SCIENTIFIC SERIALS

American Journal of Sciences and Arts, January 1874.—This number commences with an account, by Mr. H. Gillman, of some Indian mounds and skulls in Michigan. The numerous tibiæ unearthed showed the compression or flattening which characterises platycnemic men; and the race, from Detroit River to St. Clair and Lake Huron, seems to have been marked with platycnemism to an extreme hitherto unobserved in any other part of America, or perhaps any other country in the world. The writer thinks the type of bone will be found predominant in the entire region of the great lakes.—Mr. Hilgard follows with a note on silt analyses of Mississippi soils and sub-soils (the author having used his "churn elutriator"); and Mr. Longbridge discusses the distribution of soil ingredients among the sediments obtained in silt analysis, and the influence of strength of acid and time of digestion in the extraction of soils.—Mr. Lesquereux communicates the remarkable discovery that traces of land vegetation exist in the Lower Silurian of America; branches or small stems of a species referable to *Sigillaria* having been found by the Rev. H. Herzer in clay beds of the Cincinnati group. The only records hitherto had of vegetable remains from the Silurian of North America are some fragments of stems and rhizomes of *Psilophyton* observed by Dawson in the Gaspé group of Canada; the only link of connection of the Devonian flora with that of the Silurian period. In Europe, too, the first remains of land plants have been found in the Lower Devonian; and as yet only a single specimen of *Sigillaria*. The same writer, in another note, argues against the view, recently advanced, that the lignite beds of the Rocky Mountains have been formed by the heaping up of drifted materials. We also find notes on the geology of Western Texas (Jenney), on the results of recent dredging expeditions on the coast of New England (Verrill), on fossil woods of British Columbia (Dawson), on a combination of silver chloride with mercuric iodide (Lea), &c.—An appendix contains a paper (with two plates) by Prof. Marsh, treating of the structure and affinities of the Brontotheridæ.

Poggendorff's Annalen der Physik und Chemie, No. 11, 1873.—This number contains the concluding part of M. Kundt's paper on the vibrations of square air plates.—Dr. Schüngel describes some experiments made with reference to change in the pitch of sounds through a movement of translation of the sounding body. He arranged an apparatus in which a tuning fork, mounted, with its case, on a little waggon, was rapidly drawn along (by a cord passing round a drum) towards the observer, who stood beside another fork making a slightly greater number of vibrations than the moved one. In this way a different number of beats was obtained; less than that produced when both forks were at rest. The pressure of a key, giving rise to this motion (through electro-magnets, &c.), caused a telegraphic strip of paper to be at the same time impressed, showing a continuous line; and a second pendulum, closing a current at each swing, produced a series of points on the same strip. By this means could be measured the time in which a certain number of successive beats was heard, and the rate of motion of the travelling fork. The author points out how the method may be employed for determining the velocity of sound, and commends it to the attention of physicists for further development.—M. Zöllner replies, at some length, to the considerations urged by M. Reye against his explanation of the sun-spots and protuberances; and M. Behrens communicates a note on porcelain and allied products.—A mercury air-pump, of improved construction, is described by M. Mitscherlich; and a variation-barometer by M. Kohlrausch; the latter instrument being formed with the vacuous metallic ring of a Bourdon aneroid.—M. Herwig makes a calculation of the number and weight of ether-molecules contained in electrical conductors.—Among the extracted matter, we note several important papers; one by Dr. Heinrich Streintz (Vienna Acad.), on the changes in elasticity and length of a wire traversed by a galvanic current; one by M. Plateau (Belgian Acad.) on the measurement of physical sensations, and the law which connects the intensity of these with that of the exciting cause; and one by M. Helmholtz (Berlin Acad.) on galvanic polarisation in gasless liquids.

Astronomische Nachrichten, No. 1,974.—In this number Prof. Spoerer writes a very interesting account of his sun-spot and prominence observations, from which he concludes that faculæ occupy the same places where protuberances arise or where the points of the "flaming chromosphere" are situate; and further, that protuberances are in most cases connected with spots, and are very conspicuous before and at the commencement of a group of spots. In many cases, he says, it is possible to calculate when a spot will appear, from the observation of a flaming protuberance, and that the spots are produced by the substances thrown up becoming cooled and producing a cloud of products of condensation.—Dr. Hugo Goricke contributes a number of observations of position of the minor planets Asia, Flora, Thetis, and Hera.

Astronomische Nachrichten, No. 1,975.—In this number Prof. Schmidt gives an account, in full, of his observations on Sun-spots, the number of groups being given for each day in 1873, the maximum number on any one day being 9, and the minimum 1. There is no day on which the sun was free from spots. Prof. Schmidt says that clouds have prevented observations on 12 days; we, in this country, should be content with missing 120 days. Prof. Schmidt also gives the maxima and minima of a number of variable stars, and we regret that want of space prevents our reproducing his results, which are worthy of perusal by those interested in the matter.

