

to Lake Howe has been carefully measured, and, with the exception of the north-west portion of the colony, nearly every district has been emmeshed by the geodetic surveyors. The most important operation of late has been the determination of the termini of the boundary between New South Wales and Victoria." It is much to be regretted that the late retrenchments in the public expenditure have materially interfered with the progress of the survey.

After a few remarks on the commercial importance of local industries, especially the preservation of meat, the president referred to our vastly increased knowledge of the sun since the date of the eclipse of May 1869, to the nature of the sun's spots, and to the connection of the latter with the occurrence of magnificent auroras and magnetic storms, and to the spectrum of auroral light. "During the most brilliant display in April last, I was able," he observes, "to obtain a very bright spectrum of the light with a micro-spectroscope. Unfortunately the dispersion was small, but the light was so intense as to admit of a very narrow slit. The spectrum obtained from the red streamers consisted of a strong red band or line (which I estimated was rather more refrangible than C line), and bands in the green, which I believe to be the same as described by Angström. The spectrum of the green light which formed the lower arch of the aurora, however, contained no red band, and the appearance of it, as the spectroscope was passed up and down, so as to receive the light from the streamers or green arch, was very marked indeed. I am not aware of this red band or line having been noticed by any previous observers; and had it not been so clear and prominent, far brighter than the green ones—and had I not proved that it belonged to the red streamers, and not to any other, of the auroral light, by the method referred to—I might have been doubtful as to the real existence of a line not hitherto noted in the spectra of aurora." The address concludes with a few observations regarding the possibility of our ever being able to ascertain the laws which govern the weather so as to predict with certainty the atmospheric condition of to-morrow. On this point Mr. Ellery does not express himself very hopefully, but he thinks that the greater climatal events, such as dry or wet, hot or cold, seasons may be traced to varying conditions in the sun itself, and will be found to be extraneous to our globe.

G. E. D.

SCIENTIFIC SERIALS

THE *Journal of the Royal Geological Society of Ireland*, vol. xii. Part 3 (vol. ii. Part 3, new series), containing the Proceedings of the Society for the session 1869-70, has just been published. It contains among other memoirs, Prof. Traquair on *Griffithides mucronatus* (McCoy) Plate xvi., and on *Calamoichthys calabaricus*. Rev. J. D. La Touche on Spheroidal Structure in Silurian Rocks, Plates xvii.-xx. Rev. M. Close on some Corries and their Rock Basins in Kerry, Plate xxi. Edward Hull on the Geological Age of the Ballycastle Coal-field, and its Relations to the Carboniferous Rocks of the West of Scotland, Plate xxiii. W. H. Bailly on the Fossils of the Ballycastle Coal-field, Co. Antrim.

Zeitschrift für Ethnologie, 1870, Hefts 3, 4.—A paper by Bastian on the legend of the Amazons, is full of valuable information, but is written with less skill than learning. The footnotes make more than three-fourths of the whole, and the parentheses nearly half of the rest.—Hensel contributes a description of two skulls of Coroado Indians (Brazil) with figures. He agrees with many of our best ethnologists that the dimensions of the cranium afford us no safe ground for making racial or specific distinctions. On the other hand, he regards the structure of the facial bones as of great importance from this point of view.—R. Hartmann continues his studies on domestic animals by an account of the reindeer in its present condition, followed by an interesting discussion on the evidence of its domestication in prehistoric times. This number also contains a short archaeological account of the Uglei See (one of the numerous lakes in the east of Holstein, situated in an enclave belonging to Oldenburg), by E. Friedel.—The last number of the same journal (1870, 4) is almost entirely devoted to American Ethnology. Prof. Strobel concludes his contributions to comparative ethnology by an account of the weapons and food of the South American Indians; Dr. Fonck has a paper on the Indians of Southern Chili; Ernst of Carácas one on the Natives of the Peninsula of Goajiro, which forms the western boundary

of the entrance to the gulf and bay of Maracaybo, in Columbia; and Erman contributes an account (with a map) of the various races inhabiting what was until lately Russian America, the Aleutian Isles, and the opposite coast of N.E. Asia; he divides them into two great groups according to their system of numeration.

