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PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

FROM NOVEMBER 1892 TO JUNE 1893.

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PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

(SESSION 1890-91.)

November 6th, 1890.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Alfred Taylor, Esq., was elected a Fellow.

The President announced that a selection of 58 volumes had been received from the Library of the late Mr. John Ball, a Fellow of the Society, and that an appropriate label had been placed in each of them in commemoration of the donor.

Mr. E. M. Holmes exhibited and made remarks on some little-known seaweeds, including *Monostroma Blythii* and *Capsosiphon aureolus*, collected at Taymouth and on the Devonshire Coast.

Mr. George Murray exhibited and described the peculiarities of some Galls of *Rhodymenia*.

Prof. Geo. Bond Howes exhibited a specimen of *Lima hians*, with a byssus "nest" which it had spun in 21 days in a vessel of sea-water in which it had been placed. Although constantly watched by day and night, the act of spinning had not been observed. (See Appendix, p. 30.)

On behalf of Mr. J. W. Willis Bund, Mr. Harting exhibited and made some remarks upon a South Pacific Petrel (*Œstrelata torquata*, Macg.), which had been shot in Cardigan Bay in December 1889.

On behalf of Prof. Martin Duncan, who was unable to be

present, Mr. W. Percy Sladen exhibited two microscopic preparations of the ambulacral ampullæ of Echini, showing that each ampulla is supplied by one offshoot from the main ambulacral water-vessel. (See Appendix, p. 30.)

Mr. Harting exhibited a specimen of the Baltimore Oriole (*Icterus Baltimore*), which had been lately obtained at Balta Sound, Shetland, but which he regarded as an escaped cage-bird.

The following paper was read:—

"A Contribution to the Study of the Relative Effects of different parts of the Solar Spectrum on the Assimilation of Plants." By the Rev. Prof. Henslow, M.A., F.L.S.

November 20th, 1890.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

João Francisco Braga, Esq., and the Rev. Edmund M'Clure were elected Fellows.

Mr. George Murray exhibited specimens of a freshwater *Delesseria* (*D. amboinensis*) previously unknown.

On behalf of Mr. Henry Hutton, of Cape Town, Mr. B. Daydon Jackson exhibited some follicles and seeds of a somewhat rare Asclepiad (*Dregia floribunda*); and showed also, on behalf of Mr. W. Matchwick, some ripened fruits of *Ailanthus glandulosa* from a tree at Reigate, said to be 100 years old.

Prof. F. O. Bower exhibited several drawings of microscopic sections of Carboniferous Fern sporangia, belonging to Prof. Williamson, and pointed out the peculiarities of their structure and the singular uniformity of type which they exhibited. For comparison with them he also showed sections of the sporangia of *Todea barbara*; and while hesitating to refer them to any distinct genus, he thought that their Osmundaceous affinity was unmistakable.

Mr. J. E. Harting exhibited some original MSS. and water-colour sketches of birds, fishes, and plants found in Sussex by William Markwick, the friend and correspondent of Rev. Gilbert White, of Selborne, which had been presented by him to the Society in his lifetime, and had been lost sight of for many years. The drawings were sufficiently well executed to enable the correct determination of several species which the author had failed to identify.

The following papers were read :—

1. "On a brown Seaweed (*Punctaria*, Grev.)." By Prof. T. Johnson, F.L.S.

2. "On a Variety of *Alectona Millari*." By A. Vaughan Jennings, F.L.S.

December 4th, 1890.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Surgeon-Major Arthur Barclay, Richard Bentley, Esq., William Brown, Esq., William Ambrose Clarke, Esq., Walter Gill, Esq., Charles M'Rae, Esq., William Henry Miskin, Esq., Henry George Plimmer, Esq., and Henry Williams, Esq., were elected Fellows.

The President exhibited some eggs of the Shell Slug (*Testacella haliotidea*), and briefly described the habits and mode of feeding of this mollusk. He also delineated and described the feeding-tract of the Snail (*Helix aspersa*).

Mr. F. J. George exhibited an autumnal flowering form of *Mercurialis perennis* with stems 4 feet in length, which he had found at Preston, Lancashire.

Mr. R. A. Rolfe exhibited and made some remarks on a coloured drawing of *Cycnoches Rossianum*, showing both male and female inflorescence on the same pseudo-bulb.

Mr. J. E. Harting exhibited an immature example of Bonaparte's Gull (*Larus philadelphia*, Ord), of North America, which had been shot on the Cornish Coast at Newlyn on the 24th October last.

Mr. T. Christy exhibited and made remarks on some Coca Leaves which had been forwarded from an East-Indian plantation, and were found to be superior to any received from South America.

Mr. John R. Jackson exhibited some native implements used on the West Coast of Africa in the preparation of the astringent substance known as Gambir.

The following papers were read :—

1. "On the Genus of Orchids, *Bromheadia*." By Henry N. Ridley, M.A., F.L.S.

2. "On the Vegetation of British Beluchistan." By J. H. Lace, F.L.S., and W. B. Hemsley, A.L.S.

December 18th, 1890.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Rev. Thomas W. Fyles, August Wilhelm Kappel, Esq., Seth Lister Mosley, Esq., Reginald W. Phillips, Esq., Allan Peter Swan, Esq., and Wilfred Mark Webb, Esq., were elected Fellows.

Prof. T. Johnson exhibited and made remarks upon the male and female plants of *Stenogramme interrupta*.

Mr. Clement Reid exhibited specimens of *Helix obvoluta* from new localities in Sussex; and, by the aid of a specially prepared map, traced the present very local distribution of this mollusk in England.

Mr. E. M. Holmes exhibited some examples of Galls formed in *Styrax Benzoin* by an Aphis, *Œtegopteris styracophila*. He also exhibited and described some new British Algæ, *Mesoglœa lanosa* and *Myriocladia tomentosa*.

The following papers were read:—

1. "On the Structure and Development of the Cystocarps in *Catanella Opuntia*." By R. J. Harvey Gibson, F.L.S.
2. "On the Effect of Exposure on the Relative Length and Breadth of Leaves." By Geo. F. Scott Elliot, F.L.S.

January 15th, 1891.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Leopold Field, Esq., Edwin Stephen Goodrich, Esq., Hugh Sidney Streatfeild, Esq., John Symons, Esq., and Dr. Charles Wilson were elected Fellows.

The President exhibited a bunch of holly berries, the middle zone of which was remarkable for being perfectly black instead of red, but which in no other respect looked abnormal. The peculiarity was attributed to the effect of a fungus.

Mr. J. E. Harting exhibited a male specimen of the Wigeon (*Anas Penelope*), which had been shot in Ireland, and had a tassel of feathers about an inch in length depending from the under side of the neck. The explanation suggested was that it was the result of a former shot-wound, when the pellet, as often happens, plugged the wound with feathers, and the skin had grown round and below the obstruction.

The following papers were read:—

1. "On certain points in the Morphology of the Cystidea." By P. Herbert Carpenter, D.Sc., F.L.S.

2. "A Botanical Visit to the Lord Auckland and other Antarctic Islands." By Thomas Kirk, F.L.S., in a letter communicated by Sir J. D. Hooker.

February 5th, 1891.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

T. F. Bourdillon, Esq., Capt. Christopher Theodoe Pacey Keene, and Prof. A. Milnes Marshall, were elected Fellows.

Thomas Hughes Buffham, Esq., was elected an Associate.

The vacancy among the Foreign Members, caused by the death of Dr. Alexander von Bunge, having been announced by the President, the following nomination was read, and the Certificate ordered to be suspended:—

Prof. Carl Cramer, Stattehofen, Adlerburg, Zürich, author of numerous and important papers on Cryptogams, especially Algæ.

