International Fishery Exhibitions of Boulogne, Arcachon, and Havre.

AT the recent annual meeing of the Royal Cornwall Institution, a discussion arose on a paper read by Mr. Robert Blee "On the Comparative Health and Longevity of Cornish Miners," in the course of which the startling statement was made, that a death occurred every other day among the Cornish miners from the mode in which the men were raised from the pits.

PROF. DANIEL WILSON, of Toronto, publishes in the *Canadian Journal* an essay on "The Huron Race and its Head-form," illustrated with a lithograph and many outline drawings. Prof. Wilson's investigations lead him to believe that the comprehensive generalisations of earlier American ethnologists, under the guidance of Dr. Morton, which led to the doctrine of a homogeneous cranial type for the American aborigines, have everywhere failed when subjected to the crucial tests of detailed observation, and that we everywhere find transitions from one to another and essentially distinct ethnical group. There is, he concludes, no longer an assumed American man, as distinct from every type in the Eastern Hemisphere as the Catarhine Simiadæ of the Old World from the Platyrhine group of New World monkeys.

ON Monday, August 21, between three and four o'clock in the morning, a large waterspout burst over the village of Ollon and the adjacent mountains in Switzerland. Great damage was done to the roads and vineyards, but no loss of life is reported.

A VIOLENT hurricane and some earthquake shocks are reported from the Island of St. Thomas, in the West Indies, on the 21st of August. Hundreds of houses were destroyed, and over 150 persons killed or wounded.

FROM Indian sources we learn that the rainfall in Bombay this season is generally less than half the average of former years.

A VIOLENT typhoon raged at Kobe in Japan, on the 4th of July. Many vessels were wrecked, and about 400 lives were lost. Great damage was done to property on sea and on land.

THE news of most terrible earthquake shocks and volcanic disturbances comes to us from the Philippine Islands. In the small island named Camiguin, near to Misamis, for some months past a succession of most violent earthquakes has been experienced, causing crevices, &c., in the open country. On the 1st of May, about five o'clock in the evening, the earth burst asunder, and an opening was formed 1,500 feet long. Smoke and ashes, earth and stones, were thrown up and covered the ground far and near. At about seven o'clock, as darkness was coming on, this crater burst into activity with a loud explosion, followed by a shower of lava and ashes. About 150 persons were destroyed. The eruption of the new volcano has since been so tremendous that the inhabitants have forsaken the island, and of the 26,000 previously there, not 300 are left. Camiguin is only about thirty-six miles in circumference, and was very productive in abacá (the Manilla hemp) yielding annually from 30,000 to 40,000 piculs, or more than a tenth of the produce of the world. There is little hope of the island ever being again reoccupied or cultivated.

THE *American Journal of Microscopy* recommends, as the best plan of collecting diatoms in large quantities, to tie a thin, fine piece of linen over the faucet of the hydrant in the evening, and allow a small stream of water to pass through it all night. In the morning take off the cloth and rinse it in a little water in a goblet. When ready to examine, take a drop of water from the bottom of the goblet with a small pipette, or glass rod, and place it on a flat slide, or a slide with a concave depression, holding a few drops. Then, with a power of 100 or 350, sweep the field, and you will be rewarded with the sight of a wondrous collection of beautiful and unique forms.

THE BRITISH ASSOCIATION MEETING AT EDINBURGH

SECTION A.

Report of the Tidal Committee, by Sir W. Thomson.