In the *Journal of the Ethnological Society of London* (October 1870) is an interesting paper by Mr. David Forbes "On the Aymara Indians of the Peruvian highlands." Very full information as to their physical structure is given, together with *exact measurements*. Beside their short stature and capacious thorax (which seems to be constantly fixed in the condition of inspiration) Mr. Forbes's statistics show that the thigh is shorter than the leg, and that the heel is as much shorter than a European's as a Negro's is longer. The half-castes between these Indians and the white population are not believed by the author to be prolific, so that, as in the case of mulattos, the intermediate race would soon die out if not continually recruited by new accessions. Among many interesting details on the food of the Aymaras—especially their method of preparing potato so as to keep it from rotting—on their disposition and habits, their implements, and their language, perhaps the most remarkable is an account of a silver statuette (figured in pl. xx.) of a man in a strange headdress, who holds in one hand a mask, which he has apparently taken off in order to look through an instrument like a telescope. This tube he holds to his left eye (without shutting the other) and directs it upwards. Mr. Forbes believes this to be a unique specimen.

The last part (Band vii. Heft 1) of the *Zeitschrift für Biologie* contains: 1. The results of an elaborate series of experiments by Gustave Meyer of Oldenburg on the effects of feeding dogs and man on bread alone, and bread mingled with meat and other articles of diet. He shows what indeed has long been known, that to feed either animals or man on bread alone is a great waste of material, and that immense quantities must be given in order that the body should lose no flesh, whilst on the other hand the addition of some, even though a small quantity, of meat is economical. He demonstrates that the tissues of the body become more watery with insufficient food, which renders the whole organism less capable of resisting injurious influences. In his experiments on man he endeavoured to ascertain which of the several kinds of bread in ordinary use (white bread, rye bread, black bread) was absorbed in greatest amount during its passage through the alimentary canal, and found that white wheaten bread occupies the first place, then leavened rye bread, then the bread (rye) prepared by the Horsford-Liebig process, and lastly the Pumpernickel (North German black bread). Nevertheless, the first is not so satisfying to the feeling of hunger as the three latter, and is more expensive in every point of view. He denies the great nutritious value often attributed to bran, since the nitrogenous compounds it contains are mingled with much non-assimilable matter, but admits that if these could be extracted and were then returned to the flour, the best results would be obtained, as the meal already contains abundance of salts. 2. A paper by MM. Ernst Schulze and Max Märcker on the determination of Nitrogen in the Urine of the Ruminants. 3. A paper by Dr. J. Bauer on the Metamorphosis of tissue in poisoning with Phosphorus; and lastly a short paper by Max von Pettenkofer on Typhus and Cholera as connected with the basal water line in Zurich.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, April 6.—Prof. Frankland, F.R.S., president, in the chair. The president, occupying the chair the first time since his election, returned his thanks to the Society for the honour conferred upon him, and expressed his readiness to discharge the duties of his office to the best of his abilities. The following gentlemen were elected fellows:—F. Coles, C. E. Groves, E. W. T. Jones, L. T. MacEwan, and J. L. Shuter. The following papers were read: "On Burnt Iron and Burnt Steel," by W. Mattieu Williams. Iron, which has been damaged by reheating, or excessively heated and exposed after balling in the puddling furnace, is designated "burnt iron" by the workmen. It is remarkable that no amount of heat applied to the iron in the blast furnace or in the early stages of the puddling process produces burnt iron. Burnt iron is brittle, its fracture is