Mr. Clement Reid exhibited and described some recent additions to the fossil Arctic flora of Britain.

Mr. Thomas Christy exhibited and made remarks on some specimens of honey:—(1) "Arbutus honey" from Turkey, said to produce great drowsiness and sleep; (2) "Eucalyptus honey" from Mount Barker, Adelaide, said to possess valuable therapeutic qualities; and (3) the so-called "Wool honey" from the Euphrates, collected by natives from the leaves of the oak, which would be more properly termed "honey dew," being formed by Aphides and not by Bees.

Mr. J. E. Harting exhibited a living albino example of the Common Frog (*Rana temporaria*), captured in Wiltshire in September last, and remarked upon the infrequency of albinism amongst the Batrachia and Reptilia, of which he had only been able to find four or five recorded instances.

The following papers were read:—

1. "The Tree-Ferns of Sikkim." By J. Gammie, Jun. (Communicated by C. Baron Clarke, M.A., F.L.S.)

2. "A Revised Classification of the Tunicata." By Prof. W. A. Herdman, F.L.S.

3. "Hermaphrodite Genitalia of the Codfish." By Prof. George Bond Howes, F.L.S.

February 19th, 1891.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Frank Hill Perry Coste, Esq., Herbert Jones, Esq., and Alexander Horsburgh Turnbull, Esq., were elected Fellows.

The President then read the following proposed alterations in certain Bye-Laws, to be submitted to the Fellows for approval on March 19th :—

CHAP. I. SECT. 4.

Each Certificate of Recommendation of a Candidate for election as Fellow shall be read at a General Meeting of the Society, and then hung up in the common meeting room, with the date on which it was read written thereon, for two further meetings at least, before the date appointed for the ballot.

CHAP. I. SECT. 5.

No more than thirty persons shall be elected as Fellows in any one year. The election shall take place at the General Meeting held on the first Thursday in May. The balloting list shall contain the names of all the Candidates, arranged in the order in which they shall be received, and a copy shall be supplied to every Fellow present at the meeting who shall apply for it. Each Fellow voting shall put a mark opposite the name he desires to vote for, and shall place his list so marked in the balloting glass, which shall remain open until half-past Eight o'clock. If any Fellow shall vote for more than thirty names, his voting-paper shall be invalid. When the ballot is closed the President, or Chairman, shall appoint three or more scrutineers to examine the lists and to report the result to him, whereupon he shall declare the same, and he may in case of need order a further ballot or ballots. No person shall be declared to be elected a Fellow unless he have in his favour a majority of the Fellows voting. The Certificate of an unsuccessful Candidate may be resuspended on the written request of one of his proposers.

Proposed Addition to the foregoing Section.

After the words "arranged in the order in which they shall be received," add :—

"and an asterisk shall be placed opposite the names of those thirty Candidates whom in the opinion of the Council it is most desirable to elect into the Society."

CHAP. VIII. SECT. 3.

That "half-past three" and "four" be substituted for "four" and "half-past four," as the time for closing the ballots for Council and Officers respectively.

CHAP. VIII. SECT. 5.

To be rescinded, and the following substituted:—

V. Each Fellow voting shall place his balloting list or lists in the respective glasses.

Mr. Thomas Christy exhibited a number of food-nuts utilized by the natives of North Queensland, the species of which had not been determined, since neither flowers nor foliage of the trees producing them had been obtained.

On behalf of Mr. Arthur Roope Hunt, the Secretary exhibited a curiosity in the shape of an orange within an orange, and remarked that a similar abnormality had been described and figured by Dr. Perrier (Bull. Soc. Linn. Normand. ix. tab. 2).

The following papers were read:—

1. "The Dillenian Herbarium at Oxford." By George Claridge Druce, F.L.S.
2. "On a Self-fertilizing Hermaphrodite Trout." By Charles Stewart, Pres. Linn. Soc.
3. "Some points in the Life-history and Rate of Growth of Yew Trees." By Dr. John Lowe, F.L.S.

March 5th, 1891.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Thomas Butler Cato, Esq., and the Rev. Edgar Norman Langham were elected Fellows.

The alterations in the Bye-Laws proposed by the Council to be submitted to the Fellows at the next Meeting on March 19th were read the second time from the Chair.

Mr. D. Morris exhibited a dwarf species of *Thrinax*, which he found growing plentifully in the Island of Anguilla West Indies, and was apparently undescribed.

Mr. Thomas Christy exhibited the fruit of some undetermined species of tree which had been introduced into commerce by the name of Monchona, but the origin of which had not been ascertained.

Mr. J. E. Harting exhibited several instantaneous photographs (taken by Mr. W. H. St. Quintin in Yorkshire) of a living Great Bustard (*Otis tarda*), and gave a brief account of the recent visitation of several of these birds to England. Between December 9th and February 5th no less than seven had been shot in Norfolk, Suffolk, Essex, Sussex, Hants, Wilts, and Carmarthenshire.

The following papers were read:—

1. "A Morphological and Systematic Account of the Fucaceous Genus *Turbinaria*." By Miss E. Barton. (Communicated by Dr. Dukinfield H. Scott, F.L.S.)

2. "On a new Species of *Caulerpa*, with observations on the position of the Genus." By Geo. R. M. Murray, F.L.S.

3. "On the Genus *Lerneonema*, a Parasitic Crustacean." By Dr. John Lowe, F.L.S.

March 19th, 1891.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

John Hagger, Esq., the Rev. William Ross, and William Dickerson Wickes, Esq., were elected Fellows.

The President announced that the sense of the Meeting would be taken by ballot on the proposed alteration of certain Bye-Laws, of which due notice had been given as prescribed by the Charter of the Society, these alterations having been also read at the two preceding Meetings of the Society; and after explaining their nature and object, he invited those present to express their opinion. A discussion followed in which twenty-two of the Fellows took part; and on the votes being counted, it was found that the alterations proposed in respect to Sections 4 and 5 of Chapter I. of the Bye-Laws were not confirmed. Those relating to Sections 3 and 5 of Chapter VIII. were confirmed as follows:—

Chap. VIII. Sect. 3. That "half-past three" and "four" be substituted for "four" and "half-past four," as the time for closing the ballots for Council and Officers respectively.

Chap. VIII. Sect. 5. To be rescinded, and the following substituted:—

Sect. 5. Each Fellow voting shall place his balloting list or lists in the respective glasses.

The following papers were read:—

1. "Researches on Earthworms of the Genus *Lumbricus*." By Rev. Hilderic Friend, F.L.S.

2. "Hemiptera and Heteroptera of Ceylon." By W. Forsell Kirby, F.L.S.

April 2nd, 1891.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Rev. Prof. Henslow exhibited specimens of *Oxalis cernua*, Thunberg, a native of the Cape of Good Hope; and gave an account of its introduction into the countries bordering the Mediterranean, and the Canaries and Madeira, tracing its present northern distribution. (See Appendix, p. 31.)

Mr. A. Barton Rendle, having examined the specimens of "Monchona" exhibited by Mr. Christy at a previous Meeting, expressed the opinion that this trade product was the preserved fruit of a palm, belonging to a species apparently undescribed. It was stated somewhat vaguely by the importer to have come from the South Pacific. Mr. Rendle also exhibited another specimen of an orange within an orange, which differed from that shown at a former Meeting, in that the inner orange possessed a rind, and was not entirely enveloped by the outer one.

The President exhibited an abnormal specimen of a butterfly (*Gonepteryx Rhamni*) possessing five wings, or two hinder ones on one side.

