

A discussion ensued, in which Mr. G. F. Linney, Mr. H. M. Klaassen, Dr. Strong, and the President took part.

In addition to the collection of minerals, &c., exhibited by the President in illustration of his paper, Mr. J. Packham, of Katharine-street, exhibited 22,000 grains, equal to 3-lb. 2½-oz. of solid matter which had been obtained by distillation, from 1,000 gallons of Croydon water; Mr. A. D. Taylor, Lavender, with scent ducts; Mr. K. McKean, Larva; Mr. E. Lovett, Parasite of Flying Fox, also an improved method for illumination of objects; Mr. Edward Williams, Fungi.

NINTH ANNUAL SOIREE.

Held on Wednesday, Nov. 6th, 1878.

This was held, as hitherto, in the Large and Small Public Halls, and was attended by: 140 members, 53 of whom exhibited; 106 exhibitors from other clubs; and 549 visitors, making a total of 795, as against 770 in 1877. 173 microscopes were exhibited.

The musical arrangements were again under the care of Mr. George Webb, who attended with four instrumentalists.

Many interesting objects were exhibited, among which may be mentioned a collection of crystals by the President; the Quadruple Electro Chronograph which was used for the observations on the transit of Venus in 1874, exhibited by Mr. Thomas Cushing, by permission of the Secretary of State for India; a Phoneidoscope, an instrument for observing the colour figures of liquid films, under the action of sonorous vibrations, by Dr. Philpot; Butterflies from the Malay Archipelago, among which were specimens of the Leaf butterfly (*Kallima paralekta*), of Sumatra, by Mr. Alfred Russel Wallace; two Roman cinerary urns of glass, a number of skulls of Mammalia, stuffed birds, and a portion of the trunk of a horse chesnut tree in which an iron chain had become embedded, by Mr. John Flower; Aquaria, by Mr. H. M. Klaassen and Mr. A. D. Taylor; mineralogical specimens by Mr. J. Toms and Mr. H. Long; crustacea, by Mr. Lovett; fossils by Mr. Henry Turner and Mr. J. R. Frewer; a carbon candle as used in the Jablochhoff system of electric lighting, by Mr. Thomas Cushing; specimens of silk-producing insects, by Mr. J. A. Clark; weather charts, by Mr. George Corden. Microscopical specimens were also kindly lent by Dr. Ord, and exhibited by the President.

Microscopes were exhibited by members of the following clubs: Croydon.—The President, Messrs. W. R. Adams, Berney,

of calf; H. Long, Parasite of goldfinch, wheat mildew; K. McKean, Larva of beetle; Mr. R. Owen, Fungus; A. D. Taylor, Pollen of *Godetia*; A. Warner, Section of stem of exotic fern, stained in two colors; W. L. Serjeant, soap films.

Ordinary Meeting, Feb. 26th, 1879.

JOHN FLOWER, M.A., F.Z.S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. Alfred Russel Wallace was balloted for and elected.

The PRESIDENT announced that Mr. G. Corden had forwarded to the secretary a copy of a letter written by him to the *Croydon Advertiser* which contained some interesting particulars as to the very remarkable thunder storm which broke over Croydon on Sunday, June 23rd, 1878, and the letter was laid on the table for perusal by the members. (*See p. 32*).

He also announced that Mr. Mason, photographer, of George-street, had taken three very good photographs of the piece of the chestnut tree with the iron chain embedded in it, which was exhibited at the soiree, and described at the meeting on November 20th, 1878, and he presented copies of the three photographs to the Club.

He further intimated that the soiree of the Quekett Microscopical Society would be held at University College, Gower-street, London, on Friday, March 14th.

Mr. H. TURNER read an interesting paper "On Yeast," and Mr. HENRY LEE read a short paper, by Mr. H. Long, who was unavoidably absent, on the same subject.

A discussion took place on these papers, in which the President, Mr. H. M. Klaassen, Mr. J. S. Johnson, and others took part. Mr. Klaassen solved one of the difficulties felt by Mr. Long, by explaining that two varieties of yeast, distinguished by the Germans as the "Ober-hefe," or surface yeast, and the "Unter-hefe," or sediment yeast, were now recognized by naturalists, and explained and described the peculiarities of each. Mr. Long's experiments had probably been made with the surface yeast, which, when dried, became converted into a "tough horny substance," as described by Mr. Long; whereas the sediment yeast, when dried, appeared as a fine powder. Mr. J. S. Johnson, at the request of the President, also explained how it was that yeast cells were commonly found in some parts of the urinary system of the human body in certain diseases.

The following objects were exhibited:—Mr. H. Turner,

torulæ, cells of yeast plant under high power; Mr. A. D. Taylor, polypodium vulgare, showing sori; Mr. J. S. Johnson, clematis, stained; Mr. K. McKean, mould from jam; Mr. H. M. Klaassen, yeast plant, and experiments with soap bubbles to illustrate cell division of torulæ; Mr. E. Lovett, orbitolites, eocene, Isle of Wight, pupa cases and larva, from China; Mr. E. B. Sturge, two vols. Ephraim Chambers' Cyclopædia, published 1738; Mr. J. Toms, diatoms.

Ordinary Meeting, March 19th, 1879.

JOHN FLOWER, M.A., F.Z.S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

The following gentlemen were balloted for and elected:—Mr. Richard Backwell, Mr. E. Mawley, Mr. H. T. Mennell, Mr. J. Poland, Mr. W. R. Harwood.