short and what is called crystalline, it has lost the fibrous character of good iron. If steel is raised to a bright red heat and suddenly cooled, it is rendered hard and brittle, but these conditions may be modified by the process of tempering; if, however, the steel be raised to a yellow or white heat, and then be suddenly cooled, it is no longer capable of being tempered by mere reheating. It is worthless for ordinary uses of steel unless it is again raised to a welding heat and rolled or hammered while hot, and then allowed to cool gradually. The fracture of burnt steel presents a coarse grain and a crystalline appearance. Careful investigation, however, shows something more, viz., that the facets of the aggregated granules have a more or less conchoidal form. The name of "toad's eyes" has been given by practical men to these concavities. Mr. Williams found that a piece of burnt iron contained oxide of iron dispersed through its mass. A sample of burnt steel, however, investigated in the same manner as the iron, showed no indications of the presence of oxide. This, of course, was to be expected, as the carbon of the steel must, more or less completely, protect the metal from oxidation. That iron, when unprotected by combined carbon, should oxidise not merely on its surface, but through its whole substance, when exposed at a sufficiently high temperature and for a sufficient length of time to the action of the atmospheric oxygen, is not difficult to conceive, since the researches of Deville, Troost, and Graham have shown red-hot iron to be permeable by certain gases. In the case of steel, as Mr. Williams states, the burning is limited to the oxidation and consequent removal of the carbon, which takes place even at a low red heat. The permeability of red-hot steel by oxygen and carbonic oxide enables us to understand the process of the internal oxidation of the carbon. The "toad's eyes" or conchoidal facets of the so-called crystals, Mr. Williams explains by supposing a piece of steel at the temperature most favourable to the rapidest endosmosis of oxygen and the exosmosis of carbonic oxide to be suddenly cooled, and the possible occlusion of the carbonic oxide to be arrested. The results would be a certain molecular disintegration and porosity of the steel presenting those conchoidal spots. This view is further supported by the fact that burnt steel may be cured by reheating and hammering, or rolling at a welding heat.—"On the Formation of Sulpho-acids," by Dr. Armstrong. Occupied with an investigation into the constitution of sulphuric acid, the author turned his attention to chlorhydric sulphate, a body discovered some years ago by Prof. Williamson. When that substance, SO_2 , HO Cl , is made to react on benzol, the chief product of the reaction is sulphobenzid; sulphobenzolic chloride and sulphobenzolic acid being also formed, but in relatively small quantity. This led Dr. Armstrong to commence a series of experiments to determine, if possible, the conditions under which the one or the other of the above reactions took place, and to arrive at a general expression for the action of chlorhydric sulphate on organic bodies. The bodies he had until now acted upon with SO_2 , HO Cl are brombenzol, nitrobenzol, nitrophenol (both modifications, the volatile and the non-volatile), and naphthalin. The results of his experiments lead the author to conclude that the normal action, so to speak, of SO_2 , HO Cl is to form a sulpho-acid, the Cl of the chloride removing H from the body acted upon, and replacing it by the group HSO_3 ; it is only under certain conditions that both Cl and HO are removed from the chloride, and a sulphobenzid-analogous compound formed. What these conditions are Dr. Armstrong hopes to establish by further experiments.—"On a Water from the Coal Measures at Westville, N.S.," by Prof. How. The contents of this paper bear upon the relation of the constitution of a water, and the nature of the geological stratum from which it takes its origin. The water above-mentioned comes from what Dr. Dawson terms the Middle Coal Formation of Nova Scotia, which includes the productive beds of coal, and which, according to the same authority, are destitute of properly marine limestone. The analysis of the water seems to bear out the latter assertion, since the water is very poor in chlorides.

Geologists' Association, April 4.—The Rev. T. Wiltshire, M.A., F.G.S., president, in the chair. A paper by Messrs. Alfred and R. Bell was read, "On the English Crags, considered in reference to the Stratigraphical Divisions indicated by their Invertebrate Fauna." In this paper the authors object to the present division of the crag series, and especially to all the beds which have hitherto been included under the term Red Crag being associated together. From palæontological and other evidence they conclude that the upper portions of the Red Crag ought to be associated with the Mammaliferous Crag, the Chilles-

