Sulphuric acid is then introduced into the short limb until it forms a column equal to that in the longer limb. A small tube is finally attached to the short limb, and dipping a little way into a small bottle containing a small quantity of sulphuric acid, prevents the access of moist air into the short limb. The tube thus completed possesses the following advantages :—1st. There is the utmost facility in the movement of the column, so that the most minute changes of pressure are at once registered without any dragging. 2nd. The depression produced by capillary action is reduced to one half, so that the siphon arrangement can be satisfactorily used as affording an accurate neutralisation of capillary action.—Mr. Baxendell read a letter from Prof. C. Piazzi Smyth, F.R.S., Astronomer Royal of Scotland, referring to Prof. Reynolds's experiments on exploding glass tubes, and confirmatory of the conclusions of the immense force exerted by water when suddenly converted into steam, as when lightning rends a tree.

VIENNA

Imperial Academy of Sciences, Oct. 9, 1873.—Prof. Krasan made two contributions in plant physiology ; one of them as to what degree of heat wheat-seeds can bear without losing the power of germination. It is much higher than had been thought. They could bear a boiling heat for some hours, desiccation being effected by very gradual rise of temperature, and the use of chloride of calcium (65° for one hour was the limit previously supposed) —A second paper treated of the germination of tubers and bulbs of some early-spring plants.—Prof Lindemann communicated a paper on the behaviour of acrylic acid towards hydrogen liberated from acid solution, and towards agents of oxidation. He finds that acrylic acid at 100° C., with zinc and sulphuric acid, readily passes into ordinary propionic acid ; and that, in oxidation, it furnishes no acetic acid. He thinks acrolein and acrylic acid cannot be constituted similarly to true aldehydes and fatty acids.

October 16.—Prof. Heller, who had been requested to study the Tunicata of the Adriatic, gave a paper on the vascular system of these animals, and especially Ascidians. The walls of the heart (which is a long cylindrical bag, with a thin pericardium), show fine striated muscular fibres, not parallel, but forming a network. The two vascular trunks immediately proceeding from the heart have a similar wall-structure, and contract along with it. The vessels supplying the outer coat in Ascidians always appear as double vessels, joined together only at the end of the last ramification ; in one vessel the blood flows outwards, in the other inwards. The blood in Ascidians is often coloured ; sometimes greenish yellow, sometimes brownish ; while in some species (as *A. intestinalis*), it is quite colourless.—Dr. Von Reuss communicated the first part of a monograph of the fossil bryozoa of miocene Tertiary strata in Austro-Hungary. —Prof. Ritter read a paper on the path of Winnecke's Comet (III. 1819).—Prof. Böhm described experiments which proved the injurious action of ordinary gas on plants. For example, of ten plants (Fuchsia and Salvia), in pots, in which gas was constantly being conducted to the roots, seven died in four months. It was also shown that the gas does not in the first instance kill plants, but that it poisons the ground. Dr. Böhm recommends Von Jürgen's method of preserving plants from gas in the ground, which is, to place the pipes in wider pipes communicating with the outside air, and in which a draught is produced.

October 23.—M. Stefan gave the result of experiments on evaporation, made chiefly with ether. The rapidity of evaporation of a liquid in a tube is inversely proportional to the distance of the liquid surface from the open end of the tube ; it is independent of the diameter, and increases with the temperature. If a pipe, closed at one end, open at the other, is dipped with the latter in ether, bubbles are developed, and the times in which successive equal numbers of bubbles appear, are (initially) in the proportion of the odd numbers. If the tube contains hydrogen instead of air, the same number of bubbles appears in a four times shorter period. Thus evaporation in hydrogen is four times quicker than in air. If a pipe, with open stop-cock, is dipped in ether, and the cock then closed, the