The PRESIDENT proposed four gentlemen for election as honorary members, and, in doing so, remarked that when the Club was in its infancy it was felt that they could hardly ask distinguished men to be connected with it, but now that the Club had increased to very considerable dimensions, and had come to be known beyond the limits of Croydon, the time had come when they could properly ask men who were eminent in science to accept the honorary membership of the Club. He had, therefore, pleasure in proposing Mr. John Evans, D.C.L., F.R.S., of Nash Mills, Hemel Hempstead, Herts; Professor W. H. Flower, LL.D., F.R.S., President of the Zoological Society of London, of the Royal College of Surgeons, Lincoln's Inn Fields, London; Professor Joseph Prestwich, M.A., F.R.S., Professor of Geology in the University of Oxford, of No. 34, Broad-street, Oxford; and Professor George Rolleston, D.M., F.R.S., Linacre Professor of Anatomy and Physiology in the University of Oxford.

The proposal was seconded by Dr. Carpenter, and the PRESIDENT announced that these gentlemen, having been duly nominated, would be balloted for, in accordance with the rules of the Club, at the next meeting on April 16th.

The PRESIDENT called attention to what had passed at the annual meeting, on January 15th, with reference to the wording of the rules of the Club, and stated that the matter having been considered by the committee, they recommended that the rules should be altered in the following respects:—That the first paragraph should be as follows—

of the various species of ants, contrasting them with bees. He also alluded to their propensity for eating flesh, and explained how by the agency of ants, good skeletons of small animals could often be obtained. In proof of this he took up the skull of an animal which was lying on the table, and which had been cleaned in a most beautiful and effectual manner by those insects. In the piece of the laburnum tree which was exhibited, the arrangement of the nest was seen in a very clear manner. Unfortunately the tree had been split open before the existence of the formicarium was discovered. A portion of the nest had been sent to the British Museum. The remainder was before the meeting. The covered ways, the winding staircase like passages, and the extensive apartments in which the eggs of the ant were stowed away, and moved about, were very manifest. It would appear that the ant was an acute observer of the state of the atmosphere, that, without either barometer or dew point measure other than those existing on their own persons, they were able to judge as to the kind of day in store for them, and used to arrange their eggs and pupa accordingly, with almost unerring certainty. Dr. Carpenter also called attention to the walls of the nest, which were arranged so as to limit the action of cold and moisture to the fullest extent.

In the discussion which ensued,

Mr. W. H. ROWLAND asked whether the water-rat, in addition to living upon vegetable matter, did not also eat fish. When he had been snipe shooting he had found pieces of cray-fish shell which had apparently been eaten by water-rats, and he thought that in addition to vegetable matter these rats indulged in food of this kind.

The PRESIDENT said that about almost every river, especially if near a town, there were two kinds of rat—the water-rat (*Arvicola amphibia*), and the common brown rat (*Mus decumanus*). The latter was very fond of water, and was constantly seen upon river banks, and would eat anything. The water-rat on the other hand was more like a beaver, and as a rule lived upon vegetable food only. He was very much inclined to think that the cray-fish referred to by Mr. Rowland had been eaten by the common brown rat, and not by the water-rat. The two were very often confused, but they were very distinct animals in their habits and their structure.

The PRESIDENT called particular attention to a very interesting series of nests, 47 in number, exhibited by Mr. P. Crowley, in each of which a cuckoo had laid its egg. (*These were again exhibited at the meeting on April 16th. See p. 38.*) He also called attention to a skull, to which Dr. Carpenter had

referred as having been cleaned by ants, which was exhibited by Mr. Maitland Gardner.

Mr. A. R. WALLACE being appealed to, explained that this was the skull of a species of Pig, the Babirusa, or Pig Deer (*Barbirusa alfurus*), an animal with which he was well acquainted. It is found only in the Island of Celebes, the Sula islands, and the island of Bouru, all in the Malay Archipelago; but as regards Bouru it is probably not indigenous, but has been introduced by the natives. Mr. Wallace called attention to and described the long curved tusks in the upper and lower jaws. These were probably once useful to the animal, but changed conditions of life have rendered them unnecessary, and, no longer being worn down as fast as they grew, they now develope into a monstrous form, just as the incisors of rodents do if the opposite teeth do not wear them away. The history and structure of the creature all seem to indicate that it is a survival of a very ancient form.*

The PRESIDENT read some notes on a sterile Grey Hen, the Cirl Bunting, the Stock Dove, and a foot of a cock Pheasant with an additional toe. (*See p. 34*).

The following objects were also exhibited:—By the President, nest and eggs of the Common Yellow Bunting; Mr. J. Berney, volvox; Mr. P. Crowley, specimen of yeast; Mr. E. Gill, White Ant; Mr. E. Lovett, Black Ants (*Glyciphagus plumiger*) from Gibraltar; Mr. H. Long, fermentation of malt liquor, and shewing fermentation of surface yeast; Mr. H. R. Owen, Coralline; Mr. E. B. Sturge, *Asterina gibbosa*; Mr. W. L. Sarjeant, Peristome of moss and peculiar variety of Lime Hawk Moth; Mr. A. Warner, section of leaf and midrib of *Strelitza augusta*, stained in two colours; Mr. W. H. Rowland, Globe Fish (*Diodon*?).

At the conclusion of the meeting, Mr. G. F. LINNEY described the Albo-carbon light (patented by the Albo-Carbon Light Company), with which the room in which the meeting was held was lighted.

* The skull of the Babirusa is well figured in Mr. A. R. Wallace's work, "The Malay Archipelago," vol. 1, p. 434.

Mr. COOPER exhibited a specimen of the Smew (*M. albellus* L.) which was obtained, last winter, at Wallingford, Berks, and the history of this species, and its occurrence in the British Isles as a winter migrant only, was explained by the President.