The following papers were read:—

1. "On Variation in the Floral Symmetry of certain Plants having Irregular Corollas." By W. and Anna Bateson. (Communicated by Francis Darwin, F.L.S.)

2. "On two new Genera of Orchids from the East Indies." By H. N. Ridley, M.A., F.L.S.

April 16th, 1891.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

William Duppa Crotch, Esq., Joseph Alfred Hill, Esq., Walter Bessemer Longsdon, Esq., Dr. James Oliver, and Arthur Smith Woodward, Esq., were elected Fellows.

The President announced that the following Auditors to examine the Treasurer's accounts had been nominated by the Council:—

For the Council { Dr. Dukinfield H. Scott.
Dr. John Meiklejohn.

For the Fellows { Mr. John Jenner Weir.
Mr. Ernest Clarke.

And by a show of hands these were elected.

The following papers were read :—

1. "On Lichens collected in Victoria." By the Rev. F. R. M. Wilson. (Communicated by William Carruthers, F.R.S., F.L.S.)

2. "On the Life-history of two Species of *Puccinia*." By Surgeon-Major Arthur Barclay, F.L.S.

May 7th, 1891.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The proposed sale of the Society's Carpological Collection to the Science and Art Department for the sum of £20 was submitted for the approval of the Fellows, and was carried by show of hands.

Marc Arnold Ruffer, Esq., was elected a Fellow, and Dr. Carl Cramer was elected a Foreign Member.

A panoramic arrangement for displaying drawings at Biological Lectures was exhibited for Prof. R. J. Anderson.

Mr. John Young exhibited a nest of the Bearded Titmouse (*Calamophilus biarmicus*), which had been built in his aviary. Several eggs were laid, but none of them were hatched.

The Rev. E. S. Marshall exhibited several specimens of a *Cochlearia* from Ben More, in Assynt, believed to be undescribed.

Mr. Robert Drane forwarded for exhibition a plant of the rayless Daisy found growing abundantly in the neighbourhood of Cardiff; and an undetermined sponge dredged in about 40 fathoms off the coast of South Wales.

Mr. D. Morris drew attention to a Jamaica Drift Fruit recently found on the coast of Devonshire. Although figured so long ago as 1640 by Clusius, and subsequently noticed by other observers, the plant yielding it had only lately been identified by Mr. J. H. Hart, of Trinidad, as *Sacoglottis amazonica*. Mr. Morris likewise exhibited specimens of the fruit of *Catostemma fragrans*, received for the first time from St. Vincent, showing its true position to be among the Malvaceæ, tribe Bombaceæ.

Mr. Thomas Christy exhibited some Kola nuts, and made remarks on the medicinal properties attributed to them.

The following paper was then read and discussed :—

"Anatomy of the Mesostomata.—Part I. *Pterygotus* and *Slimonia*." By Malcolm Laurie, F.L.S.

May 25th, 1891.

Anniversary Meeting.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Treasurer presented the Annual Statement of Accounts duly audited, as shown on p. 12.

The Secretary read his Report of the deaths, withdrawals, and elections of new Fellows for the past year as follows:—

Since the last Anniversary Meeting the deaths of 18 Fellows had been reported, or their deaths been ascertained, viz.:—

James Backhouse.
Peter Hinckes Bird.
William Hope Boulth.
Thos. Rich. Archer Briggs.
Alfred J. Burrows.
W. Sweetland Dallas.
Rev. John Downes.
Charles H. Fawcett.
Robert Garner.
Henry Groves.
Robert Mason.
W. Kitchen Parker.
Houghton Perkins.
Theodore Rathbone.
Clifford Winslow Turner.
John Way.
Tuffen West.
Benjamin S. Williams.

Foreign Members (3).

Prof. Alexander von Bunge.
Prof. Carl Johann von Maximowicz.
Prof. Carl von Naegeli.

During the past official year 5 Fellows had withdrawn, viz.:—

Kenric Harold Bennett.
George Thomas Bettany.
C. Laurence Bradley.
George F. Dowdeswell.
Rev. Paul William Wyatt.

Five had been struck off for non-payment of arrears, and 38 Fellows and one Foreign Member have been elected.

During the past year there had been received as Donations from private individuals to the Library 116 volumes (including 58 from the Library of the late Mr. John Ball) and 156 pamphlets and separate impressions of memoirs.

From the various Universities, Academies, and Scientific Societies there had also been received in exchange and otherwise 225 volumes and 101 detached parts, besides 46 volumes and 6 parts obtained by exchange and donations from the editors and proprietors of independent periodicals.

Receipts and Payments of the Linnean Society, from May 1st, 1890, to April 30th, 1891.

Receipts.	£	s.	d.
Balance at Bankers' on 1st May, 1890	335	4	9
Interest on Investments	212	17	10
Admission Fees	258	0	0
Annual Contributions	1450	0	6
Compositions	180	0	0
Sales of Publications:—			
Transactions £74 5 7			
Journals 175 6 3			
Proceedings and Catalogues 0 2 6			
	249	14	4
Donations	80	6	9
	£2766	4	2

Payments.	£	s.	d.
Taxes and Insurance	19	1	3
Repairs and Furniture	69	3	8
Coals and Gas	58	12	7
Salaries	593	18	4
Library:—			
Books £208 9 7			
Binding 79 1 8			
	287	11	3
Expenses of Publications:—			
Printing £556 18 5			
Illustrations 342 12 2			
Distribution 70 11 1			
	970	1	8
Miscellaneous Printing and Stationery	56	1	2
Petty Expenses (including Tea and Postage)	113	0	9
Investments	180	0	0
Balance at Bankers' on 30th April, 1891	418	13	6
	£2766	4	2

Investments on the 30th April, 1891.

	£	s.	d.
Consols, 2¾ per cent.	4453	10	5
Metropolitan 3½ per cent. Stock	1182	2	5
Great Indian Peninsula Railway 5 per cent. Guaranteed Stock	1086	15	0
Forth Bridge Railway 4 per cent. Stock	553	10	0
	£7275	17	10

FRANK CRISP, *Treasurer.*

21st May, 1891.

Audited and found correct. { C. STEWART, JOHN W. S. MEIKLEJOHN, ERNEST CLARKE, J. JENNER WEIR, D. H. SCOTT, W. PERCY SLADEN. } *Auditors.*

The Council, on the recommendation of the Library Committee, had sanctioned the purchase of 168 volumes and 104 parts of important works.

The total additions to the Library were, therefore, 555 volumes and 367 separate parts.

The following was the number of books bound during the last year:—In half-morocco 218 volumes, in half-calf 6 volumes, in full cloth 117 volumes, in vellum 25 volumes, in buckram 15 volumes, in boards or half-cloth 11 volumes, rebacked (half-morocco and cloth backs) 19 volumes, relabelled 25 volumes. Total 436 volumes.

The Senior Secretary having read the Bye-Laws governing the elections,—

The President opened the business of the day, and the Fellows present proceeded to ballot for the Council and Officers.

The Ballot for the Council having been closed, the President appointed Mr. H. T. Stainton, Mr. E. Morell Holmes, and Mr. Herbert Druce to be Scrutineers, and the votes having been counted and reported to the President, he declared the following members to be removed from the Council, viz.:—Mr. John Gilbert Baker, Mr. William Carruthers, Prof. P. Martin Duncan, Mr. Edward B. Poulton, and Dr. Dukinfield H. Scott; and the following to be elected into the Council, viz.:—Mr. Charles Baron Clarke, Prof. George Bond Howes, Mr. Arthur Lister, Dr. St. George J. Mivart, and Prof. Francis Wall Oliver.