ford beds, &c., for the whole of which deposits the name Upper Crag is proposed. The Red Crag proper should then be called Middle Crag, and for the term Coralline Crag the name Lower Crag should be substituted. The authors having paid great attention to the organic remains of the crag, were able to give with their paper lists in which were enumerated a larger number of species from the Red Crag than had previously been published. Mr. Henry Woodward, F.G.S., while commending the labours of Messrs. Bell in the Red Crag, urged the systematic exploration of the Norwich Crag, which would, he thought, yield interesting and valuable results. Communications which had been received from Mr. G. Charlsworth and the Rev. Osmond Fisher on the subject of the paper were read, and after some remarks by Mr. Lobleby on the nomenclature at present in use, Prof. Morris, in an interesting speech, referred to the labours of Mr. Charlsworth and others, and advised the postponement of any alteration of the crag nomenclature until the recent researches of Mr. Prestwich have been published. Several other members took part in the discussion, after which Mr. A. Bell briefly replied.—A paper on South African Diamonds was then read by Prof. Tennant, who exhibited a fine collection of specimens of these brilliants, as well as models of the largest which have been found. Amongst the interesting facts stated it was pointed out that in four years six diamonds, each weighing upwards of fifty carats, had been found in South Africa, while in the same period only one of a similar weight had been obtained from Brazil. The president expressed his belief that diamonds would ultimately be produced artificially. Prof. Morris inclined to the opinion that diamonds were of vegetable origin, and thought they might have been produced from decomposed resins. The geological formation from which diamonds are derived is very doubtful, as the stones are found in gravels and sands brought down by streams. Mr. Rabone, who has lately returned from the diamond-fields, gave a very interesting account of the discovery of diamonds in the colony, and of the operations now going on there. It appears that no less than 150,000*l.* worth of diamonds have been passed for duty, and this amount, there is reason to believe, is not more than half of the entire value of the stones found during the past four years. The diamond country is, perhaps, 20,000 square miles in extent, and there are now 13,000 persons engaged in searching for the gems. Mr. Rabone expressed his conviction that after two or three months' labour success on the part of a searcher was certain, and corroborated Prof. Tennant's statement as to the large proportion of heavy diamonds found. He considered the discovery of diamonds in South Africa was intended to further the spread of the human race, reminding the meeting that the colony of South Africa is larger than France, while the population is not greater than that of the city of Glasgow.—At the next meeting of the association on the 5th May a paper will be read by Mr. Henry Woodward, F.G.S., F.Z.S., "On the Fauna of the Carboniferous Epoch."

NORWICH

Norfolk and Norwich Naturalists' Society, March 31.—Mr. H. Stevenson was elected the President for the ensuing year, and the Rev. Joseph Crompton, who has filled the chair since the formation of the society, was elected a Vice-President. Mr. Thomas Southwell was elected secretary, and Mr. C. G. Barrett treasurer. The retiring President then read an interesting address, setting forth what had been done by the society during the past year, and what should be its objects in the future, contrasting favourably the present state of scientific inquiry and the spirit in which the search after truth is received, with that which prevailed in years that are passed, concluding with some remarks upon Darwin's last book, the "Descent of Man," which he said should rather have been called the "Ascent of Man."—After the President's address, a letter was read from Mr. Stevenson, who was unable to be present, strongly reprobating the practice of killing woodcocks in spring, when returning northwards to their accustomed breeding haunts. He deprecated the act as inexcusable, inasmuch as a March woodcock is useless for the table, and the shooting season being over, they are mostly killed by gamekeepers, whereas, if the birds were allowed to remain unmolested, many would breed in this country, every season affording fresh instances of their inclination to do so.

KILKENNY

Royal Historical and Archæological Association of Ireland, April 5.—Mr. P. Walters in the chair. The following new Associates were elected:—Rev. F. E. Hamilton, Messrs. R. O'Brien, R. W. Banks, W. F. Skene, J. H. Browne, J.