The following objects were also exhibited:—Mr. J. Berney, various sections of wood, section cutting apparatus; Mr. P. Crowley, section of fennel; Mr. J. S. Johnson, striate muscular fibre and acarus; Mr. H. M. Klaassen, transverse sections of stems of fern, cane, and sycamore; Mr. E. Lovett, section of *Pteris aquilina*, 96 sections of wood, seeds, nuts, &c.; Mr. K. McKean, *Anodonta cygnea* (var. *anatina*), *Unio tumidus*, *Helix aculeata*; Mr. W. J. Nation, various sections; Mr. H. R. Owen, beetles, Central Africa; Mr. W. L. Sarjeant, radial section of pine, polarized; Mr. E. B. Sturge, various sections; Mr. A. D. Taylor, specimens of various woods.

Ordinary Meeting, November 19th, 1879.

JOHN FLOWER, M.A., F.Z.S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. William Blades, Rev. E. M. Geldart, and Mr. B. Pudicombe were balloted for and elected.

The PRESIDENT announced the donation of six slides of wood sections by Mr. Nation, also that Dr. Lionel Beale had presented to the Club a copy of the new edition of his book, "How to work with the Microscope," and the thanks of the Club were accorded to Mr. Nation and to Mr. Beale.

Mr. THOMAS CUSHING, F.R.A.S., read a paper entitled "Notes on Barometers, with experiments, illustrative of the principles on which they are constructed," and by an elaborate series of experiments, and numerous instruments, explained, very clearly, the structure of the various kinds of barometers, the scientific principles involved in their construction, and the practical uses to which they may be put in scientific investigation. He further explained the manner in which the principle of the barometer was first discovered, and the way in which modern barometers had been gradually developed.

The paper was followed by a discussion, in which the President, Mr. Mawley, and others took part, and a very cordial vote of thanks was accorded to Mr. Cushing for his excellent paper.

Mr. GEORGE CURLING called attention to the recent discovery of a large per centage of copper in the green colouring matter of some of the wing feathers of the Turako (*Corythacola*

cristata) one of the largest of the Helmet Birds of West Africa, a group which are closely allied to the crows, and exhibited and described a specimen of Touracine solution, containing the colouring matters of the feathers.

Mr. A. RUSSEL WALLACE gave some further particulars as to the properties of this colouring matter, and mentioned, amongst other things, that it seemed so far soluble in water, that much of the colour could be washed out of the feathers.

The PRESIDENT also pointed out that these birds were only found in a comparatively small part of Africa, and could only exist where copper was present in the soil. He also expressed the opinion that in all probability they were only to be found in districts where some particular plant, or group of plants, abounded, which contained copper in the seeds or fruit upon which the birds fed. He also remarked upon the very singular fact, mentioned by Mr. Curling, that it was only one or two feathers in the wings of these birds which contained the copper.

Dr. WILLIAMS also added some further observations as to the Turako.

The PRESIDENT called attention to a remarkable proof of the voracity of the Great Black Backed Gull which had lately come under his observation. (*See p. 56*). He also exhibited and described some minute red earth worms, which he had received from Mr. J. Chisholm, from the mud of the river Thames, near North Woolwich, and which were found there in such numbers that at low water they quite coloured the mud.

Mr. W. N. COATES exhibited and described a variety of the common snipe (*Sc. russata*) shot by him in County Meath, last autumn.

The following objects were also exhibited:—The President, head of Black Backed Gull (*Larus marinus*), Common Gull (*Larus canus*); Thomas Cushing, standard and wheel and Aneroid barometers, Sympiesometer, Hypsometer, &c.; Henry Long, sulphate of alumina; section stalk of Tobacco; Edward Lovett, Tubes of annelid, microscopic cephalo pod from Bermuda; K. McKean, jaw of *Helix ericetorum*; H. R. Owen, muscular tissue of Crab; S. Overton, palate of Sting Ray; W. F. Stanley, six genera of exotic ferns, double stained, also chrono-barometer; W. Low Sarjeant, circulation in *Vallisneria spiralis*; J. Berney, section-cutting machine.

TENTH ANNUAL SOIREE,

Held on Wednesday, November 26th, 1879.

This was held, as in previous years, in the Large and Small Public Halls, and the number of persons present was unusually large, being 135 members, 109 exhibitors (non-members), and 571 visitors; total 815, as against 795 in 1878.

The following is a list of exhibitors of microscopes:—

Croydon.—The President, Messrs. H. Berney, J. Berney, T. Bindley, W. H. Beeby, J. H. Baldock, W. Cheshire, T. Compton, W. Cooper, P. Crowley, A. W. B. Drummond, E. Gill, R. Hall, J. Harrod, W. Ingrams, J. Joyce, E. F. Jones, R. A. James, J. S. Johnson, H. Klaassen, T. M. Loftus, E. Lovett, W. Lee, H. Long, K. McKean, M. D. Northey, H. R. Owen, S. Palmer, J. Poland, G. Manners, E. R. Moules, H. Moules, S. Overton, J. C. Oswald, J. C. Swaine, Dr. Strong, W. L. Sarjeant, E. B. Sturge, J. A. Toms, A. D. Taylor, H. Turner, F. West, J. Williams, M. D., E. Williams.

South London.—Messrs. C. W. Balls, J. G. B. Brewer, A. Butt, E. Dadswell, T. D. Errser, George Hardess, F. W. Hembry, R. G. Hovenden, W. J. Parks, J. Saffery, W. Short, D. G. Simpson, J. A. Smith, R. A. Smith, W. B. Smith, W. T. Suffolk, M. Terry, W. West, R. G. West.

Sydenham.—A. J. E. Arch, E. D. Berkeley, R. E. Crossland, E. George, E. L. Hardy, S. Milledge, A. Milledge, A. C. Perrins.

New Cross.—H. A. Auld, A. Bliss, M. Burgess, G. G. Daniel, D. W. Greenhough, F. Harrison, F. J. Hart, J. H. Stanley, F. Stewart, J. H. Swinburn, S. J. Tebbitt, S. R. Thackrah, G. Willcocks.