The Ballot for the Officers having been closed, the President nominated the same Scrutineers, and the votes having been counted and reported, he declared the result as follows:—

President, Prof. Charles Stewart.
Treasurer, Mr. Frank Crisp.
Secretaries, Mr. B. Daydon Jackson. Mr. W. Percy Sladen.

The President then delivered his annual Address (his remarks being illustrated by cartoons in pastel), as follows:—

Gentlemen,—I propose to offer you some remarks on "Secondary Sexual Characters"; by secondary I mean, of course, those features by which different sexes often may be distinguished, but which are not concerned in reproduction. I intend to deal with this question by taking examples from different groups of plants and animals, beginning with the lowest. I have been induced to select the above subject, as it receives illustration from both plants and animals, and might in consequence prove of interest to all sections of our Fellows.

Amongst the lower Algæ perhaps the most instructive example

to be found is that of the well-known *Œdogonium ciliatum*. During the time of its active vegetative growth the series of cells of this Alga, which are of considerable dimensions, are green from the presence of chlorophyll. At this time the filaments increase in number by ciliated zoospores, each formed by the entire contents of one of the cells. As the conditions become less favourable for vegetative activity, the zoospores give origin to two forms of filaments; of these one is distinguished by its small diameter, the shortness of its constituent cells, and the yellow colour presented by its endochrome. The protoplasm of certain of the cells divides into two, each becoming ciliated, constituting androspores. We have in these filaments the assumption, to a certain extent, of male characters. Besides these, there are others which in general appearance closely resemble the last described, but which, instead of forming zoospores, possess certain cells which increase in dimension; such cells constitute oospores. Near the future orifice of these cells one of the androspores settles, and grows into a minute male filament of three cells only; the protoplasm of the larger of the three cells breaks up into antherozoids, on the further development of which it is perhaps not necessary to dwell.

The noticeable points of this case are the assumption of sexual characters on the approach of adverse conditions; the small size, and relative absence of chlorophyll, in the male; and the possession of normal secondary sexual male features by the asexual filament which produces the androspores.

If we now turn to the higher Algæ, "Carposporæ," we find a good example in *Callophyllis laciniata*, for an opportunity of examining which I am indebted to Mr. E. M. Holmes. We shall see that the male is relatively small and pale in colour, with the sexual organs, the antheridia, along the borders of the thallus. The male is exceedingly rare; the female is much larger and altogether more robust in texture, thicker, and much deeper in colour.

Among the Hepaticæ we have *Metzgeriopsis pusilla*, where we find the thallus producing at certain points male, and at others female branches. If we examine the male branch, the leaflets will be found relatively small, and bearing antherozoids on the surface facing the stem; in the female branches, however, the leaflets are larger, with their margins often produced into spine-like points, and with archegonia near their bases, gemmæ being often found at various points near their margin. All the features, then, of the female branches show greater vigour.

In the higher mosses, *Mnium affine* has the male branches of a paler colour, from their possessing less chlorophyll and fewer leaves than the female; the latter is more robust, has more closely crowded leaves, which are darker in tint and form conspicuous tufts at the free end. Much the same characters are presented by *Leucobryum glaucum*, *Dicranum scoparium*, &c. In

certain species of *Sphagnum*, such as *S. subsecundum*, the male branches are commonly more slender, and in distinct tufts from the female; the individual branches of the male which actually bear the antheridia are commonly larger than the archegonia-bearing branches.

Amongst Equisetaceæ the male prothallus is always much smaller than the female. This may in part be due to the growing oospores in the latter being for some time dependent upon it for their nourishment; again, in the Heterosporeæ, such as *Selaginella*, it is the female which is the larger, and the male which is smaller.

Turning now to the flowering plants, one finds, as in the others, that though many show no such characters, yet, where secondary characters are present, it is the female in which vegetative vigour is most marked. In the Australian grass, *Buchloë dactyloides*, a slender graceful male is found, whereas the female is of coarse-leaved, rank growth, the two having long been referred to distinct species. In another Australian grass, *Spinifex hirsutus*, much the same characters are present, but the female is still less like the male, owing to the immense development of the leaves at the extremity of its flowering stem, forming a tuft, often exceeding a foot in diameter.

In *Vallisneria spiralis* the male plant is again usually much smaller than the female, although its flowering stem produces many flowers, in distinction to the single one borne by the female form. In *Asparagus*, though flowers are always somewhat inconspicuous, the perianth of the male is the larger, although the leaves generally are still more slender and the plant altogether smaller than the female. In *Ruscus aculeatus* also the leaf-like branches in the female are more narrow, but compensate for this by their greater abundance.

In the interesting *Ficus subulata*, an Indian species of fig, there is a marked difference between the sexes, the male being an erect shrub growing on the ground, whereas the female is a semiscandent epiphyte, exceedingly different in appearance.

Amongst the Orchideæ, from the time of Darwin and even earlier, marked differences between the male and female flowers have attracted great attention, and since for years a plant may produce racemes of either male or female flowers alone, the two sexes have often been spoken of as belonging to different genera. In the genus *Catasetum* we find excellent examples of this condition; the female branchlets are usually more robust, bearing fewer flowers, which, with the stem, are more or less of a predominant green colour. The male flowers, borne on a more slender stem, are more numerous, and, with the stem, have commonly some more conspicuous colour, such as red or other vivid tint.

Cannabis indica well displays the prevailing sexual characters of plants, the male plant being smaller, both as to leaves and

stem, than the female, and I am informed by Mr. E. M. Holmes that the male plant is generally found in the more outlying sterile portions of the fields. This suggestive feature may be observed in the common hop, *Humulus Lupulus*, in which the female is larger, and the male similarly situated in the more sterile regions.

If we now take some example from the animal kingdom, we shall find more varied features presented by the male and female respectively, there being far more disturbing influences at work than is the case with the more simple plant. Amongst Rotifers, as, for instance, in *Brachionus ursularis*, the male is often not more than a sixth of the length of the female, and is little more than a locomotive reproductive machine, it having no alimentary canal, and its life of necessity being exceedingly brief, though very active whilst it lasts, being spent in rapidly darting through the water in search of its mate. The eggs from which the male and female respectively emerge are exceedingly different, the male ova being rounded and not more than half the diameter of the oval eggs of the female, and also being five times more numerous. Again in Crustacea, amongst Isopods, we find some extreme differences following the usual rule. In *Anceus maxillaris* the male is smaller, with legs far more developed and more hairy than the female, and with powerful predaceous jaws; in the female the last three segments of the cephalothorax are greatly distended to lodge the ova, and the mouth-parts are of a simple suctorial character, the limbs being feeble. In the common *Bopyrus squillarum*, so often found in the gill-chamber of prawns and shrimps, the male is almost microscopic in dimensions, less than a millimetre, and spends its life as a parasite attached to near the genital orifice of its relatively gigantic mate, which is about half an inch in length, or about twelve times the length of its partner. There is a curious exception met with in the Isopods, nor am I able to interpret the exception; it is that of the common *Lygia oceanica*, in which the male exceeds the female by one third, although the female, as in other Isopods, has not only to carry her eggs, but also her young, when each is about three millimetres in length. In Amphipods the differences between the sexes are often found to be very great, and have led to numerous mistakes, the male being usually hairy and bearing more specialized limbs, probably to assist in grasping the female. For instance, *Aora gracilis* is the male of *Microdeuteropus anomalus*, and *Erichthonus difformis* is the male of *Dercothoë punctata*. In the Decapods a striking example is furnished by *Corystes Cassivelaunus* (the Mask Crab), the males of which species are far more numerous than the females, their chelæ being more than twice the length of those of the females. A still more extreme difference is found in the sexes in certain Cirripeds; in *Scalpellum regium* the male is not more than a millimetre in its greatest length, and, having no mouth, it is

attached as a parasite to the integument of the female, which sometimes attains the dimensions of more than four inches. The life of each male being probably brief, one may often find the dead bodies of as many as seven former husbands on each side of the female.