He stated that the work performed for the Tidal Committee since the last meeting of the British Association had consisted chiefly in the evaluation of tide components in a similar manner to that described in the previous reports. Mr. Parkes having again placed the tracings of the curves of the Kurrachee (Manora) self-regulating tide gauge at the disposal of the committee, a second year's observations had been read off and completely reduced. In addition to the tide components evaluated for Liverpool and Ramsgate, others had been introduced to correct the lunar diurnal (declinational) tides for parallax. Those components had been found to have sensible values for Kurrachee, where the diurnal tides are comparatively large. The solar elliptic semi-diurnal components had also been included, now that two complete years' observations were available. The comparison between the calculated and recorded heights from Liverpool not being considered as good as might have been expected from the labour bestowed on them, it was determined to continue the analysis of the Liverpool tides, with the view, if possible, of detecting the cause of the largeness of some of the differences. It would be seen on comparing the results contained in the previous report with the results arrived at, that the chief tides (the lunar and solar semi-diurnal) are now more retarded by about 4° than during the year previously analysed. The calculated heights in the comparison should therefore more nearly represent the heights about eight minutes after the hours assigned to them. An examination of the differences would show this to be the case. A fresh calculation and due allowance made for atmospheric pressure would doubtless very considerably reduce the discrepancies. The gradual increase in the height of the mean level of the water, probably arising from the filling in of the bed of the river, and consequent increase of friction, would account for some portion of this increased retardation. There was a very violent rise in the mean level for the year 1868-69, amounting to four-tenths of a foot. It, however, in the following year, had again subsided to almost its anticipated height. The uncertainty in the mean level of the water is an element which must at times seriously affect the differences between calculated and recorded heights, in any method of computation of heights from a *fixed* datum. It was very much to be regretted that the authorities at Liverpool had chosen the George's Landing-Stage for a tide float, affected as it must be (sometimes to a considerable extent) by the ever-varying weight it has to bear. This would affect the whole of the tide components evaluated, but more especially the solar components, and will account for the different values of the solar semi-diurnal tide, which, judging from the corresponding lunar component, should agree within much narrower limits. It was therefore thought that, should it be determined to again discuss the Liverpool tides, it would be better to take the tide curves as self-registered at Helbie Island, at the mouth of the Dee, in preference to those of the George's Pier. The Helbie Island tide curves, it was considered, would give much superior results. Through the kindness of the United States Coast Survey Office, two years' tide observations, taken at Port Point, San Francisco Bay, California, had been received. Here again there was an abrupt diminution in the height of mean level for the first two years. It having come to the knowledge of the Tide Committee that the United States Coast Survey Office were in possession of a series of hourly tidal observations, taken at Cat Island, in the Gulf of Mexico, and which were of a very remarkable and interesting character, it was thought a favourable opportunity of testing the value of the harmonic analysis for the evaluation of the components of the tides of this place, which appeared very complicated and peculiar. Application having been made, a series of about thirteen months had been received, and were now in course of reduction. It was extremely interesting to find that, although the lunar and solar semi-diurnal tides were very small in value, the series of means from which they were obtained were extremely regular and good, and the consequent determination of the phase of spring tides from their respective epochs was probably correct within a few minutes. The proportion between the amplitudes of the lunar and solar semi-diurnal tides was the nearest to equality yet obtained, being in the ratio of 11 to 6. The proportion between the lunar and solar diurnal (declinational)

tides was about 4 to 1. After reading the report, Sir William said that one chief object which the originators of this investigation had in view was the determination of long period tides, and particularly the lunar declinational fortnightly tide, and the solar declinational semi-annual tide. The reason for desiring the determination of such tides with great accuracy was that this would give a means of estimating with absolute certainty the degree of elastic yielding which the solid earth experienced under the tide-generating influences of sun and moon. It was quite certain that the solid earth did yield to some degree, as it must do so unless they were infinitely rigid. It had long been a favourite assumption of geologists that the earth consisted of a thin shell of solid rock twenty to fifty miles thick, according to various estimates, inclosing an interior filled with melted material, lava, metals, &c. This hypothesis was, however, absolutely untenable, because, were it true, the solid crust would yield with almost as perfect freedom (on account of its thinness and great area) as if it were perfectly liquid. Thus the boundary of the solid earth would rise and fall under the tide-generating influences so much as to leave no sensible difference to be shown by the water rising and falling relatively to the solid, showing that if the earth, as a whole, had an average degree of rapidity, equal to that of glass, the tides would be very much diminished from the magnitude corresponding to a perfectly rigid globe with water like that of our seas upon it. This consideration, he had shown, rendered it probable that the earth had considerably more average rigidity than a globe of glass of the same size. The mathematical calculation showed a somewhat startling result, to the effect that a globe of glass of the same size as the earth, if throughout of exactly the same rigidity as glass on a similar scale, would yield, like an indiarubber ball, with remarkable freedom to the tide-generating influences, thus leaving a very much smaller difference to be shown by water if placed on the surface of such a globe, and estimated in its rise and fall relatively to the solid bottom on which it rested. The precise agreement of precession and nutation with dynamical estimates, founded on the supposition of the earth being perfectly rigid, made it probable that the earth was in reality vastly more rigid as a whole than any specimen of surface rock in the condition in which it was when experimented on in our laboratories. In speaking on this subject about ten years ago to Dr. Joule, that gentleman suggested that probably the great pressure in the interior produces in the material—which might be of the same substance as surface rocks—a greatly-increased rigidity in its actual position at any great depth below the surface; but the proposed tidal observation and calculation was the only method which gave directly, and without any possibly doubtful suppositions regarding interior arrangement of density on the earth, a measurement of its elastic yielding to the tide generating influences. Now that observations from so low a latitude as that of Cat Island were available for comparison with those of the tides on our own coast, the committee might advance hopefully to this part of their inquiry, which, accordingly, they proposed to make a primary object in the calculations to be next undertaken.