Royal.—Messrs. W. Brindley, F. Bossey, J. W. Goodinge, and A. C. Goodinge.

Quekett.—Rev. H. M. Clifford, and Messrs. F. W. Andrew, A. L. Corbett, F. Enock, H. J. Fase, J. H. Hadland, J. J. Hunter, J. E. Ingpen, G. A. Messenger, J. Nelson, G. T. Plomer, B. W. Priest, F. Reeve, T. D. Russell, Alpheus Smith, J. E. Simmonds, and T. P. Watson.

Greenwich.—Messrs. W. H. Collins, G. Dannatt, W. A. Dannatt, and J. W. Dannatt.

Hackney.—Messrs. J. K. Crossfield, T. R. Doggan, A. Fieldwick, A. E. Raynes, J. Smith, and C. W. Willmott.

Tower Hill.—Messrs. J. Alstone, J. H. Burn, G. T. Crossfield, W. Simpson, R. Sedgewick, and W. Vernon.

Old Change.—Messrs. J. A. Batchelor, R. W. Cockrayne, and Mr. Gribbell.

Private.—Mr. Bidwell, A. Barker, R. M. Christian, J. Case, S. Henson, J. W. Justican, Legrand and Sutcliff, G. Payne, E. Scargill, C. W. Stidstone, J. P. Taylor, C. Thorpe, J. W. Worster, C. J. N. Yuill.

Makers.—J. W. Bailey, R. and J. Beck, C. Baker, J. Browning, G. A. Christmas, Dring and Fage, How and Co., Murray and Heath, W. Moginie, W. F. Stanley.

The following were the principal objects exhibited:—The President, Mr. J. Flower, contributed a very fine collection of stone implements and weapons; Mr. A. Russel Wallace exhibited a large number of skins of tropical birds; Mr. Bidwell, a series of 264 eggs of the Common Guillemot, shewing the variations in colour and markings; also a collection of stuffed birds "in the down;" Mr. G. Payne, stone implements from Sittingbourne, Kent; Mr. E. Bailey, nest of trap-door spider; Mr. W. Low Sarjeant, British land and fresh water shells; Mr. A. A. Cowdell, Bhuddish manuscripts from Mandalay; Mr. W. Cheshire, a collection illustrating the process of wood engraving.

Through the kindness of Mr. Philip Crowley, the platform was beautifully decorated with a large number of choice exotic plants.

During the evening a band, under the direction of Mr. George Webb, played a selection of music.

Ordinary Meeting, December 17th, 1879.

JOHN FLOWER, M.A., F.Z.S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. W. H. Burbidge, Mr. J. Bonella, and Mr. J. Emery were balloted for and elected.

The PRESIDENT announced that the Annual Meeting to receive the report of the committee, and to elect officers for the ensuing year, would be held on the 21st of January, and would be exclusively a business meeting.

The PRESIDENT further announced that according to the rules of the Club it was necessary to elect two auditors to audit the accounts for 1879. The names of Mr. J. C. Swaine and Mr. J. Chisholm were submitted, and they were duly elected auditors.

Dr. CARPENTER expressed a hope that the annual meeting would be a large one, because he was anxious then to bring

Annual Meeting, January 21st, 1880.

JOHN FLOWER, M.A., F.Z.S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. W. Adamson, jun., Mr. John Browning, Mr. Arnold Pye-Smith, Mr. William J. Fuller, Mr. William C. Dade, and Dr. James T. Hinton, were balloted for and elected.

The PRESIDENT announced that the soiree of the New Cross Microscopical Club was fixed for Tuesday, February 24th.

Referring to the notice given by Dr. Carpenter at the last meeting, of his intention to bring before this meeting a proposal to provide permanent quarters for the Club, the PRESIDENT announced that as Dr. Carpenter was detained in London he would not be able to lay his proposal before the Club.

The HON. SECRETARY then read the report of the committee and their balance-sheet for the year 1879 as follows:—

REPORT.

The committee have again the pleasure of submitting to the members of the Club their annual report of its proceedings, and in doing so draw attention to the fact that this is the tenth annual meeting which has been held, and that on April 6th next, the Club will have completed the tenth year of its existence.

During the year 1879, twenty three ordinary members have been elected, and owing chiefly to the many removals from the neighbourhood, twenty-three members have resigned. The committee regret to add that two members, Mr. W. S. Masterman and Mr. Henry Sykes have died. The following distinguished men have been elected honorary members of the Club:—Mr. John Evans, D.C.L., F.R.S., Professor W. H. Flower, L.L.D., F.R.S., Professor Joseph Prestwich, M.A., F.R.S., Professor George Rolleston, D.M., F.R.S.

The total number of members on 31st December, was 238 ordinary and five honorary members.

The following papers have been read:—

February 26th.—Mr. HENRY TURNER, "On Yeast."

March 19th.—Dr. ALFRED CARPENTER, "On Ants." The PRESIDENT, "Ornithological Notes."

April 16th.—Mr. J. W. WALLIS, "On Man: his social progress in Pre-historic Times." The PRESIDENT, "On the nesting habits of the Cuckoo;" and "On the anatomy and mechanism of the breastbone of the Gannet."

May 21st.—Mr. WM. INGRAMS, "On Diatomaceæ."

Sept. 17th.—Dr. CARPENTER, remarks "On a fungoid growth on a piece of oak, and "On some recent floods at Llandula, North Wales." Mr. E. LOVETT, "Notes on the Geology of the Island of Jersey."

Oct. 15th.—Mr. W. J. NATION, "On wood sections."

Nov. 19th.—Mr. THOS. CUSHING, F.R.A.S., "Notes on barometers, with experiments, illustrative of the principles on which they are constructed."