Amongst the Arachnida the male is usually the smaller of the two sexes. In *Arrhenurus caudatus* the male is small, more conspicuously and brilliantly coloured, with more hairy limbs, and exhibits greater activity. In the higher Spiders, perhaps one of the most instructive examples (for the knowledge of which we are indebted to Mr. and Mrs. Peckham) is known as *Astia vittata*. The male is sometimes of a uniform red colour and somewhat smaller than the female, but, besides these males, there are others in which the palpi, lateral and end portions of the cephalothorax, and the whole of the abdomen are of a rich velvety black, and with three tufts of black bristles standing up from the middle of the red upper surface of the cephalothorax. The behaviour of these two sorts of males in courtship is exceedingly different, the black variety being always more appreciated than the red male, the fore limbs of which are directed forwards parallel to the ground, whereas the black or partially black male raises himself off the ground as high as possible on the three hind pairs of limbs, the front pair being raised high in the air; the female always prefers the courtship of the last-mentioned male.

Amongst Insecta it is nearly always the male which is most conspicuous by colour or some extravagance in form, as, for instance, in Diptera, the interesting Philippine-Island forms *Phytalmia cervicornis* and *P. alcicornis*, which possess some most remarkable horn-like projections on the head; in beetles also it is the male in such forms as *Ceratorrhina Morgan* &c. which shows remarkable horn-like projections on the head, thorax, &c.; a general prolongation of the head characterizes the male of *Rhyticephalus brevicornis*. In *Acanthinodera Cumingii* the male is small and hairy, covered with light brown hairs, whereas the female is destitute of such hairs; we have again the special tufts of hairs in the males of numerous butterflies and moths, as *Calopsilia aleurona*, *Calesia dasypterus*, or the extremely developed palpi in *Mastygophora mirabilis*. As to antennæ, it is in the male that they are most developed, as in *Amphidasis prodromaria* &c. amongst Lepidoptera, and amongst Diptera *Ctenophora atrata*. In beetles *Polyphylla fullo* furnishes an extreme example.

The eyes, again, have differences, and are largest in the males; this is especially evident in *Bibio pomone* and many Tabanidæ; the mandibles also are exaggerated in such forms as many Lucanidæ. The limbs, again, may differ in the sexes, as the swollen thighs of the male in *Œdomera*, the long fore limbs of *Cyrtotrachelus*, the hind limbs of *Chrysophora*. The apterous

condition presented by so many females is associated with their other habits of concealing themselves when burdened with eggs or engaged in laying them; of these we have examples in *Nyssia hispidaria* amongst Lepidoptera, various species of *Mutilla* in Hymenoptera, and our common black-beetle amongst Orthoptera.

The wings of certain Lepidoptera are also sometimes distinguished by special lobes, as *Lobophora hexapterata*; perhaps the most extreme difference is found as regards the wings in that remarkable group of highly modified beetles belonging to the genus *Stylops*, in which the female is a limbless grub-like creature parasitic in the abdomen of bees, whereas the male is an active large-winged insect.

As regards sound-producing organs in this group, if it be confined to one sex, it is the male which possesses them, as in Cicadæ, Acridæ, &c.

Turning now to the Vertebrata, in fish it is almost invariable that the male is more conspicuous from brilliant coloration, the colours being intensified at the breeding-season. The genus *Girardinus* illustrates this very well. Special skin-appendages are found distinguishing by their presence the males from the females, as the warts on the head of the male of *Discognathus* and the special process on the head of the male of *Chimæra*. It is suggestive that the young of *Myxine glutinosa* is a male until it has attained a length of 32–33 centimetres, and then assumes the female state. In *Chrysophrys auratus* the same individual is stated to become male or female at different times of the year. Not only do the males differ from the females by such integumentary warts mentioned in *Discognathus*, but the teeth, which are essentially of dermal origin, sometimes present marked differences in the sexes, as in *Raia clavata*, in which the male has pointed teeth, whereas the female teeth are rounded for crushing.

In Amphibia the male *Triton* at the breeding-season shows the well-known immensely developed crest of skin, with the broad swimming tail and the brilliant coloration, features which distinguish it from the simpler adornment of the female. We have also the gular pouches so well developed in the male *Rana esculenta*, the glandular patch on the fore limbs of *Pelobates*, the immensely distensible subgular pouch of *Hyla arborea*, but in most Anura the male is smaller than the female. In lizards the male is commonly the larger, brilliantly coloured, and more conspicuous than the female, as we see in *Calotes nigrilabris* &c. Amongst Bats secondary sexual characters are well known, as in the special supranasal appendages of *Phyllorhina*, the gular pouch of *Taphozous longimanus*, the special gular hairs of *T. melanopogon*, the special tuft of coloured hairs with associated gland on the shoulder of *Epomophorus*, or the curious sac on the wing of *Saccopteryx*.

In Mammals the familiar crest or distensible chamber on the

head of *Cystophora cristata*, or the nasal projection of *Macrorhinus*, the spur and special glands on the hind limbs of *Ornithorhynchus* and *Echidna* may be given as tending to show some of the many differences which distinguish the males irrespective of their reproductive organs; and although it is more usual to find the male smaller, more brilliant, more active and conspicuous than the female, yet entire groups may present, in certain features, a reversal of this, the more common condition.

Mr. Herbert Druce then moved the following resolution, viz.:—"That the thanks of the Society be given to the President for his excellent address, and that he be requested to allow it to be printed." This, having been seconded by Mr. Charles Tyler, was carried unanimously.

The Linnean Gold Medal for the year was then presented to Dr. Edouard Bornet, of Paris, being received on his behalf by M. Raymond Lecomte, Secretary to the French Embassy, who made suitable acknowledgment of the honour done to his countryman, and read a letter from Dr. Bornet.

The President said:—

In presenting to M. le Docteur Edouard Bornet the Gold Medal of the Society, it is my duty, in accordance with the practice of my predecessor, to refer to the scientific works which have conferred distinction on his name. His earliest published botanical papers related to the structure and life-history of fungi and lichens, including researches on *Meliola*, on Ergot, on Ephebe, and other lichens. But it is mainly through his series of brilliant researches into the life-histories of Algæ that he has become famous. Among the best known of those are the investigations of the nature of the lichen gonidia, which led to the secure establishment of the theory of the dual nature of lichens. The part played by M. Bornet in this remarkable investigation (viz. the proof of the algal nature of these gonidia), which first opened the eyes of naturalists to the phenomenon of Symbiosis, entitles him to equal claims as regards the establishment of the theory with Schwendener and De Bary. At the time of these discoveries M. Bornet was no less busy in collaboration with his distinguished countryman M. Thuret in the elucidation of the life-histories, especially the fecundation, of the Florideæ. It is not too much to say that we owe to MM. Thuret and Bornet the foundations of our knowledge in this department of phycology, and to their example and methods later investigators are indebted for success. In 1878 he edited and published the 'Etudes Phy-

cologiques' of M. Thuret, and in 1876–80 he published the 'Notes Algologiques,' with their magnificent illustrations of the structure and life-history of Algæ; these books are the subject of daily reference by all students of phycology. Since then M. Bornet has published a steady stream of scientific papers of exceptional interest, among which I would especially note his various memoirs on the Protophyceæ and on the Algæ which perforate calcareous bodies. His researches are in active progress, and even in course of publication, and we may happily still look forward to further achievements by this distinguished botanist, on whose behalf I now present this Medal.