Der Naturforscher, Jan. 1874. In this number we may first note an account of some observations by M. Hann, at Hong Kong and in Ceylon, as to the decrease of temperature with the height. It appears that the yearly average of decrease is much the same in the tropics as in central Europe. During the regular monsoons, the decrease is much more gradual on the windward side of a mountain than on the lee. The quick decrease in time of rain is due, in part, to increase in quantity of rain with the height, and greater cooling in consequence.—From experiments on alcoholic fermentation, by M. Brefeld, it is concluded that alcohol yeast always requires free oxygen for its growth; it cannot grow on oxygen from a compound like sugar; further, that living, but non-growing, yeast-cells (free oxygen being excluded) may yet excite fermentation in sugar solution. As showing the affinity of the yeast-cell for free oxygen, the author states that it may grow in CO_2 containing less than $\frac{1}{1000}$ of its volume of such gas, and will fully absorb it.—We also find a note of some experiments on butyric fermentation, by M. Paschutin; and in the botanical department there are several interesting notes.—On the reaction of plant protoplasm to mechanical injuries, by M. Hanstein; the cause of periodical motions in leaves, by M. Batalin, stated to be, chiefly, unequal growth, preponderating at one side or the other, through varying conditions of light, temperature, and turgescence; on the morphological differentiation of the lower plants, by M. Pfingsheim, and others.—In a suggestive mineralogical paper, M. Hirschwald theorises on the cohesion-relations in drops and in crystals.—Physics is represented by several extracted notes—on evaporation, on phenomena of polarisation produced through dispersion of light, on relations between capillary and electric phenomena, on intermittance of the electric current, &c., most of which have already been noticed elsewhere in our columns; and in physiology there is an account of a valuable investigation by M. Forster, as to the significance of ash-constituents in food.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, Feb. 12.—"On the influence of Ethyl Alcohol on the Bodily Temperature, the Pulse, and the Respirations of a healthy man." By E. A. Parkes, M.D., F.R.S., Professor of Hygiene, Army Medical School.

The author made a large number of experiments on a strong healthy soldier, T.R., aged twenty-five, height 5 ft. 8¾ in., weight (naked) 67·46 kilogrammes, or 148 lbs.

The course of the experiments was as follows:—His breakfast was taken at 6.30, was finished every day by 7 A.M.; he took for breakfast 8 ounces of bread, ½ ounce of butter, and 17 fluid ounces of tea with sugar, and with 3 ounces of milk. Immediately after breakfast he went to bed again, and did not get out of the recumbent position for any purpose until 2 o'clock. He then dined on 12 ounces of beefsteak, 4 ounces of bread, and 8 ounces of water.

After dinner he took exercise and smoked, had tea (same food as at breakfast) at 6, and a glass of water at 9 P.M., when he went to bed. He took daily precisely the same diet and quantity of water.

Thermometers (tested for accuracy and exactly corresponding) were placed in the axilla and rectum at 6 o'clock, and, except

at breakfast, they were removed only for the purpose of being read at first every 30, and then every 15 minutes, and were at once replaced, until 2 o'clock; after which time the temperatures were only taken every two hours.

After several days' preliminary examination (during which time he took no alcohol) the experiments were commenced and carried on for six days without alcohol; then during five days undiluted brandy containing 50 per cent. of absolute alcohol was given once daily, viz. at 11 A.M., four hours after breakfast.

On the first day one fluid ounce of brandy (= ½ ounce of alcohol) was given; on the second day two ounces, on the third day four ounces, on the fourth day six ounces (= 3 ounces of alcohol), and on the fifth day also six ounces.

The following were the conclusions arrived at:—

1. The change in the temperature of the axilla and rectum produced by brandy was very slight. It was never increased, but was probably slightly lowered; but the result is not quite certain; and if any lowering occurred, it did not exceed 0°·35 Fahr., and may not have been more than 0°·07 Fahr.

2. The pulse, which was lessened in number by long rest in a recumbent position, was increased in frequency by a single dose of brandy for three hours, but subsequently fell in number, so that the daily work done by the heart was the same on the water and the brandy days. What occurred was accelerated work for a certain time, and compensation for this by lessened work afterwards. That brandy increases the force as well as the number of the pulse, was shown by sphygmographic tracings in the papers already communicated to the Royal Society; and in order not to disturb the state of rest, no sphygmographic observations were taken in this case.

3. The respirations appeared to be slightly lessened by brandy; but the evidence is not very strong.

The author made another series of experiments to determine the effect of alcohol after sixteen hours' fasting.

The following conclusions may be drawn from the observations formerly recorded ("Proceedings of the Royal Society," Nos. 120, 123, and 136), and from those now laid before the Royal Society:—

1. When alcohol in dietetic doses (=2 fluid ounces, or 57 cub. centims., of absolute alcohol) was given to a healthy man fasting and at rest, a decided though slight lowering of bodily temperature (as judged of by the heat of the rectum) was caused. The amount of lowering was under half a degree of Fahrenheit; and sometimes even this amount was not perceptible, being probably counteracted by the opposing influence of the heat-producing changes in the body, which cause slight variations of temperature independent of food and movement. The greatest effect was produced about from one to two hours after the alcohol was taken, and the effect was evidently passing off in three hours.