J. Cramsie, W. E. B. Wyse, T. Atkinson, J. O'Neill, and J. Martin, M.D. The following members were admitted as Fellows:—Hon. B. E. B. Fitzpatrick, Lieut.-Col. E. Cooper, Captain Langton, Messrs. E. Shine, R. R. Brash, J. Watson, N. Ennis, J. Digges, F. Coney, J. Hill, J. E. Mayler, and W. R. Molloy. An application from Mr. Justin McCarthy Brown, Hobart Town, Tasmania, "that the Journal of the Association might be given as a free grant to the Tasmania Library, Hobart Town," was considered and granted. The Secretary, Rev. James Graves, reported on the progress made with the restoration of St. Francis Abbey, Kilkenny, and pointed out the necessity for further subscriptions to preserve the beautiful old tower. A report on the present state of the ruins at Monasterboice, Co. Louth, by J. Bell, C.E., was read, and the following subscriptions, to commence forming a preservation fund, announced:—E. Fost, Bart., D. Dunlop, R. M. Bellew, C. Fortescue, M.P., and M. O'Reilly-Dease, M.P., 10*l.* each; M. Branagan, 5*l.*; Revs. Harpur and Campbell offered not only to subscribe but also to collect subscriptions. The Chairman exhibited and described some more of the ancient record of the Corporation of Kilkenny.—Papers read:—"On the exploration of Cranoges," by G. H. Kinahan, M.R.I.A., "On some iron tools and other antiquities found in the Cranoge of Cornagall," by W. F. Wake-man, M.R.I.A.

CALCUTTA

Asiatic Society of Bengal, January 4.—The president, the Hon. T. B. Phear, exhibited some diagrams, showing the diurnal oscillations of the barometer at Dalhousie during part of October 1870. He remarked upon these curves, and called attention to the part which the pressure of vapour in the atmosphere was supposed to have in effecting the barometric oscillations. Colonel Strachy stated that the opinion that the presence of vapour in the atmosphere had any important influence on the oscillations of the barometer was totally unfounded, and indicated the results of his own observations at various stations.—Mr. T. W. H. Tolbort communicated a paper on the history, archæology, and natural productions of the district of Dera Ismail Khan, which will be published in the Journal of the Society.—Rābu Rājendralā Mitra read a memoir on the antiquity of Indian architecture, in which he maintained the indigenoussness of the art.—Mr. Wood Mason exhibited and described a very curious instance of polydactylism in a horse from Bagdad. This horse had on each fore-foot a supernumerary digit, furnished with an asymmetrical hoof, articulated to the rudimentary metacarpals of the fourth toes; these digits consisted of the usual number of phalanges. Figures of this curious malformation are given.

PHILADELPHIA

Academy of Natural Sciences, December 6, 1870.—Dr. Ruschenberger, president, in the chair.—Professor Cope made some observations on a number of species of reptiles from the Cretaceous beds of Kansas, which he had recently studied. He stated that the specimens included parts of *Elasmosaurus latyrurus* Cope, *Polycotylus latipinnis* Cope, *Liodon proriger* Cope, and two new Liodons, which he named *L. ictericus* and *pl. nudgii*. A third new Mosasauroid of the size of the *L. Mudgeri* was described under the name of *Clidastes cinerorivum*. It was stated to be much the largest species of the genus, and to differ from the three now known in having the plane of the articular extremities at right angles to the long axis of the centra, and not oblique to it. He described a third new Liodon, of gigantic size, stating it to exceed by very much the Maestricht reptile, and even the *Mosasaurus brumbzi* Gibbes, which was till now the largest known species. He pointed out the characters of the vertebrae, which were very much depressed as to the centrum, which measured 5½ inches in diameter. It was allied to the *M. brumbzi*, but differed in having a strong emargination of the articular faces to accommodate the neural canal. He named it *Liodon dyspilor*. Prof. Cope also exhibited the humeri and femora of *Polycotylus*, which were like those of *Plisiosaurus*, and measured eighteen inches in length.—Mr. Thomas Meehan exhibited several specimens of the *Maclura aurantiaca*, the common osage orange, in which the plants were inarched together in pairs in a remarkable way. He said the osage orange was extensively grown as a hedge plant, and in digging up the one-year plants these united twins were usually found in the proportion of about one score in ten thousand. Double kernels were common occurrences in many seeds. There were double peaches, almonds,