M. Raymond Lecomte having received the Medal on behalf of M. Bornet, read the following letter of acknowledgment:—

"Monsieur le Président de la Société Linnéenne:—

"En me décernant sa médaille d'or immédiatement après des savants aussi éminents que MM. Hooker et de Candolle, la Société Linnéenne me fait un honneur dont je lui suis d'autant plus reconnaissant que ni le nombre ni l'étendu de mes travaux ne me placent à un rang aussi élevé parmi les botanistes contemporains. La Société a voulu sans doute, en m'attribuant une aussi haute distinction, récompenser les efforts d'une vie consacrée toute entière à la recherche de la verité, sans autre préoccupation que de la découvrir et de l'exposer en toute simplicité telle qu'elle s'est montreé.

"Que la Société veuille bien agréer l'expression de ma reconnaissance.

"Je vous prie d'accepter pour vous-même, Monsieur le Président, l'hommage de mes sentiments respectueux.

"Ed. Bornet, F.M.L.S."

The obituary notices of deceased Fellows were then read:—

James Backhouse was born 22nd October, 1825, at York, where his father carried on the old-established nursery so long known for its alpine plants as a strong and special feature. The father's travels in South Africa and Australia are well known; with him the subject of our remarks was accustomed to spend his holidays in exploring botanically the mountainous parts of Wales and Scotland, and, with Richard Spruce, in opening up the rich treasures of Upper Teesdale. At that time trips of this kind were not so feasible as now; many of the places they visited were accessible only by dint of toilsome journeys on foot and rough fare at the end of each day. Backhouse's chief contribution to botanical literature was his 'Monograph of the British Hieracia,' published in 1856, in which he showed his keen discrimination of differentiating characters. For many of the later years of his life he was accustomed to spend a part of his summer in Teesdale, generally at the High

Force Inn, where "Mr. Backhouse's room" was in full view of the Force itself. Geology was a favourite pursuit with him, and he had many a rich find in the Teesdale region.

Mr. Backhouse died at his house in York 31st August, 1890; his connexion with this Society dated only from 7th May, 1885.

Thomas Richard Archer Briggs, whose recent death will be fresh in the memories of most here, was born at Fursdon, Egg Buckland, near Plymouth, in May 1836. His health was rather delicate whilst young, and it was not until he was about 15 years of age that he showed any love for natural history; then, however, he began to collect in many departments, at last coming to confine his efforts to plants, of which he had so accurate a knowledge. He hardly stirred from home during his life, never for more than a few days, so that his local knowledge was only supplemented by dried plants from other parts of the kingdom. Beyond his scattered papers on sundry critical plants, he will be best remembered by his admirable 'Flora of Plymouth,' on every page of which is to be read his intimate acquaintance with the various phases of the local vegetation. On the completion of this book he presented a set of the Rubi therein mentioned to the British Museum; and since his death his herbarium has been gone over by the authorities of Kew and the British Museum with a view of securing the most valuable of his plants.

Mr. Briggs was a bachelor, and latterly lived with a brother; in addition to his chosen study, he was active in helping on every good work in his native parish. He died on 23rd January last from inflammation of the lungs, due no doubt to the severe winter through which he had passed, and was buried in Egg Buckland churchyard. He was elected Fellow 18th January, 1872.

Alexander von Bunge, who died at Dorpat on the 6th July last in his 86th year, was the Nestor of Russian botanists. He was born at Kiew on the 24th September, 1803, and went at an early age to Dorpat, passing out from the Gymnasium there when eighteen, in 1821; two years later he was the recipient of a gold medal, and on 24th November, 1825, he took his degree of M.D. at that University. Between the last two dates he had travelled through the Baltic provinces, and then, having duly qualified himself, he engaged in practice as a country doctor. In 1830 the St. Petersburg Academy despatched him to China as medical officer of an expedition sent thither; and on his return he published, in the 'Mémoires des Savants étrangers,' his well-known "Enumeratio plantarum quas in China boreali collegit" in 1831. This, with a conspectus of "Russian Gentians" in the Moscow 'Memoirs' in 1824, was his first contribution to scientific botany; and it is worthy of remark that Bunge's published

Botanical works, though few in number, are weighty, and were all issued in the publications of scientific societies, with the single exception of his 'Indices Seminum,' which are merely small tracts. In 1833 he was appointed extraordinary professor of botany at Kasan, and three years afterwards he migrated to Dorpat, in succession to Ledebour, a post which he held until his retirement in 1867, when Willkomm succeeded him from that date till 1869.

Whilst holding this seat he next produced the "Reliquiæ Lehmannianæ," the first part in the Riga 'Arbeiten,' and the whole in the St. Petersburg 'Mémoires' in 1868–69.

His next important work was the 'Anabasearum Revisio' in 1862, a Monograph of *Cousinia* in 1865, and then his great work, the elaboration of the Old-World species of the vast genus *Astragalus*; this forms two parts, the first in the St. Petersburg 'Mémoires' for 1868, with a clavis, and the full descriptions with localities in the volume for 1869, thus unfortunately entailing a double quotation. The total number of his botanical productions is stated to amount to thirty-five, besides some of medical interest. Bunge was connected with this country by married relatives; he was elected Foreign Member of this Society 7th May, 1863.

William Sweetland Dallas was born in London in 1824. As a boy a love for nature began to mould his life and character, and led him to devote himself to entomology. At an early age, however, family circumstances, consequent on the death of his father, obliged him to seek some definite means of gaining a livelihood for himself, and with this end in view he was placed in a business house in the city. Young Dallas soon found, however, that such a life was altogether uncongenial to him, and he again applied himself to his favourite branch of science. As an example of his industry and of the energy with which he worked at this time, it may be stated that he made a transcript in the reading-room of the British Museum of the whole of Fabricius's 'Entomologia Systematica,' together with a coloured figure of each genus—an undertaking sufficient to have daunted the ardour of many an enthusiast. Encouraged by Dr. John Edward Gray and other naturalists, he was led to contribute papers to the Entomological Society, and for ten or twelve years he was occupied in preparing lists of insects for the British Museum and in writing various excellent compilations, amongst which his 'Natural History of the Animal Kingdom' is a well known and justly appreciated work.

In 1858 he removed from London to York on his acceptance of the Curatorship of the Yorkshire Philosophical Society's Museum. The duties of this post he ably discharged for ten years, continuing at the same time his numerous literary engagements, and contributing a large number of papers to the 'West-

minster Review,' the 'Annals and Magazine of Natural History,' the 'Philosophical Magazine,' and other periodicals.

In 1868 Mr. Dallas again returned to London, having been appointed Assistant-Secretary to the Geological Society, a post whose arduous duties he continued to discharge with uncommon tact and ability for twenty-two years, until struck down by paralysis a few days before his death, which took place on the 29th May, 1890.

He was elected a Fellow of this Society in 1849.

A man of brilliant attainments and of rare geniality and kindness of disposition, he was ever ready to help and advise all who came to him for counsel. Few men, indeed, have had such a power as Dallas had for gaining the hearts of those who came into contact with him, and his memory will long be held in affectionate regard by all who had the privilege to call him friend.

Henry Groves was the youngest son of Richard Groves, druggist, of Weymouth, Dorset, where he was born in 1835, and educated, mainly in London, at a private school. He was apprenticed to his father, and, on completing his term, studied in the Pharmaceutical Society's school till 1856, when he went to be with Messrs. Bell & Co., after which he spent three years with Mr. C. Delacre, of Brussels. On his return home he assisted his father; but hearing of an opening in Florence he went thither and took the business which had been begun by Mr. Frazer at 15 Via Borgognissanti, and for nearly 30 years his pharmacy there became a resort for English visitors and residents.