2. When alcohol in dietetic doses was given to a healthy man at rest, and in whom the process of digestion was completed, and whose temperature, raised by the food, was again commencing to fall, a lessening of temperature was also proved, but its amount was not so great; it could not have been more than 0°·35 Fahr., and may have been only 0·07 Fahr.

3. When alcohol was given with food with either usual or increased exercise, no effect on temperature was perceptible, even though the alcohol was given in large quantities, viz. from 4 to 8 fluid ounces of absolute alcohol (114 to 227 cub. centims.) in twenty-four hours. It is to be presumed that the amount of heat generated from the food and movement concealed the effect of the alcohol, which would require a more delicate method for detection.

4. In no case did alcohol raise the temperature.

5. The effect of alcohol on the pulse was uniform in the four men experimented upon. The contractions of the heart were more frequent during complete rest, from five to ten beats per minute for some time; and when exercise was taken the increase was greater. The mean pulse of the twenty-four hours was, however, not increased unless the amount of alcohol was large and repeated. In other words, the heart's beats were less frequent than natural when the effect of the alcohol had passed off. The pulse became both fuller and softer to the touch; and this relaxation of the radial artery was shown also by the sphygmograph. That the smaller vessels were relaxed was shown by the redness of the surface and by the evident ease with which the blood traversed the capillaries, as shown by the sphygmographic tracings.

6. The respirations were not increased in number by alcohol; they were indeed lessened, and were deeper in some of the experiments; but the effect was not very marked.

Feb. 26.—"The Winds of Northern India, in relation to the Temperature and Vapour-constituent of the Atmosphere," by Henry F. Blanford, F.G.S., Meteorological Reporter to the Government of Bengal.

Geological Society, Feb. 20.—His Grace the Duke of Argyll, K.T., F.R.S., president, in the chair. In handing the Wollaston Gold Medal to the foreign secretary, Mr. W. W. Smyth, for transmission to Prof. Heer, of Zurich, the president referred to the fact that last year the council had awarded the balance of the proceeds of the Murchison Geological Fund to Prof. Heer, and remarked that it gave him much pleasure that the Wollaston Medal, the highest honour which the Society had it in its power to confer, should be so worthily bestowed. He alluded briefly to the labours of Prof. Heer in the difficult departments of Fossil Botany and Entomology, and to the admirable works in which he had given to the world the results of his indefatigable researches.

Mr. W. W. Smyth, in reply, said:—"My Lord President, it is with a great pleasure that I undertake the transmission to Prof. Heer of this new testimony of the importance attached by this Society to his long-continued labours. I have received from our valued foreign member a letter stating that my announcement of the award had found him extended on the bed of sickness, and begging me to assure the Society that, but for this misfortune, nothing would have given him greater pleasure than to have been present at this meeting, and to have thanked the Society personally for the high honour which has now been awarded to him."

The President then presented the balance of the proceeds of the Wollaston Donation Fund to the foreign secretary for transmission to Dr. H. Nyst, of Brussels, remarking that this distinction had been well earned by Dr. Nyst by his admirable researches upon the Molluscan and other fossil remains of his native country.—Mr. W. W. Smyth briefly thanked the president on behalf of Dr. Nyst.

The president next presented the Murchison Medal to Dr. J. J. Bigsby, F.R.S., and remarked in so doing that there was a peculiar fitness in this award, which would have met the approval of the distinguished geologist in accordance with whose last wishes this medal was given. It was awarded to Dr. Bigsby in recognition of his long and valuable labours in that department of geology and palæontology with which the name of Murchison is more particularly connected.—Dr. Bigsby replied, thanking the Society for the honour conferred upon him, and the president for the terms in which he had spoken of his labours.

The president then handed half the balance of the proceeds of the Murchison Geological Fund to R. Etheridge, F.R.S., for transmission to Ralph Tate, F.G.S., expressing a hope that it would be regarded by him as a testimony of the value set by the Society upon his palæontological researches, especially on the Fauna of the Lias, and that it would enable him to enlarge the sphere of his investigations.—Mr. Etheridge, in reply, read the following letter of acknowledgment from Mr. Tate:—

"My Lord President and Gentlemen, To say that I am unworthy of the honour that you have awarded me by the bestowal of the 'Balance of the Proceeds of the Murchison Fund,' would be to call into question your judgment, and would render nugatory its value to me. The encouragement that such an award conveys is ample recompense for labour bestowed in palæontological research, and is a real incentive to more diligent work. It is in this spirit that I accept the award, and tender my warmest thanks to you for the distinction it confers. It is now twelve years since I was led to select for special study the geological history of the Lias, which appeared to me not to have received that attention at home that it had upon the Continent, and which it claimed by offering the earliest phase of Mesozoic life, and presenting a number of physical problems that seemed upon the threshold of the inquiry to reward even the casual observer with a rich harvest. I have published from time to time fragments relating to the stratigraphy and palæontology of this period, but I hope soon, in conjunction with my friend Mr. J. F. Blake, F.G.S., to submit, in a work entitled 'The Yorkshire Lias,' a comprehensive review of the chief characteristics of the period, embracing the remarkable variation of mineral conditions, and the particular distribution of organic life, as indicative of peculiarities of depth of ocean, the direction and proximity of land, &c. Despite all these efforts, the ambition to acquire the position of an expositor of the life of this interesting group of strata urges

me to the completion of a *Prodromus* or *Thesaurus Liassicus*, the materials for which have been accumulated during several years; but from the great labour demanded to bring into harmony the nomenclature of the fossils, without which the compilation can have no real value, some time must elapse before the results can be submitted to you.—Faithfully yours, Ralph Tate."