Dec. 17th.—Mr. W. J. NATION, "Further remarks in continuation of his former paper 'On wood sections.'" Mr. E. LOVETT, "On the presence of chalk flints on a part of the coast of the Island of Jersey,"

and in addition to these papers numerous objects of Natural History have been exhibited and described at the various meetings.

An excursion was made on the 17th May to Caterham and Godstone, to meet the members of the Quekett and South London Clubs, and the members of the Club were invited to join the Holmesdale Natural History Society in a botanical ramble on the Addington Hills on 20th September.

A very interesting visit was also made to Mr. F. J. Horniman's Museum at Forest Hill on the 24th May, and the thanks of the members are due to that gentleman for his courtesy and hospitality on the occasion.

The tenth annual soiree took place at the Public Hall on Wednesday, 26th November, and was attended by Fellows of the Royal Microscopical Society, and members of the Quekett, South London, New Cross, Sydenham, Greenwich, Hackney, Tower Hill, The Old Change Clubs, and others, by whom and by members of the Club, 175 microscopes were exhibited, besides many other very interesting objects in Natural History, &c. The number of persons attending the soiree was as follows:—135 members, 109 exhibitors, non-members, and 571 visitors. Total, 815, as against 795 in 1878.

Members of the Club have also attended the Soirees of the Greenwich, New Cross, South London, Quekett, and Tower Hill Clubs, and have also given exhibitions of microscopical objects at the Church of England Young Men's Society Rooms, North End, and at the Christ Church School Rooms, Broad Green.

The journals and reports of the Royal Microscopical Society, the New Cross, Watford, Quekett, Hackney, South London, East Kent, Berwickshire and Belgian Clubs and Societies, have been received, and a great honour has been conferred upon the Club by the Royal Microscopical Society in constituting our President for the time being an *ex-officio* Fellow of that society.

The donations to the Club were as follows:—Two slides *Phylloxera devastatrix*, by Mr. K. McKean; two slides belemnite from Yorkshire, by Mr. E. Gill; three photographs of horse chestnut tree, by the President; a large quantity of butterfly wings for mounting, by Mr. F. J. Horniman; six slides of wings of tropical Lepidoptera, by Mr. E. Lovett; a list of succulent plants, by Mr. J. J. Peacock; six slides wood sections, by Mr. W. J. Nation; Dr. Beale's work on the Microscope, fifth edition, by the author; "Notes on the Flora of Surrey," by Arthur Bennett, by the author.

Sub-committees on Meteorology, Geology, and Zoology, have been appointed in accordance with the recommendation of the committee in their last report, and are at work on their respective subjects.

The attendance at the ordinary meetings has been up to the usual average, but the conversational meetings have been so badly attended that the committee recommend that they should be discontinued.

The balance to the credit of the Club's account has been increased during the year, but the report and transactions for 1878 have not yet been put in the printer's hands.

The thanks of the Club are again due to the Local Press for the full reports of the various meetings which have appeared in the columns of the *Croydon Advertiser*, *Croydon Chronicle*, and *Croydon Guardian*.

Signed on behalf of the Committee,

Croydon, 21st January, 1880.

JOHN FLOWER, President.

The PRESIDENT, in moving the adoption of the report, congratulated the Club upon the past year, which he said had been a year of uninterrupted progress and success. The proceedings at the ordinary meetings had not in any way declined in interest during the year, and the attendance at those meetings had been, if anything, larger than in previous years. As the report pointed out, this was the tenth annual meeting of the club, and on the 6th April the Club would complete the tenth year of its existence. With regard to the honorary members who had been elected during the year, he thought the fact that they had accepted the honorary membership of the Club was a great compliment, and the same might be said of the fact that the Royal Microscopical Society had elected the President of the Club for the time being an *ex-officio* Fellow of that society. With regard to the papers, those read during the past year were certainly as good and as interesting as they had ever had. Some of the meetings had been unusually fully attended, and twice at least the room had been so full that members had not all been able to find seats. With regard to the soiree, he thought that also marked the progress of the Club. Notwithstanding the unfavourable weather, more members and visitors were present than had ever attended on a similar occasion, and the number of microscopes and the objects exhibited were quite as interesting and important as at any previous soiree. The conversational meetings were started in accordance with the suggestion of some of the members, and purely as an experiment. It was thought that if the Club had intermediate meetings between the ordinary meetings some good results might be obtained, but the attendance had been so meagre that the committee did not see their way to recommending the continuance of those meetings. With regard to this subject, however, he should tell the members that one or two suggestions had been made whereby it was hoped that the conversational meetings could be made more attractive and useful to members, and perhaps before any formal resolution was come to to discontinue the meetings, it would be desirable to see what Dr. Carpenter's proposal was as to providing permanent quarters for the Club, because if the Club ever had proper quarters it would not be necessary to have these conversational meetings at all. They would then have rooms which every member could come to in the evening, and which would be very considerably used. In concluding, the President repeated the thanks of the committee to the Local Press, and moved that the report and balance-sheet be received and adopted, and that they be printed and circulated amongst the members.

Mr. T. CUSHING seconded the motion, and it was carried unanimously.

Mr. A. R. WALLACE then moved the re-appointment of Mr. John Flower, M.A., F.Z.S., as President of the Club for the ensuing year.

Mr. C. C. MORLAND seconded the motion, which was put and carried unanimously, the PRESIDENT briefly acknowledging the compliment which had been paid to him by his re-election.

Mr. W. J. MELLIS next moved that Mr. Philip Crowley be re-elected treasurer for the ensuing year.

The motion having been seconded by Mr. C. HENMAN, jun., was carried unanimously.