and double yolks in eggs. But these all had their separate seed coverings or membranes, and the yolks their own albuminous envelopes, consequently the separate embryos produced distinct plants. But these indicated that there had been two separate embryos under one seminal covering, and that the radicular portions of this double embryo, having no membrane to separate them, had inarched themselves together while passing to the ground. If this was the true explanation, he thought there was no such case recorded. That it was true seemed probable, from the fact that all the specimens were united in exactly the same manner, showing that time, place, and the circumstances of the union were uniformly the same. The scars showed that there were four cotyledons and two germs, and that the place of union was midway between the pairs of cotyledons. From the base of the cotyledons extending the whole length of the radicle, the union existed. The length of this united part was from half an inch to one inch, according to the vigour of the plant. Another lesson he thought was afforded by these specimens. Dr. Asa Gray had recently remarked, in *Silliman's Journal*, that European botanists still believed what American botanists had learned to doubt, that the radicle was a true root, rather than a morphologised joint of stem. Here was, he believed, an illustration of the American view. These radicles, which had evidently united together under the seed coat, had elongated after protrusion, just as a young shoot with all its parts formed in the bud elongates after the bursting of the bud scales. They comprised the half inch, or inch united portions before referred to. If these radicular portions of the seed were of the nature of root rather than of stem, we might expect to see lateral fibres push from them, as we do see from the true roots, which start out below the union. But these parts are as free from rootlets as any portion of the true stems above the cotyledon points, indicating, as had been suggested, that their properties were rather of stem than of root.

December 20.—Mr. Vaux, vice-president, in the chair.—Prof. Leidy directed attention to a preparation of the trunk of an adult male subject, from the dissecting room of the University, in which all the viscera were reversed in the order of their usual position. The heart is reversed in position with its apex directed to the right. The aorta descends on the right side; and the cavæ are placed on the left of the vertebral column. The liver is placed in the left, the spleen in the right side. The stomach is reversed, and the large intestine commencing in the left iliac region terminates in the rectum from the right side.

December 27.—Dr. Ruschenberger, president, in the chair.—Prof. Leidy called attention to an interesting geological phenomenon in the vicinity of Wayne station on the Germantown Railroad, about three miles from Philadelphia. At the point where Wayne Street cuts through a fold in the micaceous schists of this district, there occur huge imbedded boulders of very hard compact hornblende rock. The matrix of mica schist has the appearance of an altered argillaceous slate, and rapidly decays on exposure. The hornblende rocks are thus left protruding above the soil, and would be difficult to account for if attention had not previously been called to them in place. As occurring in the schist, they are rounded upon their corners and edges, and smooth upon the sides. It does not appear an improbable conjecture to suppose that they constituted a part of a primitive surface formation—perhaps the original earth crust—which was broken up before the deposition of the metamorphic rocks which make up the azoic rocks of undetermined geological age, overlying the south-eastern angle of Pennsylvania; and that by steam and current actions, perhaps in part by glacial, they were brought into the shape of boulders at a time anterior to the deposition of the sedimentary mica schists. And it is a fact of interest in this connection that the highly garnetiferous mica schists of this district, are charged with dodecahedral garnets, which have probably belonged to pre-existent rocks, inasmuch as their angles and edges are rounded off, and the crystals reduced to an almost globular form. This is true of the garnets while still firmly imbedded in the mica schists, and applies to the garnetiferous mica schists extending over a wide area.

American Philosophical Society, February 17.—Dr. Emerson read a paper on the Lunar Influence in its supposed relation to meteorological phenomena, combating views favourable to the existence of such influence.