The President then presented to Mr. Alfred Bell the other half of the balance of the proceeds of the Murchison Geological Fund, and stated that this was awarded to him in recognition of his valuable researches upon the fossils of the newer Tertiary beds of this country, and to assist him in the completion of his work upon the Crag deposits of the eastern counties. Mr. Bell, in reply, said that he was most grateful for this token of the Society's appreciation of the value of his labours, and stated that up to the present time he had been enabled to distinguish about 3,000 fossil species from the newer Tertiaries of Britain, and that he hoped yet to add very largely to their number.

The President then proceeded to read his Anniversary Address, in which he stated that the pressure of his official duties during the period of his presidency had prevented his keeping himself thoroughly acquainted with the recent progress of geological research, and he therefore proposed in his present address to advert rather to those questions in geology which seemed to him still to require an answer. He referred to the relations between geology and cosmogony, to the effects and causes of volcanic and earthquake action, and finally to the great questions which are still unsettled as to the origin of life and the sequence of organic beings on the face of the earth. The address was prefaced by some obituary notices of Fellows and Foreign Members and Correspondents deceased during the past year, including Mr. J. Wickham Flower, Mr. J. Garth Marshall, Prof. Agassiz, and M. de Verneuil.

The Ballot for the Council and Officers was taken, and the following were duly elected for the ensuing year :—President—John Evans, F.R.S. Vice-Presidents—Robert Etheridge, F.R.S. ; R. A. C. Godwin-Austen, F.R.S. ; Sir Charles Lyell, Bart., F.R.S. ; Joseph Prestwich, F.R.S. Secretaries—David Forbes, F.R.S. ; Rev. T. Wiltshire, M.A. Foreign Secretary —Warington W. Smyth, F.R.S. Treasurer—J. Gwyn Jeffreys, F.R.S. Council—The Duke of Argyll, K.T., F.R.S. ; H. Bauerman ; Prof. G. Busk, F.R.S. ; J. F. Campbell ; Frederic Drew ; Sir P. de M. G. Egerton, Bart., F.R.S. ; R. Etheridge, F.R.S. ; John Evans, F.R.S. ; David Forbes, F.R.S. ; Capt. Douglas Galton, F.R.S. ; R. A. C. Godwin-Austen, F.R.S. ; J. Gwyn Jeffreys, F.R.S. ; Sir Charles Lyell, Bart., F.R.S. ; C. J. A. Meyer ; J. Carrick Moore, F.R.S. ; Joseph Prestwich, F.R.S. ; Prof. A. C. Ramsay, F.R.S. ; Samuel Sharp, F.S.A. ; Warington W. Smyth, F.R.S. ; Prof. J. Tennant, F.C.S. ; W. Whitaker, B.A. ; Rev. T. Wiltshire, F.L.S. ; Henry Woodward, F.R.S.

Anthropological Institute, Feb. 24.—Sir Duncan Gibb, Bart., M.D., in the chair.—Mr. Biddle Lloyd, C.E., F.G.S., read a paper on the Beothucs, a tribe of Red Indians, supposed to be extinct, which formerly inhabited Newfoundland. The author, after reviewing the various accounts related of the aborigines of the island from the time of Sebastian Cabot downwards, gave the results of the information he picked up from various sources during an exploratory cruise he made last summer round the coast of Newfoundland, respecting the strange tribe of Indians which inhabited the island up to a period which terminated about forty years ago, when, by reason of the cruelties practised on them by the English fishermen, and the warfare carried on against them by the Mic-mac Indians, they were reduced in number, and finally the few of them that were left, it is supposed, crossed over the straits of Belleisle, or at all events disappeared. Several singular circumstances in connection with the Beothucs, as they styled themselves, were noticed : namely, the curious shape of their birch-bark canoes, the fact that the dog was not domesticated by them, and their manner of hunting the Caribou by means of long lines of fencing put up to keep the herds of deer along certain tracks.—Mr. Lloyd also read notes on Indian remains found on the coast of Labrador. The Indian remains found on the coast of Labrador consisted of rudely-constructed buildings, of stone slabs, which were discovered on the sea-shore at the western entrance of the straits of Belleisle. They were described to the author as Indian graves, but there was no evidence to show that such was the use to which they had been applied. On the contrary, it seemed probable they were stone wigwams built by some Indian families for a summer residence. The author was fortunate enough to discover at L'Anse du Diable, which is a cave situated about 20 miles east of the locality where the so-called Indian graves were found, a few arrow-heads of quartzite and hyaline quartz on a sandy "barren" which stretched inland from the head of the cave. From circumstances connected with the cave, the author concluded that the locality had been chosen by some unknown tribe of Indians for the manufacture of their arrow-heads during an occupancy of some considerable time on the spot.—A paper was read by Dr. Sinclair Holden on a peculiar Neolithic implement from Antrim.