Mr. CROWLEY, in replying, said his office was a sinecure, for their excellent secretary kept all the accounts. He had simply to sign the cheques, and the bank took care of the balance.

Mr. MAITLAND GARDNER then proposed the re-appointment of Mr. E. B. Sturge as hon. secretary.

The Rev. J. K. HAWKER seconded the motion, which was carried by acclamation, and Mr. STURGE briefly acknowledged the renewed expression of confidence that had been reposed in him.

Mr. E. WILLIAMS moved the appointment of the following gentlemen as the committee:—Dr. Carpenter, Mr. J. Chisholm, Mr. T. Cushing, Mr. J. S. Johnson, Mr. H. Lee, Mr. G. Manners, Mr. K. McKean, Mr. A. D. Taylor, and Mr. H. Turner.

The motion was seconded by Mr. T. MITCHNER, and carried unanimously.

The Rev. E. M. GELDART then moved, in pursuance of the notice which he had given at the meeting on December 17th, "That Rule 7 as to membership be altered so as to stand as follows:—

'Any member may introduce a visitor at an ordinary meeting, and the name of such visitor, with that of the member by whom the visitor is introduced, shall be entered in a book to be kept for that purpose.'

—and spoke at some length in support of his proposal.

Mr. A. R. WALLACE seconded the motion, and also spoke in favour of the proposed alteration in the rule.

The proposed alteration having been very fully discussed,

The Rev. J. K. HAWKER moved by way of compromise, and as an amendment, that a discretionary power be left with the committee to invite the presence of ladies.

Mr. CHISHOLM seconded the amendment, and stated that if the original motion of Mr. Geldart was put, he should vote against it.

The PRESIDENT held that the meeting could not force a

discretionary power such as that proposed by the Rev. Mr. Hawker on the committee, whom, he believed, for reasons which he stated, would decline to receive it.

The amendment, therefore, fell to the ground, and the motion of Mr. GELDART being put to the meeting, 15 members voted for it, and the great majority of the meeting (over four-fifths) voted against it. The motion was therefore lost.

Mr. A. R. WALLACE gave notice that at the meeting on February 18th, he would move the following addition to the rules:—

“That the reader of a paper be allowed the privilege of having lady visitors introduced on the occasion when his paper is read, on announcing his wish at the previous meeting.”

The following objects were exhibited:—J. S. Johnson, exuviated shell of Cray-fish from Crystal Palace Aquarium; K. McKean, larval form of leaf insect (phyllium) from Ceylon; J. H. Baldock, double oxalate chromium and potass (polar); H. Long, section of mole's jaw with teeth in situ; K. McKean, White ant, worker; H. R. Owen, diatoms, “Challenger” dredgings; S. Palmer, scale of beetle; W. L. Sarjeant, gill of *Mytilus edulis*, showing movement of cilia; A. D. Taylor, wing of moth, (*S. populi*); A. Warner, tortoiseshell rim of eyeglass, from India, partly gnawed, supposed by white ants.

Ordinary Meeting, Feb. 18th, 1880.

JOHN FLOWER, M.A., F.Z.S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. Richard Cooper, Mr. Henry Linton, Dr. Charles Dukes, and Mr. Herbert D. Price, were balloted for and elected.

The PRESIDENT announced that Mr. F. J. Horniman had kindly sent a few more boxes of butterflies' wings for distribution among the members of the Club.

Mr. A. R. WALLACE, in pursuance of notice given at the last meeting, moved that the following be added to the rules:—

“That the reader of a paper be allowed the privilege of having lady visitors introduced on the occasion when his paper is read, on announcing his wish at the previous meeting.”

—and supported the motion in a speech of considerable length,

Dr. CARPENTER seconded the motion.

The matter having been debated at considerable length,

Mr. WALLACE replied, and the motion was then put to the meeting, and negatived by a very large majority, only nine members voting in favour of the motion.

Mr. E. R. PEARCE read a paper on "The History and Uses of British Medicinal Plants," and therein described the history and medical properties of the Foxglove (*D. purpurea*), Early Purple Orchis (*O. mascula*), Common Polypody, (*P. vulgare*), Hemlock (*C. maculatum*), Agrimony (*A. eupatoria*), Henbane (*Hyocyamus niger*), Adder's Tongue (*O. vulgatum*), Bitter Sweet (*S. dulcamara*), Burdock (*A. lappa*), White Poppy (*P. somniferum*), Comfrey (*S. officinale*), Monkshood (*A. napellus*), Meadow Saffron (*C. autumnale*), and the Darnel (*Lolium temulentum*). The paper was illustrated by numerous dried specimens of the plants described.

A discussion followed the paper, in which the President, Mr. P. Crowley, and Dr. Shorthouse took part, the President calling particular attention to the poisonous qualities of many of the plants described, and to the remarkable way in which the same poisons often effected different animals, some animals being able to eat it with impunity, whilst to others it proved rapidly fatal. He also pointed out that nearly all the plants described by Mr. Pearce were to be found wild in the immediate neighbourhood of Croydon.

The following members exhibited objects:—A. Bennett, books on botany; R. F. Crafton, works on medicinal botany; Thomas Compton, wing of lace fly, gall fly, illustration of medicinal plants; E. Gill, *Mesogloia virescens*; H. M. Klaassen, transverse section of Scotch fir; E. Lovett, Long-eared Owl, shot at Shirley, Diatomaceæ, from London clay, Isle of Sheppy; W. L. Sarjeant, British land and fresh water shells; E. B. Sturge, various works on botany; A. Warner, section of Tape-worm.

Ordinary Meeting, March 17th, 1880.

JOHN FLOWER, M.A., F.Z.S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

Mr. ALFRED RUSSEL WALLACE read an important and highly interesting paper "On the peculiar species of the British Fauna and Flora." (*See p. 58*).