March 3.—Prof. Cope read a paper "On the occurrence of fossil Cobitidæ in Idaho."—A paper by Thomas Bland was read

"On the geology and physical geography of the West Indies, with reference to the distribution of mollusca." He stated that the land shell faunas of Porto Rico and the Virgin Islands, Sombrero, Anguilla, St. Martin, and St. Bartholomew, are closely allied, and may be called distinct from that of Haiti on the west and the islands to the south. He came to this conclusion from the facts of distribution, and now finds corroborative evidence from the depth of water. An elevation of the bank on which Porto Rico and the Virgin Islands stand (to and including Anegada) of less than 40 fathoms would make one island of the whole. Anguilla, St. Martin and St. Bartholomew stand on one bank, and a similar elevation would unite them; there is deep water around Sombrero. The fauna of the group is Mexican and Central American, with peculiar genera not represented in the islands south of the Anguilla bank. There are genera represented in Cuba and the Bahamas, Haiti, Porto Rico, and the islands on the Virgin and Anguilla banks, but not in the islands south. One *Strophia* fossil in Sombrero and in St. Croix, recent in the others. The depth of water between St. Thomas and St. Croix is 2,000 fathoms, telling of long separation. These facts point to a large island or continent, which embraced the Anguilla bank in its southern limit. Barbuda and Antigua stand on one bank, St. Eustatius, St. Kitts, and Nevis on another, with land shell fauna alliance with Guadeloupe, Dominica, Martinique, and Barbados—that group by their fauna connected (not a few species in common) with Guiana—water over 1,000 fathoms deep between Dominica and Martinique, and the latter and St. Lucia and St. Vincent. Now Trinidad and Tobago (both on soundings) Grenada (300 to 400 fathoms between it and Trinidad), the Grenadines (all on one bank with Grenada), and St. Vincent (1,300 fathoms between it and St. Lucia) have peculiarly the fauna of Venezuela. *Bulimus* proper (South American) is only found on those islands and St. Lucia. The greatest depth between St. Vincent and the Barbados is 1,218 fathoms, and between the latter and Tobago 1,060. These facts point to an extension of the South American continent, say from north of the Amazon River to a point west of Trinidad, and northerly to Barbuda, the west side (now Trinidad, Tobago, Grenada, Grenadines, St. Vincent, and St. Lucia), having the Venezuelan fauna, and the east side (now Barbados, Martinique, Dominica, Guadeloupe, Antigua, &c.) having the Guiana fauna—Prof. Cope read a paper entitled "Supplement to the Synopsis of Extinct Batrachia and Reptilia, &c.," in which several extinct reptiles were described. Portions of the jaws and teeth of one of these from New Jersey were exhibited. It was named *Liodon sectorius*, and was characterised by a greater amount of compression of the teeth than in any certainly known Mosasaur, the crown resembling those of some sharks.—Prof. Cope read a paper "On extinct forms of fishes of the neotropical region." Two new genera, *Prymnates* (Clupeidæ) and *Anædopogon* (? Characinidæ) were determined. He also exhibited some fossil Batrachia from the Carboniferous of Linton, Ohio, obtained by the Geological Survey under Prof. Newberry. One a specimen of *Sauropleura remex* Cope presented a well-developed hind limb. *Ostecephalus amphiuminus* was branched, and probably limbless. Another fossil, representing a new genus, was referred to as *Conchiocephalus piscinus* Cope. It had two operculum-like bones on the sides of the cranium, the teeth obtuse and in brushes; and the size of *Protonopsis*.—Mr. Pliny Earle Chase read a paper on American and European rain-falls, showing an opposition at different seasons of the year, analogous to that which he had pointed out at different periods of the lunar month. Comparing the quarterly rains at Lisbon and at Philadelphia for the sixteen years, 1855 to 1870 inclusive, he found that the half years which were the most rainy at one station were the least so at the other. He also found that, in ten years out of the sixteen, an annual rainfall above the average at one station was accompanied by one below the average at the other. Mr. Chase also communicated some of the results which he had obtained by a discussion of the meteorological observations of the Signal Service Bureau, United States War Department. Perhaps the most important of his deductions were the following:—(1) The greater importance of the barometric gradients than of the isobars, in making American forecasts; (2) the great frequency of anti-cyclonic storms in the United States; (3) the probable origin of a large proportion of our storms in the blending of the polar and equatorial currents, near the latitudes at which the general tendency of the winds changes its direction; (4) the greater severity and briefer duration of cyclonic commotions than of those which are primarily anti-cyclonic.