Royal Horticultural Society, Feb. 10.—Annual General Meeting.—Viscount Bury, president, in the chair.—The Report of the Council having been taken as read, it was moved by Mr. Haughton as an amendment to the motion for its adoption, and seconded by the Rev. C. P. Peach, that the meeting be adjourned to enable the opinion of the Court of Chancery to be taken as to the legal position of the Society. (The commissioners of the Annual International Exhibitions dispute the validity of the election of the Council chosen last year.) The amendment being put to the vote was lost by a majority of six, the numbers (including ladies' proxies) being, for, 225; against, 231. The report was then put and carried. The following vacancies were filled for the ensuing year :—President—Viscount Bury, K.C.M.G. Treasurer—Mr. Bonamy Dobree. Secretary—Mr. W. A. Lindsay. Members of Council (extraordinary vacancies) —Lieut.-Gen. Hon. Sir A. H. Gordon, K.C.B. ; Mr. Joseph Robert Tritton ; Mr. Burnley Hume ; Mr. Henry Webb.

General Meeting, Feb. 18.—Henry Little in the chair.—The Rev. M. J. Berkeley commented on a plant shown by Mr. Bull, under the name of *Rapatea pandanoides*. It is a species of *Saxofridericia*. He also gave some account of Dr. Cunningham's microscopic examinations of air in Calcutta.

Scientific Committee.—A. Smee, F.R.S., in the chair.—A large number of subjects were brought before the Committee. Among the more important were—Mr. Grote : The Tea-bug of Assam, supposed by Prof. Westwood, from the figures, to belong to the Cimicideous family, Capsidæ, and nearly allied to a species which injures chrysanthemum-buds. Mr. A. Müller thought it much more likely to be some aphis, though it might be immature.—A communication was sent through Dr. Hooker on a new disease of the coffee plantations in India (Tellicherry). The leaves turn yellow, and the back is found to be covered with a rust-coloured dust. Further information was requested.—Prof. Thisselton Dyer exhibited specimens of the Balaniform gabsy gall of the oak with specimens of the Cynips which had been bred from them. These had been identified by the Rev. T. A. Marshall as *C. radicis*, Fab. He also read a note from Mr. Fenn, of Woodstock, as to the practical impossibility of making keeping wine from out-door ripened grapes without the addition of sugar —a point of interest in connection with the supposed deterioration of the English climate ; also a note on the condition of an armour-plated ship which was being rapidly destroyed by dry-rot, and a photograph of the tree of the orange or Pearmain apple, with a drawing of the branch which had produced the russet sport exhibited to the Committee last November.

Entomological Society, Feb. 16.—Sir Sidney Smith Saunders, C.M.G., president, in the chair.—Mr. Weir exhibited a sample of wheat from Australia infested with a weevil, *Sitophilus oryzæ* ; the cargo was so much damaged that about two tons were utterly useless. The weevil was accompanied by *Læmophlœus ferrugineus*. Some wheat from Japan was also infested with *Sitophilus granaria* and *Rhizopertha pusilla*.—Mr. Higgins exhibited a number of *Cetoniidæ* from the Philippine Islands, which had been described by Dr. Mohnike.—Mr. F. Smith read extracts from a letter from Mr. J. T. Moggridge of Mentone, on a small beetle, *Coluocera attæ*, Kraatz, found in the granaries of *Aphænogaster* (*Atta*) *structor* ; and stating that *Platyarthrus* was also very common in the nests. He was much struck by the frequent occurrence of the nests of trap-door spiders in the very soil of the ants' nests ; the spiders' tubes often running quite close to, and in the midst of, the galleries of the ants. As ants form a large portion of the food of trap-door spiders, this helped him to understand how it was that the spiders got a living without leaving their nests.—Some conversation took place on the ravages of the Colorado potato beetle (*Doryphora decemlineata*) in North America ; a writer in the *Times* recommending the encouragement of small birds as the best security against the pest ; but it was much doubted whether the small birds would

care to meddle with the insect, as it was stated that when crushed it caused blisters on the skin, and that if a wound was touched severe inflammation and painful ulcers followed.