Mr. Groves's relaxation lay in the investigation of the flora of the country of which he had become an inhabitant, and his holidays were devoted to tours in the less known parts of the Italian peninsula, undertaken in the height of summer, when Florence is almost deserted by its visitors. As an example of these trips may be cited his paper on the botany of the coast of Japygia, which was issued in our Journal, vol. xxi., in 1885. He had married a Genoese lady in 1875, who thoroughly entered into his pursuits, and cheerfully faced the discomforts of roughing it in these little accessible districts, where shelter for the night was frequently to be found only in some shepherd's hut or some dry cave. As the fruit of these excursions Mr. Groves amassed a large collection of dried plants, and these have been devised to a Tuscan botanical society. Besides these he wrote a few papers on topics connected with his own calling, such as on the Florentine Orris, the Italian Saffron, and the local Tuscan popular remedies.

About ten years since his health became somewhat impaired, followed not long since by a paralytic attack, from which he had partially recovered, when a second stroke occurred on March 1st

of the current year, which ended his life almost instantaneously. His funeral took place in the Protestant cemetery outside the Porta Romana, and his body was followed to the final resting place by a large concourse of sorrowing friends.

Carl Johann von Maximowicz was born at Tula in 1827, but at an early age went to St. Petersburg, where he received his chief education at a Lutheran college. The year 1844 saw his removal to Dorpat, and, after completing his studies at that place, he was appointed assistant to the director of the botanic garden there, at that time Alexander von Bunge, whose recent loss we have also to-day to deplore. Here he stayed eight years, and then he was transferred to St. Petersburg as Conservator of the Imperial Botanic Garden, and the year after he was appointed to the 'Diana,' commissioned to procure plants in a living state for the gardens under his charge. The vessel sailed westward and touched at Rio, Valparaiso, and Honolulu, when the outbreak of the Crimean war forced the Russian frigate to shelter on the coast of Manchuria. Maximowicz here quitted the vessel in order to explore the country lying on both sides of the river Amur, and, after suffering much privation and many difficulties (due in great measure to his scanty resources), he succeeded in getting home by way of Siberia.

The first results of this journey were issued by Ruprecht in the 'Bulletin physico-mathématique de l'Académie Impériale de St. Pétersbourg'; but two years having been devoted by the explorer himself to the working up of his collections, he produced in 1859 his important work, "Primitiæ Floræ Amurensis; Versuch einer Flora Amurlandes," in the ninth volume of the 'Mémoires des Savants Étrangers' of the Academy. The high character of the work here published was consistently maintained by Maximowicz in all his subsequent labours; to him we owe important contributions to our knowledge of the vegetation of the far east of Asia, monographs on the Rhamnaceæ, the Hydrangeas, and the Rhododendrons of the region, and numerous detached papers in the 'Bulletin' of the St. Petersburg Academy, which were re-issued in the 'Mélanges Biologiques' of that body. Much of the material for these labours was got together in his second visit to the East, where, from 1859 to 1864, he travelled through Manchuria and Japan, returning this time by sea and visiting England on his way home. He was then suffering from the remnants of a fever taken in Japan, from which he was never afterwards entirely free.

Regarded, and rightly so, as the highest authority on the flora of that part of the Russian dominions, he had the collections of later travellers, such as Prjevalsky, Potánin, and others, passing through his hands. The stress of official duties prevented his finishing some of the work which he had in hand, and there does

not appear to be anyone to step into his vacant place to bring these enterprises to a successful issue.

He leaves behind him the reputation of a highly accomplished man, a courteous correspondent, and a botanist of high sagacity and accuracy. He was elected Foreign Member May 6th, 1880.

Carl von Naegeli, the intelligence of whose death has so recently reached us, was born on the 27th March, 1817, at Kilchberg, near Zürich, the son of a country doctor, who afterwards rose to some distinction in the republic as Councillor of State. Carl was first sent to school at an establishment founded partly by the care of his father; then he proceeded to the Gymnasium at Zürich, and finally to the then newly-instituted University of the place. Here he came under the influence of Lorenz Oken, and received so strong an impulse towards the study of natural history that his leanings to the study of medicine, for which profession he was intended by his father, sensibly cooled. At length, thanks to the persuasion of his accomplished mother, his father's unwillingness was overcome and Carl was permitted to engage on a botanical career; accordingly he set out for Geneva, to study under the elder De Candolle and Oswald Heer, the first product of his study being on the Swiss species and hybrids of the genus *Cirsium*, which was afterwards incorporated in the second edition of Koch's 'Synopsis.' This was his inaugural dissertation for the degree of Doctor, and was dedicated to his friend and teacher Heer.

He married into a Zürich family in 1845, and in his wedding tour visited this country, spending a considerable time in the south-western counties, and there amassing a large store of material for his next work, 'Die neuen Algensysteme,' 1847. In 1847 Naegeli settled in Zürich as Privatdocent in the University, also filling the post of professor of botany in the Veterinary School, from which he was afterwards transferred to the High School, where he did not long remain, for he accepted an invitation to Freiburg-im-Breisgau, having declined a previous offer. He lived there from 1852 till 1855, when he took up the position of professor at Zürich University; his greatly loved mother died on the very day of his induction.

Two years later he became professor at Munich, and retained this chair during the remainder of his working life.

Soon after attaining the age of sixty he was much troubled by attacks of giddiness and other nervous symptoms, which sometimes prostrated him. An attack of influenza in 1889–90 greatly enfeebled him; but the summer being spent among the mountains he regained much of his accustomed strength, and a month in the last winter passed in the Riviera was wonderfully efficacious in the apparent renewal of power; but he had hardly returned home when his death occurred with unexpected suddenness.

It now remains to mention some of the more important works

of his prime. In 1855–58 he brought out the first and second Hefts of his 'Pflanzenphysiologische Unterschungen,' the second of which contained his memoir on starch, Cramer writing the third and fourth parts. Soon after this he issued his 'Beiträge zur wissenschaftlichen Botanik,' the second and fourth parts of which, in 1860–63, contained Schwendener's 'Untersuchungen über den Flechtenthallus.' With the last-named he also produced a practical treatise on the use of the microscope, which attained a second edition in 1877. The latest production is his cooperation with Peter, 'On the Forms of the *Pilosella* Section of the Genus *Hieracium*,' a work which cannot be ranked as doing much more than cataloguing the protean forms of that portion of a difficult genus, and Naegeli's share in the joint production is probably small.

Dr. Naegeli died at Zürich on the 10th of May, 1891, and was cremated at the Central cemetery on the 13th, in the presence of a large number of old friends and pupils, the funeral oration being pronounced by his life-long associate, Dr. Carl Cramer.

William Kitchen Parker was born at Dogsthorpe, near Peterborough, June 23rd, 1823. After going to the village schools of Dogsthorpe and Werrington, he was sent for a short time to Peterborough Grammar School, and was then apprenticed, at the early age of fifteen, to a chemist and druggist at Stamford. At eighteen he was apprenticed to Mr. Costal, medical practitioner, at Market-Overton, and in December 1844 he came to London and entered Charing Cross Hospital as a medical student. Becoming acquainted with Dr. Todd, he had the privilege of working in his laboratory at King's College, and acted for a time as prosector at his lectures. He qualified as Licentiate of the Society of Apothecaries in 1849, and commenced to practise at Tachbrook Street, Pimlico.