The other papers read were almost entirely confined to pure mathematical subjects. They were as follows :—

Report on Hyper-elliptic Functions by W. H. L. Russell, F.R.S.

Note on a Question in Partitions, by Prof. Sylvester, F.R.S.

On the Number of Invariants of a Binary Quantic, by Prof. Cayley, F.R.S.

On Linear Differential Equations, and *On Focal Properties of Surfaces of the Second Order*, by W. H. L. Russell, F.R.S.

On Certain Families of Surfaces, by C. W. Merrifield, F.R.S. If $z = F(xy)$ be a surface, then writing

$$\alpha = \frac{d^3z}{dx^3},\ \beta = \frac{d^3z}{dx^2dy},\ \&c.$$

If the surface be a cone $(\alpha\delta - \beta\gamma)^2 = (\alpha\gamma - \beta^2)(\beta\delta - \gamma^2)$; and if a cylinder $\alpha\delta - \beta\gamma = 0$, $\alpha\gamma - \beta^2 = 0$, $\beta\delta - \gamma^2 = 0$. In the present paper it is investigated whether solid surfaces, fulfilling these conditions, are necessarily cones or cylinders.

Description of a Model of a Ruled Cubic Surface, by Prof. Ball. The cubic surface was $z(x^2 + y^2) - 2axy = 0$.

On Vortex Rings, by Prof. Ball.

On the Mathematical Theory of Atmospheric Tides, by Prof. Challis, F.R.S.

Remarks on Napier's Original Method of Logarithms, by Prof. Purser.

On the Calculation of e (the base of the Napierian Logarithms) from a Continued Fraction, by W. L. Glaisher, F.R.A.S. The continued fraction from which e was calculated was

$$\frac{e-1}{2} = \frac{1}{1+}\ \frac{1}{6+}\ \frac{1}{10+\&c.}$$

A formula far more convergent than the ordinary one for e in a series. The calculation gave e to 137 decimals, and confirmed the result given by Mr. Shanks, the value of e given in all the editions of Callet's logarithms being incorrect from the fortieth figure.

On Certain Definite Integrals, by J. W. L. Glaisher. The integrals were $\int_0^\infty \sin(x^n)\,dx$. $\int_0^\infty \cos(x^n)\,dx$.

On Lambert's Proof of the Irrationality of π, and on the Irrationality of certain other Quantities, by J. W. L. Glaisher. The quantities referred to were chiefly circular and exponential functions.

On Doubly Diametral Quartan Curves, by Prof. F. W. Newman. A large number of drawings of quartic curves were exhibited to the Section.

On a Canonical Form of Spherical Harmonics, by Prof. W. K. Clifford. The canonical form in question is an expression of the general harmonic of order, n, as the sum of a certain number of sectorial harmonics, the number being when n is even, $\frac{5n-10}{2}$, and when n is odd, $\frac{5n-9}{2}$

SECTION C.

THE papers to be read on Tuesday numbered twenty-three, so that but little time could be allowed to each author, and then there was time for no more than half the papers to be brought forward. A report by Prof. Duncan, M.B., F.R.S., on British Fossil Corals was read, wherein he pointed out the relations between the neozoic and palæozoic corals. Then Prof. Geikie read his report on the Progress of the Geological Survey of Scotland, a notice of which appeared in NATURE of August 10. Mr. Henry Woodward described a new and nearly perfect Arachnide from the Ironstone of the Dudley coal-field. The Pennystone Ironstone nodules of the coal measures have long been celebrated for their fossil contents, having yielded King Crabs, wings of Orthopterous insects, a supposed beetle, and numerous plant remains, both ferns and fruits of Lycopodiaceæ. The specimen described by Mr. Woodward is perhaps the most perfect form hitherto described. It is identical with one figured and described by Buckland as a Diamond beetle (*Curculio*) and named by him *Curculioides Prestvicii*. By means, however, of the specimen now obtained, the author clearly showed that it was not a Coleopterous insect, but a true Arachnide, closely related to the recent genus *Thrynus*. Mr. Woodward proposed, therefore, to name it *Eophrynus Prestvicii*, the genus *Curculioides* being retained for *C. Anstii*, another specimen also figured by Buckland, which may be a true Rhynchophorous insect. Dr. Bryce called attention to some fossils from the Durine Limestone of Sutherland, Prof. Harkness exhibited one of the earliest forms of Trilobites, and Mr. John Muller furnished some remarks on the so-called Hyoid Plate of *Asterolepis*, and pointed out that it was really the dorsal plate.