Institution of Civil Engineers, Feb. 10.—Mr. T. E. Harrison, president, in the chair.—The paper read was on the construction of Harbour and Marine Works with artificial blocks of large size, by Mr. Bindon Blood Stoney, M.A. The author described a new method of submarine construction, with blocks of masonry or concrete far exceeding in bulk anything hitherto attempted. The blocks were built in the open air on a quay or wharf, and after from two to three months' consolidation, they were lifted by a powerful pair of shear legs, erected on an iron barge or pontoon. When afloat, the blocks were conveyed to their destination in the foundations of a quay wall, breakwater, or similar structure, where each block occupied several feet in length of the permanent work, and reached from the bottom to a little above low-water level. The superstructure was afterwards built on the top of the blocks in the usual manner by tidal work. By this method the expenses of cofferdams, pumping, staging and similar temporary works were avoided, and economy and rapidity of execution were gained, as well as massiveness of construction, so essential for works exposed to the violence of the sea.

EDINBURGH

Royal Society, Monday, March 2.—Sir Robert Christison, honorary vice-president, in the chair.—The following communications were read:—"On the Parallel Roads of Glen Roy, with a Notice of finding Fossil *Diatomaceæ* in the Deposits," by the Rev. Thomas Brown.—"On the Perception of Musical Sounds," by Dr. M'Kendrick.—"On the Establishment of the Elementary Principles of Quaternions on an Analytical Basis," by Mr. G. Plarr. Communicated by Prof. Tait.—"Preliminary Note on Spectra under exceedingly small Pressures," by Prof. Tait and Mr. J. Dewar.—"Laboratory Notes," by Prof. Tait (1) On Atmospheric Electricity; (2) On the Thermoelectric Position of Sodium.

DUBLIN

Royal Irish Academy, Feb. 9.—Rev. J. H. Jellett, president, in the chair.—W. H. Baily, F.L.S., read a preliminary report on the plant-fossils of the Kiltorkan district. In this preliminary report Mr. Baily stated that the most frequent plant met with is *Palæopteris hibernica*, first noticed by the late Prof. E. Forbes, under the provisional name of Cyclopteris, afterwards referred to Adiantites by A. Brogniart, and now placed by Schimper in his genus Palæopteris, differing as it does from the former genus in the arrangement of its leaflets and from the latter in its mode of fructification. Some of the fronds met with were nearly five feet long and three wide. Two new species were described as *Sphenopteris hookeri* and *S. humphresianum*, both of which were comparatively rare.—A fine example of the stem of *Sagenaria bailyana* of Schimper was met with, the total length of which was 20 ft. 4 in., and at its lowest portion it was 6 in. in diameter; it branched at about 15 ft. from the base; and the upper portion of these branches corresponds with *Cyclostigma minuta* of Haughton. Cone-like bodies, somewhat resembling Lepidostrobus of the coal were met with. They are composed of elongated scales, terminating in long linear processes showing large and very distinct sporules.—These presumably belong to the Sagenaria but have never yet been found attached.—The report was referred to Council for publication.—Mr. G. Kinahan, of the Geological Survey, believed the report was a most valuable one, and that the researches of Mr. Baily had proved that many of Mr. Carruther's species were but portions of the same plant.—Prof. M'Nab read a report on some researches into the physiology of plants. These experiments were first a series to determine the amount of water transpired by leaves, and secondly the ascent of water in the stem. The plants selected for both series of experiments were the cherry-laurel, the common privet, and the common elm. It would be impossible to condense the large series of experiments made by the author. One series, to determine the amount of water transpired by leaves, made on August 7, 1873, showed that, with very nearly the same exposure and under the same conditions, the cherry-laurel lost, of water, 51·81 per cent. of the weight of the branch employed; the privet, 26·78; the elm, 65·61. Very many experiments were made to determine the actual rate at which fluid ascends in the stem. In Sach's experiment on this subject he fixed the rate to be 9 in. per hour. In Dr. M'Nab's first experiments he obtained a rate of 24 in. per hour. The present series of experiments were made on the same species of plants mentioned above. In the privet the rate was 6 in. per hour; in the elm the rate was 15·6 in. per hour. But in both plants the leaves and stem soon became placid, and the experiments were not completely satisfactory. In the cherry-laurel the rate in one experiment was 24 in. per hour; in a second, 13·2 in. per hour; and in a third, 18·6 in. per hour. The author also recorded a large series of experiments: 1. As to the rapidity of the ascent of fluid in stems when in (*a*) sun, (*b*) diffused daylight, and (*c*) darkness. 2. Rapidity of ascent in branches cut off in the dark. 3. Rapidity of ascent in branches with the cortical tissue removed. 4. Rapidity of ascent in stems deprived of their leaves. 5. Rapidity of absorption of lithium when applied at apex of the branch; and 6. Rapidity of ascent when fluid was taken up under pressure of mercury, intended to represent the root pressure of the plant.—This report was also referred to Council for publication.