BOOKS RECEIVED

ENGLISH.—Fragments of Science for Unscientific People: J. Tyndall (Longmans).—Classical and Prehistoric Influences upon British History, pt. 1: S. Bannister (Longmans).—British Rainfall for 1870: G. J. Symons (Stanford).—Symons' Meteorological Magazine for 1870 (Stanford).—The Beginning: its When and its How: M. Ponton (Longmans).—The Poor Artist: R. H. Horne (Van Voorst).—Half-crown Saturday afternoon Rambles round London: H. Walker (Hodder, Stoughton, and Co.).—A Sketch: Romance of Motion: A. Lee (Longmans).—What is Industrial and Technical Education? two Orations by Dr. John Mill (Simpkin and Co.).

FOREIGN.—(Through Williams and Norgate)—Die Elektromagnetische Telegraph: Dr. Schellen (2 vols.).

DIARY

THURSDAY, APRIL 20.

ROYAL SOCIETY, at 8.30.—Note on the Circumstances of the Transits of Venus over the Sun's Disc in the years 2004 and 2012: J. R. Hind, F.R.S.—On the Existence and Formation of Salts of Nitrous Oxide: Dr. E. Divers.—Research on a new group of Colloid Bodies containing Mercury, and certain members of the series of Fatty Ketones: Dr. J. E. Reynolds. SOCIETY OF ANTIQUARIES, at 8.30.—On the Original Purport and Use of the Galilee of Durham Cathedral: W. White, F.S.A.

LINNEAN SOCIETY, at 8.—Notes on Mr. Murray's paper on the Geographical Relations of the chief Coleopterous Fauna: Roland Trimen, F.L.S.

CHEMICAL SOCIETY, at 8.

ROYAL INSTITUTION, at 3.—On Sound: Prof. Tyndall.

FRIDAY, APRIL 21.

ROYAL INSTITUTION, at 9.—On the pre-Socratic Philosophy: Prof. Blackie, F.R.S.E.

SATURDAY, APRIL 22.

ROYAL SCHOOL OF MINES, at 8.—Geology: Dr. Cobbold.

ROYAL INSTITUTION, at 3.—On the Instruments Used in Modern Astronomy: Mr. Lockyer.

MONDAY, APRIL 24.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.

INSTITUTE OF ACTUARIES, at 7.—On Industrial Assurance: H. Harben.

LONDON INSTITUTION, at 4.—On Astronomy: R. A. Procter, F.R.A.S. (Educational Course).

SOCIETY OF ANTIQUARIES, at 2.—Anniversary Meeting.

TUESDAY, APRIL 25.

ROYAL INSTITUTION, at 3.—On the Geology of Devonshire, especially of the New Red Sandstone System: William Pengelly, F.R.S.

WEDNESDAY, APRIL 26.

GEOLOGICAL SOCIETY, at 8.—On a new species of Coral from the Red Crag of Waldringfield: Prof. P. Marti Duncan, F.R.S., F.G.S.—Notes on the Minerals of Strontian, Argylshire: R. H. Scott, F.R.S., F.G.S.—On the probable origin of Deposits of "Loess" in North China and Eastern Asia: T. W. Kingsmill, of Shanghai.

SOCIETY OF ARTS, at 8.—Photography in the Printing Press, being a Description of the Working of the Heliotype Process: Ernest Edwards.

ROYAL SOCIETY OF LITERATURE, at 8.30.—On the Classical Names of Rivers: Hyde Clarke.—On Shakespeare's Birthday: C. M. Ingleby, LL.D.

LONDON INSTITUTION, at 12.—Annual Meeting of Proprietors.

THURSDAY, APRIL 27.

ROYAL SOCIETY, at 8.30.

LONDON INSTITUTION, at 7.30.—On Economic Botany: P. of. Bentley.

ROYAL INSTITUTION, at 3.—On Sound: Prof. Tyndall.

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