Mr. Milne Home brought forward a notice of a scheme for the Conservation of Remarkable Boulders in Scotland, and for the Indication of their Position on Maps. Mr. Moggridge mentioned that in Switzerland a right of property in some of the boulders had been acquired by natural history societies and museums with a view to their preservation, and that on these a brass plate had been fixed with the word "Investable" marked upon it.

Prof. Traquair noticed some additions to the Fossil Vertebrate Fauna of Burdiehouse, near Edinburgh, and also called attention to a Labrynthodont skull, seven inches long, from the same limestone quarries (of Lower Carboniferous age), probably belonging to Huxley's genus *Pholidogaster*; this was the lowest geological horizon from which the remains of Labyrinthodont Amphibia had been as yet described.

At the meeting of the British Association at Liverpool, the Rev. John Gunn, F.G.S., &c., expressed the opinion that

Boulder Clays ought rather to be regarded as an evidence of a temperate climate in the districts where they are found, than of a glacial epoch; and in a communication now made he maintained that there is no occasion to invoke any additional causes of change of climature over and above those which are known to exist. He made some remarks on the agency of the sea in scooping out valleys and bays while clearing off or gathering over the surface of any area.

Mr. J. E. Taylor read an interesting paper *On the later Crag Deposits of Norfolk and Suffolk.* Mr. Prestwich remarked that the belief was gradually gaining ground, that the Red Crag was contemporaneous with the Norwich Crag. In regard to the fossil contents, he pointed out the difficulty there was in distinguishing the extraneous species.

Mr. P. W. Stuart Menteath read a very important paper *On the Origin of Volcanoes*, which, unfortunately, had to be hurried through in such a manner that but little could be gained from the hearing of it.

L'Abbé Richard read a paper (in French) *On Hydrogeology.*

Mr. W. S. Mitchell reported *On the Leaf-beds of the Lower Bagshot Series.*

Mr. C. W. Peach made some additions to the list of Fossils and Localities of the Carboniferous Formation in and around Edinburgh, and mentioned the occurrence of *Lituites giganteus.*

The Rev. W. S. Symonds exhibited a new *Onchus* spine from the Lower Old Red sandstone of Hay, Brecon.

A number of papers were held over until Wednesday, when it was arranged to read them; but as none of the authors of papers put in an appearance, Prof. Geikie adjourned the reading of the papers until the next meeting of the Association.

SECTION D

SUB-SECTION.—ZOOLOGY AND BOTANY

PROF. WYVILLE THOMSON made some observations on the palæontological relations of the fauna of the North Atlantic, as brought to light in his recent dredging explorations in the North Atlantic. In introducing his observations on these fauna, the professor called attention to the fact that, great as the results of the expedition in Her Majesty's ship *Porcupine* might fairly be held to be considered as an addition to scientific knowledge, still, the actual ground got over by dredging at any very considerable depth was of very small extent comparatively with what yet remained to be done. The field for these investigations, therefore, might be called in a sense unlimited.

Prof. Van Beneden read a paper, *On the Bats of the "Mammoth epoch as contrasted with those of the present day.*

MISCELLANEOUS

Among these we may particularly mention a paper by Mr. W. A. Lewis entitled *A Proposal to modify the strict Law of Priority in Zoological Nomenclature in certain cases.* The author insisted that it was perfect infatuation to serve blindly under word of the code drawn up under the sanction of the British Association now thirty years ago, and proposed that where there was now (August 1871) a universal agreement about a specific name, that name shall not be displaced on account of any prior name being discovered.

Dr. Sclater made some remarks on what he held to be an appropriate opportunity of establishing zoological observatories in connection with certain astronomical observatories which were to be established for the purpose of taking observations of the transit of Venus in 1874. On the occasion of the approaching transit, the Astronomer-Royal proposed to organise observing expeditions to the following five stations:—(1) Oohu, Sandwich Islands; (2) Kerguelen's Island; (3) Rodrigues; (4) Auckland, New Zealand; (5) Alexandria. At the first three of these stations it would be necessary to have a corps of scientific observers resident for twelve months previous to the transit, in order that the absolute longitude of these places, which was not now correctly known, might be obtained. Dr. Sclater pointed out how little was yet known of the terrestrial and marine zoology of these three islands, and specified various particulars in the case of each of their faunas, which it would be especially desirable to investigate. He then urged that the addition of one or more zoological collectors or observing naturalists to the corps of astronomical observers in each of these stations would occasion very slight additional expense, and suggested that application should be made to the Government to allow such naturalists to accompany the expedition, and to undertake the necessary explorations. He stated that there was a precedent for this course in what had been done in the case of the Abyssinian expedition.