VIENNA

Geological Institute, December 3, 1873.—One of the most obscure questions in the geology of the Austrian empire has been the geological position of the Vienna and Carpathian sandstones which form a broad continuous zone on the northern flank of the Austrian Alps, and by far a broader one still on the northern and eastern flank of the Carpathians in Moravia, Silesia, Hungary, Galizia and Transylvania. Only in Silesia, by the investigations of the late Hohenegger, and in Northern Hungary, by those of M. C. Paul, a more satisfactory knowledge has been obtained on this subject. They agree that in both regions the Carpathian sandstones may be divided into several easily distinguishable groups which belong partly to the older tertiary, and partly to the cretaceous formations. Two very valuable memoirs on this subject were read; the first from M. F. Herbich, on the Carpathians in Eastern Transylvania, between the Gyimes and the Tömös Pass. The lowest member of the Carpathian sandstones is formed here by white or yellowish sandstones, which, higher up, pass into coarse conglomerates and belong to the middle neocomian formation; they are covered by a large series of dark-grey sandstones which contain characteristic fossils, and belong to the upper neocomian. The next member, developed near Zaizon, is a grey limestone with Caprotina Lonsdali, identical with the well-known Caprotina limestone of the Alps, and belonging also to the upper neocomian. Above the neocomian strata follow again different sandstones, which M. Herbich thinks to be identical with the Godula sandstones of Hohenegger, and therefore to belong to the Gault. The second memoir, by M. Ch. Paul, treats of the Carpathian sandstones in the eastern Bukowina. They are divided in five different stages, viz., (1) Lower Teschen slates; (2) Neocomian Aptychus limestones; (3) Ropianka beds; which were formerly thought by the author to belong the Eocene series, whilst now he considers them as probably Cretaceans. They are of very great importance, because they contain in Galicia and Bukowina, as well as in Hungary, exclusively the sources of petroleum. 4. Menilith schists, with nests of fossil fishes, which are generally thought to belong to the middle oligocene formation. 5. Magara sandstone, probably upper oligocene.—Dr. Neumayer on the character and the distribution of some Neocomian cephalopods. The author, referring to a former memoir, ("Jahrb. d. k. k. geol. Reichsaunstalt," 1871, p. 521), states that the European jurassic deposits form three different provinces, the Mediterranean, the middle European, and the Russian province. By very interesting observations on the faunas of these provinces, as well as on that of the neocomian period, he establishes some facts relating to the physical geography of the mesozoic period. First he states, that at the end of the jurassic time, the middle parts of Europe were laid dry, and whilst therefore the marine life in the middle European province ceased, it continued, and was differently developed in the Mediterranean (deposits of Stramberg, of Berrias, &c.) and in the Russian province. Afterwards, about the time of the Valenginien, the middle part of Europe was again submerged and now peopled partly from the northern and partly from the southern seas; that the immigration went really partly from the north, is proved by the very curious and close affinities between some of the middle European neocomian cephalopods and those of the upper jurassic strata of Russia.

Academy of Natural Sciences, Dec. 11, 1873.—M. Hoernes described the geological features of the island of Samothrace, from observations made in the spring of 1873.—Prof. Knoll presented a paper on the reflex effects produced

on respiration, by introducing some volatile substances into the air passages under the larynx. When chloroform is inhaled through a tracheal canula (the mucous membrane of the nose being guarded against its action), there is acceleration and shallowing (*Verflachung*) of the respiratory movements, with low position of the diaphragm, and, sometimes, entire stoppage in the position of inspiration. Ether, benzine, and oil of mustard have a similar, though less, effect. Section of the vagi at the neck shows that these changes depend on reflex action of the vagi. The vapour of a strong solution of ammonia produces great change in the respiration, often lasting several minutes, and varying between a retarding and deepening effect, with long stoppage in position of expiration, and retardation and shallowing in position of inspiration. This also is due to reflex action through the vagi. Inhalation of pure carbonic acid through the tracheal canula produces, both when the vagi are cut and uncut, first, a moderate acceleration, then a considerable retardation of the respiratory movements. No phenomenon occurs which can be explained by a direct stimulation of the vagi by the Co_2.—Dr. Fitzinger communicated a paper on the species of the family of deers (*Cervi*) according to their natural relations. He enumerates twenty different species, four of which he has himself introduced, viz., *Strongyloceros*, *Elaphoceros*, *Doryceros*, and *Nanelaphus*. To Wagner's species *Macrotis* and *Furcifer*, he gives the names *Otelaphus* and *Creagrocerus*, the two former names having had a previous application in zoology. Dr. Schenck presented a note on the eggs of *Raja quadrimaculata* within the oviduct; describing the structure of the shell, and the development of the embryo.—Drs. Nowak and Kratschmer made a communication on phosphoric acid as a re-agent with alkaloids. They find that it gives, with several alkaloids, peculiar colour-reactions, in some of which characteristic reactions of smell are developed. In both respects it presents some advantages over the similarly-acting sulphuric acid It is specially preferable to this in determination of atropia, for reasons which the authors give.