The following objects were exhibited:—A. R. Wallace, case of lepidoptera, from the Isle of Man, showing in some species a remarkable diminution in the size of the wings as compared with the members of the same species in England; P. Crowley, series of stuffed birds of the peculiar British species; E. Lovett, *Nephrops Norvegicus*, from coast of Northumberland; curious varieties of the tiger moth; W. Adamson, specimens of Spence's metal; J. H. Baldock, deposit in milk; K. McKean, *Planorbis*

molested, they have no more fear of man than they have of sheep or deer, but where they are much shot at and disturbed they are almost as wild and as wary as Grouse. For these reasons he thought it much more probable that the failure of the birds to which Dr. Carpenter had referred was due to the fact that they had, for some reason, been driven to make their nests in the arbor vitæ trees, which were only lately introduced, and were in many respects very different from our native trees and shrubs, and that the birds had not yet learnt to adapt the building of their nests to their peculiarities. Referring to the use of pieces of paper by birds as materials for nesting, Mr. FLOWER mentioned some curious instances of the use of this material by blackbirds and thrushes, which had come under his own observation.

Mr. TURNER thought there was a great deal in Dr. Carpenter's theory that the birds were deficient in the intelligence which usually belonged to their species, the members of which generally selected safe places to build their nests in. He had no doubt it was the same bird that built the second and third nests, or the children of the first parents, who, no doubt, exhibited the deficiency of their parents, perhaps, in a more exaggerated form.

Mr. LOVETT, Mr. FULLER, and Mr. SARJEANT also spoke with reference to some of the subjects which had been brought before the meeting by Dr. Carpenter.

The following objects were also exhibited:—Mr. H. M. Klaassen, photographs of terminal moraines and of glaciers; Mr. H. R. Owen, coralline; Mr. E. Lovett, ova of shore crab, *mactra glauca* striated boulder from river Wansbeck; Mr. W. L. Sarjeant, quill of porcupine stained, skeleton larva under polarised light; Mr. A. D. Taylor, section of cactus, shewing spines.

Ordinary Meeting, Nov. 17th, 1880.

JOHN FLOWER, M.A., F.Z.S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

The following gentlemen were balloted for and elected:—Mr. Francis Thompson, jun., Mr. Nathaniel Bogle-French, Mr. W. F. Footit, Mr. W. Topley, F.G.S., and Mr. Charles Price Turner.

The PRESIDENT announced that Mr. P. Crowley had presented to the Club a copy of Professor Bell's new edition of Gilbert White's *Natural History of Selborne*, also three volumes (for 1867, 1868 and 1873) of Professor Symons'

work on "British Rainfall," and the thanks of the meeting were accorded to Mr. Crowley for these gifts.

Mr. E. LOVETT exhibited and described a *female* of the Drinker Moth (*O. potatoria*) which he had bred from a caterpillar, and which had all the distinctive colouring of the *male* of that species. He also exhibited and described male and female specimens of the same moth, with the normal colouring peculiar to the sexes.

Mr. ALFRED TYLOR, F.G.S., read a paper on "Colourization in Animals," illustrated by a number of skins of various animals, and by numerous diagrams. After calling particular attention to the details and peculiarities of the skins exhibited, he contended that their colours were regulated chiefly by certain laws of "Emphasis" and "Symbolism," and that it was only in a secondary degree that they were made subservient to the purposes of protection or sexual excitement.

Mr. ALFRED RUSSEL WALLACE, in commenting upon the views expressed by Mr. Tylor, said the subject which he had introduced was so vast that it would require an entire evening to go into it fully. It happened that he had a theory of his own, which did not agree with Mr. Tylor's, and he could not very well express his views without referring to this theory. In order to explain the great varieties of colour which are to be seen in nature, it is necessary, in the first place, to consider the physical nature and origin of colour, for that is the foundation of the whole matter. It is now generally held that the colour of natural objects is a subjective phenomenon. The objects themselves are devoid of colour, but they each absorb some of the different coloured rays of which white light is composed, and reflect the other rays, and the object appears to be of the colour of the rays or mixture of rays which it reflects. Thus green objects absorb the red rays and reflect the yellow and the blue, whilst purple objects absorb the yellow and reflect the red and the blue. The rays which each particular object will absorb and reflect will depend upon the nature and constitution and size of the molecules of which it is made up; and any alteration in these, from any cause, will probably produce a corresponding alteration in the colour.

As there is every conceivable variety in the molecular structure of different bodies in nature, there is, necessarily, every variety of colour. Some colours, or groups of colours, are much more abundant than others, but, as a rule, in the animal world, obscure colours predominate.

Mr. WALLACE stated that the conclusion at which he had arrived was, that, primarily, there is no reason why any animal should be of any particular colour. It may be of any colour, and as a matter of fact, every possible variety of colour does exist in

nature. But the particular colour which any particular animal possesses, is the result of an infinite variety of secondary causes which render certain colours useful and other colours hurtful to the animal. In birds, and in some other animals, the brilliant colouring of the males is usually most intense in the breeding season, when the animal is in the fullest vigour. But the one thing of all others which most affects the development of colour is the need of protection or concealment. Almost all animals need concealment because they have enemies, and those which are too powerful to fear any enemies still need concealment to enable them to catch their prey. If there were no need for protection and concealment, the beautiful colours of tropical birds, instead of being exceptional, would probably be the rule, and there would be brilliant colours throughout nature. The large Felidæ afford good instances of the advantages to animals of particular colouring. The Ounce for instance, which passes much of its time in trees, is spotted, and for this reason cannot be easily seen amongst the foliage of trees. The Tiger, on the other hand, which lives mostly in jungle and tall grass, and is never seen in trees, is striped, and so nearly resembles the grass and jungle in colour, that in it it is quite invisible at a short distance. In a similar way animals that frequent trees of different kinds do not acquire the colour of any tree in particular, whilst animals that frequent only one kind of tree, as a rule, acquire the colour of the tree which they frequent. The same law of concealment applies to birds. The bright colours of birds are principally on the breast, where they would not be seen when the birds are sitting on their nests or perched on trees, except from underneath. The reason why tropical birds have so much colour is that the vegetation is abundant and the forests dense, and hence there is less need for concealment. It is supposed by a good many people that brilliancy of colour is due to the intensity of the sun, but that is a mistake, because in the desert, where the sun is strongest, animals, as a rule, are of the colour of the sand. Mr. Wallace further disputed the theory that brilliancy of colour depends on rapidity of motion, remarking that wings of birds have generally little brilliancy of colour in them.