The department unanimously concurred in the suggestion, and the desirability of such an application to Government being made.

Dr. Grierson read a paper *On the Importance of forming Provincial Museums, in which the Products of Districts might be Exhibited.* These museums could be connected with consulting and lending libraries, and from a central source there could be sent articles for exhibition at different times, and also persons who could give instructions on such subjects. Such institutions would not only tend to spread knowledge amongst the people, but they would be a means of preventing intemperance and improving their moral habits.

Miss Lydia Becker said she took an interest in this subject as one of those to whom a small share of responsibility had been given in enforcing the Education Act, being a member of the School Board of Manchester. That Board was now about to issue a scheme for a general course of instruction, and had appointed a committee for that purpose, of which she was a member. It had always seemed to her to be a matter of extreme importance to introduce such habits of observation as would follow from the introduction of natural science into elementary schools. She believed there was no portion of the population who were more likely to be interested in the matter than the children who attended these schools. They came there with their minds fresh and open to receive those impressions which were given in childhood, and they were very apt scholars. It had been said that the difficulty was in teaching boys; but she thought it was of as much consequence to teach girls natural science as boys. With regard to the principles of physiology and the laws of health, she thought that if any difference was to be made between the sexes, the girls should be first considered in the matter, as so much of the health of the population depended on the intelligence of women in these matters.

Sir Walter Elliot read a paper *On the Advantage of Systematic Co-operation among Provincial Natural History Societies.* It stated that a comparatively hurried inquiry had disclosed the existence of 115 such societies in Great Britain and Ireland. With reference to their publications, although the volumes of a few of the more important were found in several public libraries, the transactions of by far the greater number did not extend beyond their own localities. In this way not only were the great body of naturalists shut out from much useful information, but the isolation which existed must be detrimental to the societies themselves. Two modes of remedying the evil suggested themselves to his mind. One was, to have a central committee or single editor to collect and condense the most useful materials in all the local transactions; and the other, to form groups of societies, and publish the more original and valuable papers in each group under a joint editorship.

Mr. Symonds, who had been connected with the Cotswold Field Club for many years, said one of the great difficulties connected with these societies had been condensing the reports and publishing the papers that were worth publishing in one general volume of transactions. In Gloucester, paper after paper was published of the most valuable kind that would have done honour to the Royal Society if they had been read there, but which it was impossible for persons to obtain unless they were members of the club, or had friends who were members of it. He thought the difficulty could be met by having a council composed of the presidents, vice-presidents, and secretaries of field clubs throughout the length and breadth of the land, by whom the papers which were worth publishing could be selected. The paper which Sir Walter had now read would, he hoped, have the effect of producing some organisation among these clubs such as he had suggested.

A short discussion took place on the desirableness of some effort being made to utilise the information which was contained in many of the papers read before these clubs, and Sir Walter Elliot said he believed that before these meetings had closed a meeting would be held of those interested in this matter, to consider what should be done.

Three papers on Spontaneous Generation were read; the first of which, by Dr. Ferrier and Dr. Burdon Sanderson, F.R.S., was *On the Origin and Distribution of Bacteria in Water,*

and the Circumstances which determine their Existence in Animal Liquids and Fluids. In this were detailed the results of a large number of experiments undertaken to throw light upon the phenomena of contagion. The authors employed Pasteur's solution, and also certain animal fluids, but they wished it to be understood that the conclusions at which they had arrived had reference merely to the different fluids employed, and had no distinct bearing upon the possibility or non-possibility of spontaneous generation occurring in other fluids. They did not find any evidence to show that organisms arose *de novo* in their fluids. On the contrary, they thought that the occurrence and number of organisms had to do with the extent of exposure to germs either in air or water. Some of the results arrived at were very important. Boiling the fluids employed was always found to destroy all *Bacteria* and their germs, and other experiments were recorded, tending to show that the air did not contain living *Bacteria*, as so many have assumed. They also ascertained that *Bacteria* were unable to resist the effects of desiccation even at the ordinary temperature of the air. Their examination of the fluids of the body tended to show that these, in their normal condition, did not contain the germs of *Bacteria* or other organisms. Blood and serum, when received in super-heated vessels and exposed only to super-heated air, did not undergo putrefaction—apparently because these fluids did not contain the germs of living organisms.

Dr. Dougal then read a paper *On the relative Powers of various Substances in preventing the Generation of Animalcules, or the Development of their Germs, with special reference to the Germ Theory of Putrefaction*, in which he detailed the results of his experiments upon the power which various poisons, antiseptic substances, and salts have in arresting the development of organisms, and in preventing the phenomena of putrefaction. His conclusions were wholly adverse to the germ theory of fermentation and putrefaction.