PHILADELPHIA

Academy of Natural Sciences, Oct. 7, 1873.—Dr. Ruschenberger, president, in the chair.—"Law of Seed Germination in Swamp Plants." Mr. Thomas Meehan said that it was an error to suppose that Nature placed trees in places the best suited to their growth. Almost all of our swamp trees grew much better when they could get into dryer places, if in ordinary good land. He referred among others to *Magnolia glauca*, *Acer rubrum*, *Celtis occidentalis*, *Ilex opaca*, *Cupressus thamæcyparis*, *Cephalanthus occidentalis*, *Salix babylonica*, especially as, within his own repeated observations, growing better out of swamps than in them. Why it was that they grew in swamps was no enigma to those in the habit of raising forest trees from seed. It was found that seeds of these trees would only germinate in damp places, and, of course, in a state of nature the tree had to remain in the place where the seed germinated. He thought the principle taught that plants required water to grow well was true only in so far as a humid condition of the soil was concerned. Plants as a general thing, though they were of the class known especially as water plants, preferred to grow out of the water, except in those which grew almost entirely beneath the surface. As was well known, the *Taxodium distichum* in the southern swamps sent up "knees" from various points as the roots extended, often as large as old-fashioned bee-hives, and several feet above the surface.

Oct. 21.—Dr. Ruschenberger, president, in the chair.—"Subiateiri e, a new Mineral from Santa Clara County, California," by E. Goldsmith.

Oct. 28.—Dr. Ruschenberger, president, in the chair.—The following paper was presented for publication:—"Descriptions of Mexican Ichneumonidæ," by C. T. Cresson.

Nov. 18.—Mr. Vaux, vice-president, in the chair.—The following papers were presented for publication:—"On the Homologies and origin of the Types of Molar Teeth in Mammalia Educabilia," by E. D. Cope; "Contribution to the Ichthyology of Alaska," by E. D. Cope. Prof. Cope remarked that he had observed in the Rocky Mountain region circles of stones arranged by human hands, in countries not now inhabited by the Indians. One of these is in South-western Wyoming near South Bitter Creek, inside the horseshoe of the Mammoth Buttes. The locality is a very barren one, and could hardly be regarded as a camping-ground. The circle consists of three uninterrupted concentric rings close together, the hole having a diameter of about 15 ft. The stones are of moderate size, composed of a dark silex, and evidently derived from the drift material brought down from the Uinta Mountains, which is found on the summits of the bad-land mesas. Five or six miles from this place was found a flint factory with numerous implements and cores. Two other circles were observed, in Colorado, about a hundred miles east of Long's Peak, and about five miles from a spring in a well-grassed country. The locality is unsuitable for a camp, in consequence of the remoteness of wood and water. The country is not inhabited by Indians, the nearest, a temporary camp, for travelling Cheyennes, Sioux, &c., being forty miles distant.

Nov. 25.—Dr. Ruschenberger, president, in the chair.—The following paper was presented for publication:—"Description of Seven New Species of Unionidæ of the United States," by Isaac Lea. The committees to which were referred the following papers:—"On the Homologies and Origin of the Types of Molar Teeth in Mammalia Educabilia," by Edward D. Cope; and "Contributions to the Ichthyology of Alaska," by Edward D. Cope," reported in favour of their publication in the *Journal*.—Disposition of the *Flexor perforans*, *Flexor longus hallucis*, and *Flexor accessorius* in *Paradoxurus musanga* Gray, by Dr. H. C. Chopman.

PARIS

Academy of Sciences, Feb. 23.—M. Bertrand in the chair. The following communications were made:—On the undulatory movement of a train of wagons due to a shock, by M. H. Resal.—On the acid waters which rise in the Cordilleras, by M. Boussingault.—Determination of vapour densities, by H. Sainte-Claire Deville. The author criticised the apparatus for the determination of vapour densities, recently devised by M. Croullebois.—M. Dumas communicated a note on a process invented by Dulong for taking vapour densities.—Observations concerning the last communication by M. Clausius, on the equation $\int \frac{d\,Q}{T} = 0$, by M. A. Ledieu.—M. Milne-Edwards gave news of l'Abbé A. David, now travelling in Western China, and presented, on the part of this naturalist, a note containing descriptions of several new birds.—Memoir on the swim-bladder from the point of view of station (*station*) and locomotion, by M. A. Moreau. The author described some experiments made upon a perch (*Perca fluvialis*).—Organogenesis compared with Androgenesis in its relations to natural affinities (*Class Œnotherinæ*), by M. A. Chatin.—On a new mode of ramification observed in plants of the family of the Umbelliferæ, by M. D. Clos.—Observations relative to a recent memoir by M. Helmholtz upon "Aërial Navigation," by M. W. de Fonvielle. On the lines which are doubly tangential, to the "*surface lieu*" of the centres of curvatures of a surface of the second order, by M. Laguerre.—On the permanent magnetism of steel, by M. E. Bouty.—Note on the distribution and determination of thallium, by Mr. T. L. Phipson.—On the presence of metallic silver in gallena, by the same author.—Anatomical researches on rickets of the vertebral column," by M. Ch. Robin.—Geological sketch of the Isle of Tros, by M. H. Gorceix.—On a new apparatus for registering the direction of clouds, by M. H. de Parville.—On three new human skeletons discovered in the caves of Menton, and on the disappearance of chipped flints and their replacement by sandstone and limestone instruments, by M. E. Rivière.—On pine-culture in Central France, by M. de Béhague.

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