Dr. HENRY WOODWARD, F.R.S., supported the views expressed by Mr. Wallace, and fully concurred in his opinion that the colour of animals was mainly determined by the necessity for concealment. In connection with this subject he mentioned that in Sir Thomas Fowell Buxton's coverts in Norfolk, white varieties of the common Pheasant were encouraged, and were, in consequence, rather numerous. The gamekeepers, however, did not like them, because, from their

conspicuous colouring, they attracted all the "vermin" in the neighbourhood, and the gamekeepers had great difficulty in preserving them from the attacks of Weasels and Stoats, and Birds of Prey.

Referring to what Mr. Wallace had said as to the colours of male animals being often brightest when they were most vigorous, he mentioned that at his own house he had an aquarium which contained a number of Sticklebacks which were preparing for spawning. The males were brilliantly coloured, but, being very pugnacious, were constantly fighting, and, as each of these was beaten his bright colours faded or disappeared. One of the larger males for a long time held his own against the others, but at last he was beaten, and then his colours also faded.

The PRESIDENT added some remarks as to the object of the gorgeous plumage of the males of some species of birds at the breeding season, and described the way in which the males make use of their brilliant colours at this season, which seemed to prove that the real object of the colours is to enable the male to attract and to excite the female. He also referred to a subject which he thought had not received the attention which it seemed to deserve. In some of the species of Gallinaceous birds, such as the Common Pheasant, the female occasionally assumes the brilliant plumage of the male. Sometimes this assumption is complete, and the female becomes exactly like the male, except perhaps that its colours are not quite so bright; whilst in others only a very slight amount of the male colouring is taken. Between these two extremes, it would be possible, he believed, to find every intermediate grade. This seems to show that the plumage of the male is not, as might be supposed, a dress essentially distinct in its nature from the plumage of the female; but that they are both, in all essentials, the same, and that the gorgeous colours of the male may be produced by a gradual modification of the more sober colours of the female. Mr. Flower also mentioned and described some very remarkable instances of protective colouring in birds.

Mr. TYLOR, in reply, whilst fully admitting the importance and advantage to animals of protective colouring, pointed out that this did not in any way affect the theory which he had advanced, that the external markings of animals corresponded with their internal structure, nor did it explain why the colouring was almost invariably regular and symmetrical.

The following objects were exhibited:—J. Berney, small moth; W. J. Fuller, head of horse fly in fluid; H. M. Klaassen, pigment cells in skin of fish; E. Lovett, exuviated skin of chameleon; also sand tubes of *Pectinaria belgica*, from The

Nore; W. Low-Serjeant, pond life; also nail embedded in oak; A. D. Taylor, gold tail moth—*Porthesia auriflua*; A. Warner, pediculus pubis about to cast its skin; E. Straker, dried specimens of thirty-seven species of plants in flower gathered in the present month.

ELEVENTH ANNUAL SOIREE.

Held on Wednesday, November 24th, 1880.

This was held, as in past years, in the Large and Small Public Halls. 146 members and 675 visitors were present, making a total of 821. 163 microscopes were exhibited.

The stage was again beautifully decorated with a choice collection of plants from the conservatories of Mr. Philip Crowley, and the walls of the large hall were hung with a series of valuable drawings from the collection of Mr. Geo. Butterworth. The music performed during the evening was under the direction of Mr. Geo. Webb.

Among the numerous objects exhibited were a large and varied collection of shells which were sent by the President, and a large and very fine collection of Humming Birds exhibited by Mr. W. F. Footit. The latter, which occupied nearly the whole of one side of the small Hall, from the great brilliancy of their colours, deservedly attracted a great deal of attention.

In the Old School of Art Room a set of Crookes' Radiant Matter Tubes, kindly lent by Mr. L. P. Casella, of London, were exhibited by Mr. T. Cushing, and were very ably described by him from time to time during the evening.

Mr. E. Lovett exhibited about 250 specimens of British Stalk Eyed Crustacea, obtained and prepared by himself, and the Rev. E. W. Field an interesting collection of seals and brasses. Mr. H. M. Klaassen exhibited a chameleon, sent by Mr. John H. Ley; also, a collection of mosses, ferns, and lichens under a large graphoscope, and specimens of Alpine plants, with English plants of the same genus. Mr. A. F. Sealy, of Cambridge, exhibited a complete collection of British Butterflies; and collections of Lepidoptera were also shewn by Mr. J. Berney, the Rev. E. M. Geldart, and Mr. H. A. Auld. Mr. A. D. Taylor exhibited a micro-aquarium; Mr. Alfred Russel Wallace a number of interesting objects of Malay manufacture; Mr. E. W. Foss, a number of objects from Japan; Mr. A. Barker, Zulu weapons, dresses, and ornaments. Mr. A. H. Hinton sent a collection of chalk fossils; Mr. John Drage, a case of birds obtained at the Lizard Point, Cornwall; Dr. Morton, a collection of shells; and Mr. T. D. Russell, a