Dr. Charlton Bastian, F.R.S., followed with a communication *On some new Experiments relating to the Origin of Life.* After calling attention to the fact that not-living mineral materials were continually being converted into the substance of plants during their growth, and that no special "vital principle" was now believed by physiologists to exist in plants, he said that the question that had to be settled was, whether the elements of not-living matter could group themselves anew, so as to produce living matter under the influence of the same physical forces which were concerned in bringing about the growth of the plant; or whether such combination could only be effected in the presence of pre-existing living matter in which (as was generally admitted) no special forces were resident. This question could, he thought, only be settled by experiments. Fluids deemed suitable for the production or development of living things had to be enclosed within hermetically sealed vessels, and then such flasks and their contents had to be exposed to a degree of heat which could be proved to be destructive to any pre-existing living matter which they might contain. If, after the lapse of a certain period, the flasks still remaining hermetically sealed, the fluid showed evidence of the existence and multiplication of life, then it was argued such living things must have been evolved *de novo* from some new combination among the organic molecules contained in the solution. It was therefore obviously impossible to come to any conclusion on the subject until it had been definitely ascertained what amount of heat living matter (existing in the form of the lowest organisms) could withstand. The evidence on this subject was, Dr. Bastian thought, very clear and decisive. In the first place, he had taken water containing large quantities of *Amœbæ*, ciliated infusoria, and other organisms, and had ascertained that they were invariably killed by raising the temperature of the water in which they were contained to 140° F. When we have to do with organisms of this size there can be no difficulty in ascertaining what the effects of the heat have been. Some of the organisms were partially disorganised by this temperature, and none of them ever showed any signs of life after the exposure, although kept under observation for 24 hours or more. Dr. Bastian then referred to other experiments which he had elsewhere recorded, showing that *Bacteria*, *Torulæ*, and their germs, whether visible or invisible, were destroyed by exposure for ten minutes to 140° F.

A solution of tartrate of ammonia when inoculated with a drop of fluid containing living *Bacteria* and *Torulæ*, became quite turbid in the course of one or two days, owing to the presence and multiplication of myriads of *Bacteria*. But when a similarly inoculated solution was exposed to the temperature of 140° F. or upwards, it afterwards remained perfectly clear, even though freely exposed to the air, thus showing, not only that the organisms and their germs which had been inoculated were killed by exposure to this temperature, but that the air did not contain any such multitude of living *Bacteria* germs as had been alleged. Even had he been unable to fix the precise degree of heat which was fatal to all those lower organisms, it would be important to remember that the greatest unanimity of opinion prevailed among almost all experimenters (such as Pasteur, Huxley, Pouchet, Wyman, and others) as to the fact that the lower organisms were killed in fluids heated to 212° F. Knowledge as to the limits of "vital resistance" to heat being declared the necessary starting-point for further investigation, he had made twenty-four experiments at temperatures ranging from 266° to 302° F., and he called particular attention to the fact that in about one-half of these experiments no living things had been obtained from the sealed flasks. His conclusion, therefore, as to the possibility of the *de novo* origin of living matter could not be rebutted by other experimenters who hastily recorded one or two negative results with the view of showing that he had been in error. Three of the most successful of his more recent experiments in which he had resorted to these high temperatures were then recorded. In two of these strong turnip infusions, neutralised by *liquor potassæ*, were employed, one of which was exposed to 266° F. for twenty minutes, and the other to 293° F. for ten minutes. The hermetically sealed flasks and their contents were subsequently kept in a warm place for eight or nine weeks, and they were exposed for several hours daily during eight days to the direct influence of sunlight. Before opening the flasks the vacuum was ascertained to be still preserved. After breaking the necks of the flasks the fluids were found in both cases to have become slightly acid, and to present a somewhat sour odour. On microscopical examination of the fluid *Torulæ* in all stages of development were found in both, and in that which had been exposed to the temperature of 226° F. a considerable number of *Bacteria* were also present. In the third experiment a strong infusion of a common crucifer was made, and the sealed flask into which it was introduced, after having been exposed to the temperature of 266° F. for twenty minutes, was subsequently maintained at a warm temperature, and also subjected to the influence of direct sunlight for a time. The vacuum having been ascertained to be well preserved, the flask was opened at the end of eight weeks, and among the contents of the flask there were found three slowly moving, very minute *Protamœbæ*, and many extremely active tailed *Monads*, in addition to multitudes of *Bacteria* and *Torulæ*. The active tailed *Monads* obtained from this flask were almost immediately exposed in an experimental hotwater oven to a temperature of 140° F. for ten minutes, and the result was that all these *Monads* taken from the hermetically sealed flask which had been heated to 266° F. were killed by the much lower temperature of 140° F. This result was subsequently confirmed by other observations which tended to show that *Monads* were not only killed by a temperature short of that at which water boils, but that they were more or less disintegrated by such an exposure. The experiments, supported as they were by many others of like nature, were, Dr. Bastian contended, of so strict and crucial a nature as to entitle us to believe that living matter might be born *de novo* in solutions, owing to the occurrence of new combinations therein. He further contended that such new-born living matter might, as the experiments tended to show, more or less directly assume the forms of some of the lowest organisms, just as specks of crystalline matter assume those more or less complex shapes which characterise the crystals of various saline substances.

A general discussion then followed on the three papers, and perhaps the most practical contribution to it was furnished by Miss Becker, who said that the question had an important bearing on domestic economy, in relation to the making of preserves and the preservation of jam from mould. She advised the ladies present, when making preserves, to exclude the air before the preserve had cooled. The President afterwards took back the audience to the regions of pure science, and congratulated his hearers that this mort important subject was now attracting the attention of many earnest and philosophical workers.

SUB-SECTION.—ANTHROPOLOGY

On Tuesday, August 8th, the Anthropological section, in consequence of the crowded attendance, moved into the largest lecture hall in the Science and Art Museum. Mr. Kaines read the first paper *On the Anthropology of Auguste Comte,*" in which he

expounded the views of that author according to the principles laid down by Mr. Darwin. He argued that man's intellectual and moral nature, as well as his body, were derived by natural causes, from the lower animals; and he maintained that Auguste Comte's worship of humanity would be the great doctrine of the future. He stated also that there were evidences of man's development furnished by the low condition of the human skulls of the palæolithic age.—Canon Tristram, in the discussion on this paper, granted what Comte and his followers had to say about the physical organism of man being like that of the lower animals, but was there not a metaphysical side to this question which ought to be heard.—Mr. Boyd Dawkins considered that Mr. Haines confounded two different propositions together in his essay. It was assumed, that because man's body was probably derived from that of the lower animals, his mind was equally thus derived. All naturalists were agreed, that man, so far as his body went, was descended from the lower animals; that he was the crown and front of the animal kingdom. But as regards man's mind, and his moral and intellectual faculties, he denied that any evidence whatever had been brought forward to show that their rudiments were to be found in any of the lower animals. The very least that can be done is to wait for more evidence, and the very worst to confound body with mind. He also denied that the palæolithic skulls afforded any trace of a lower state of intellect than at present. The skull of man found in the Dordogne was rather larger than usual; and that of Neanderthal, according to Prof. Huxley, might have enclosed the brain of a philosopher. We had no right to ascribe the actions of the lower animals to the same motives as our own, or to judge of their intellectual faculties by our own standard. On the evidence at present before us we must be content to confess our own ignorance.

On Wednesday, August 9, the following papers were read in the Anthropological department:—W. J. W. Flower commenced *On the Succession of the several Stone Implement Periods in England*. He argued that the two eras, Paleolithic and Neolithic, which had been given to these implements, were not now enough for England, the drift-period being separated from that of the cave, and that again from the tumuli and barrows.—Mr. Pengelly objected to the difference in time being made between the rough and polished flint implements, suggesting that it was probable that men who wished implements for rough and ready purposes, would break them off and form them, and would not go to the trouble of polishing them. He thought the fourfold arrangement of flint implements suggested by Mr. Flower might be convenient, but that at the same time the different kinds might be of contemporary formation.—Col. Lane Fox was inclined to think many of the types were accidental, arising from want of time for the worker to employ his talent. There were two great designs, however; one in which an end is rounded off so that the implement can be used in the hand, the other design being pointed at both ends, so that the implement might be inserted in a haft. As to the duration of the stone period, he thought we required a great deal more investigation and information.—Mr. Prestwich, assuming that the rivers of the flint period were frozen five months of the year, as they were now in Siberia, said some of the rough implements would have been used for cutting holes in the ice, while others would be used for digging roots. Another form, common to a later period, were the scrapers, used for scraping the skins of animals.

A paper was read from the Rev. W. Webster, *On certain Points concerning the Origin and Relations of the Basque Race*. It was in contravention of some ethnological theories propounded by Professor Huxley at a former meeting of the Association. A brief discussion took place, in which it was shown that the Basque language had similar inflections to those of the eastern languages.

Prof. Struthers gave a paper *On Sagittal Synostosis*, which was almost entirely anatomical. A controversy between design and evolution was introduced in the discussion of it.

Prof. McCann read a paper in opposition to *Mr. Darwin's Views on the Moral Sense in the Lower Animals*, maintaining that the moral sense was only implanted in man, and was the result of Divine intuition. A discussion took place on this, in which Prof. Struthers and Mr. W. Goodsir addressed the section.

The business was concluded by the President recapitulating generally the transactions of this department during the meeting. A cordial vote of thanks was passed to Prof. Turner for his services in the chair.

The sub-section was very well attended throughout the meetings, in spite of the desultory nature of the discussions, and the heterogeneous character of the papers, and of the absence of the usual debates.

SCIENTIFIC SERIALS

THE fifth number for the present year of the *Bulletin de l'Académie Royale des Sciences de Belgique* (May 1871) contains several important papers, among which we may particularly notice a Synopsis of the Cordulinæ, by M. E. de Selys Longchamps, and some investigations on the Evolution of the Gregarinæ, by M. E. Van Beneden. The former is a monographic revision of the extensive sub-family of Dragonflies, of which the genius *Cordulia* is the type; it contains a general sketch of the group and its subdivisions, and descriptions of all the known genera and species, with indications of the chief synonymy. This fresh instalment of the author's synopsis of the Dragonflies will be welcomed by entomologists. M. van Beneden's paper is a most valuable contribution to the history of those obscure parasites, the Gregarinæ; his observations were made on an unusually large species, measuring as much as 16 millim. in length, and found in the intestine of the lobster. This species, named by the author *Gregarina gigantea*, is figured in various stages in the plate accompanying the paper.—From M. J. J. d'Omalius d'Halloy we find a short note on the natural forces, in which he argues for the existence of a distinct vital force, and expresses the opinion that the vital force of man differs from that of other living beings.—M. F. Duprez discusses the observations on atmospheric electricity made at Ghent, and compares them with those made at other places; and M. de Koninck gives a tabular list of the fossil corals of the Carboniferous formation, showing their distribution in various parts of the world.

THE first publication of the Anthropological Institute has just appeared in the form of a double number of the journal, to which is attached an appendix extending over 160 pages, and containing the proceedings of the Anthropological and Ethnological Societies prior to the date of their union. Amongst the most important papers in the appendix we may mention those on "Some of the Racial Aspects of Music," by Mr. Kaines; on "The Kinnerian and Atlantean Races," by Mr. M'Lean; on "The Concord and Origin of Pronouns, and the Formation of Classes or Genders of Nouns," by Dr. Bleek; on "Some Stone Implements from Africa and Syria," by Sir J. Lubbock; on "The Prehistoric Antiquities of Dartmoor," by Mr. Spence Bate; and on "East African Tribes and Languages," by Dr. Steere. The journal itself contains eight papers, all of considerable value, but amongst which we may especially refer to those by Sir J. Lubbock "On the Development of Relationships;" by Mr. C. Staniland Wake on "The Mental Characteristics of Primative Man, as exemplified by the Australian Aborigines;" by Dr. Bleek on "The Position of the Australian Languages;" and by Mr. Boyd Dawkins on "The Results obtained by the Settle Cave Exploration Committee out of Victoria Cave in 1870."

No. 3, Vol. I. Ser. 2, of the *Proceedings of the Royal Irish Academy* has just been published. It contains, Science:—J. W. Dawson, LL.D., Addendum to paper on Eozöon; Professors King and Rowney on the Geological Age and Microscopic Structure of the Serpentine Marble or Ophite of Skye, Plate XIV.; also on the Mineral origin of the so-called Eozöon Canadense; Prof. Hennessy, F.R.S., on the Flotation of Sand by the rising tide in a tidal estuary; Dr. J. Purser, Report on the Researches of Prof. Cohnheim on Inflammation and Suppuration; C. R. C. Tichborne, report on the Molecular Dissociation by Heat of Compounds in Solution (abstract). Polite Literature and Antiquities:—H. Stokes, a List of the existing National Monuments of Ireland in the County of Kerry; A. G. More, F.L.S., on an Ancient Bronze Implement found near the Hill of Tara; R. R. Brash on an Ogham Stone at Kelbonane, County of Kerry, Plate XIII.; and an Appendix contains minutes of the proceedings of the Academy.

SOCIETIES AND ACADEMIES

LONDON

Hackney Scientific Association, June 6.—From the report read by the hon. secretary, Mr. H. W. Emons, it appeared that the society had made good progress during the past session, the number of members having more than doubled, and the papers