His taste for natural history showed itself at a very early age, for even during his apprentice days at Stamford he was an ardent collector, carefully studying and dissecting every subject he came across. It is therefore not surprising that throughout life his intense love of nature led him to work at his favourite biological studies with an ardour which his professional duties neither damped nor diminished. His first published work was upon the Foraminifera, a group upon which he afterwards contributed a number of papers, many of them being written in conjunction with other well-known workers.

His more important work, however, and that by which his name will be best remembered, are his researches on the osteology and embryology of the Vertebrata (especially of Birds and Reptiles) contained in a large number of memoirs published by the Royal, Linnean, Zoological, and Microscopical Societies. The Ray Society also published a valuable Monograph by him on the Structure and Development of the Shoulder-girdle and Sternum in the Vertebrata.

In 1866 Mr. Parker received a Royal Medal from the Royal Society, and in 1885 the Bayly Medal from the Royal College of Physicians. In 1873 he received the diploma as Member of the Royal College of Surgeons, and was appointed Hunterian Professor of Comparative Anatomy and Physiology. He was elected a Fellow of King's College, London, in 1875.

He was elected a Fellow of this Society in 1875, and he was also a Fellow of the Royal, Zoological, and Royal Microscopical Societies, Honorary Member of the Philosophical Society of Cambridge and of the Medical and Chirurgical Society. He was also a Member of the Imperial Society of Naturalists of Moscow, and Corresponding Member of the Imperial Geological Institute of Vienna, and of the Academy of Natural Sciences of Philadelphia.

Prof. Parker died suddenly, of syncope of the heart, whilst visiting his second son, Prof. W. Newton Parker, at Cardiff, July 3rd, 1890.

A man of great originality of thought and of indomitable industry, earnest and true in all he undertook, helpful to everyone who consulted his vast stores of information, and beloved by all who knew him. The record of his life is a worthy monument of an honest seeker after truth.

Benjamin Samuel Williams was born in 1824, and was a successful grower and exhibitor of plants, especially of Orchids. In 1851, whilst gardener to Mr. C. B. Warner, of the Woodlands, Ware, he wrote a series of articles on the cultivation of orchids, which became the nucleus of his popular work, 'The Orchid-Grower's Manual,' which has gone through six editions. In 1854 he started in business in Upper Holloway, at first in conjunction with Mr. Robert Parker, but latterly with his son, Mr. Henry Williams, as partner. Much of the text to Warner's 'Select Orchideous Plants,' 1862, was due to Mr. Williams, and he also wrote the descriptions to his own 'Orchid Album,' 1881, a work which is now carried on by his son. He died after a long illness on June 24th, 1890, and was buried at Highgate Cemetery on the 30th of that month.

Mr. Williams was elected a Fellow of the Society on March 6th, 1879.

June 4th, 1891.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Harold S. Ferguson, Esq., Arthur Coppen Jones, Esq., Prof. William Somerville, Surgeon-Major Laurence Austin Waddell, and Prof. Walter Frank Weldon were elected Fellows.

The President took occasion to refer to the loss which the Society had sustained by the recent death of one of its Vice-Presidents, Prof. Peter Martin Duncan, whose genial presence at the Meetings, no less than his valued contributions to the publications of the Society, would, he felt sure, be missed by every one.

The President nominated Mr. Alfred William Bennett, Dr. Robert Braithwaite, Mr. Frank Crisp, and Dr. St. George J. Mivart, to be Vice-Presidents for the ensuing year.

Sir Walter Sendall, K.C.M.G., exhibited a curious Cocoon of a Moth belonging to the genus *Tinea*, and made some remarks on its construction and peculiar coloration.

The President exhibited a case of Lepidoptera and Coleoptera to illustrate some of the more notable secondary sexual characters in insects, and made explanatory observations thereon.

Dr. John Lowe exhibited some eggs of *Mantis religiosa* which he had found adhering to the underside of stones on mountain-sides in the Riviera.

On behalf of Mr. F. J. Hanbury a sterile form of *Ranunculus acris* was exhibited by Mr. W. H. Beeby, who made some remarks on the same.

The following papers were read:—

1. "Observations on the Diseases of the Cocoanut Leaf." By Michael Cresse Potter, F.L.S.
2. "Notes on some Arctic Comatulæ." By P. Herbert Carpenter, F.R.S., F.L.S.
3. "Notes on Crinoids from the Neighbourhood of Madeira." By P. Herbert Carpenter, F.R.S., F.L.S.
4. "Remarks on a Hermaphrodite Mackerel." By Prof. Chas. Stewart, Pres. Linn. Soc.

June 18th, 1891.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Charles William Slater, Esq., was elected a Fellow.

Mr. W. H. Beeby exhibited specimens of *Hieracium protractum* and other plants collected in Shetland.

Mr. Stuart Samuel exhibited a dwarf specimen of *Acer palmatum*, and made some remarks on the dwarf trees artificially produced by the Japanese.

Mr. R. V. Sherring showed some cases of dried Bananas, and described a new method of preservation adopted in Jamaica to save waste of small parcels of fruit which would be otherwise unsaleable.

Mr. A. W. Bennett exhibited and made remarks upon a specimen of *Selaginella lepidophylla*, which was found to possess remarkable vitality, and upon proper treatment to resume its normal appearance after having been gathered some months.

Dr. R. C. A. Prior exhibited samples of spiked Star of Bethlehem, *Ornithogalum pyrenaicum*, and stated that although described in British Floras as a rare plant, it is so abundant on the hill pastures around Bath that it is brought to the market there in large quantities under the name of French Asparagus, and sold for a penny a bunch.

Mr. R. A. Rolfe showed two hybrid Odontoglossums with the parent plants, viz.:—*O. Wilckeanum* (produced from *O. crispum* and *O. luteo-purpureum*) and *O. excellens* (produced from *O. Peseatorei* and *O. triumphans*). These had first appeared as natural hybrids out of imported plants, and the parentage was subsequently ascertained under cultivation.

On behalf of Sir George Macpherson Grant, Mr. J. E. Harting exhibited some curiously abnormal horns of the Roe Deer (the result of disease) which had been taken from an animal found dead near Forres, N.B. For the purpose of comparison he exhibited some normal heads of the Roe from other parts of Scotland and from Germany, and made some remarks on the causes of variation in the size and form of the antlers to which Roe Deer were peculiarly liable.

The following papers were read:—

1. "An Investigation into the True Nature of Callus."—Part II. By Spencer Moore, F.L.S.

2. "The alleged Existence of Protein in the Walls of Vegetable Cells, and the Microscopical Detection of Glucosides therein." By Spencer Moore, F.L.S.

Appendix.

Prof. G. B. Howes exhibited a specimen of *Lima hians* with a byssus "nest" which it had spun in the jar in which it was exhibited. The animal was obtained from the Zoological Station in Naples, and he owed it to the generosity of his pupil Mr. G. W. Butler, who had been recently working there. The individual was one of three which came into Mr. Butler's hands, and when placed in a glass vessel of sea-water, kept constantly renewed from an adjacent tank, they each constructed a byssus enclosure. Upon removal from the last-named each constructed a second "nest," and one prepared a third. Mr. Butler had watched the animals both by day and by night, in vain, to observe the act of spinning. The period occupied in the construction of the enclosure exhibited was twenty-one days; for the first day or two only a few scattered threads were formed, but by the fourteenth day the trabecular work, although thin, sufficed to imprison its originator. The filaments composing the completed "nest" were attached between the side and the bottom of the jar, which was a round one; they passed for the most part obliquely, and were interwoven in an irregular and complex manner, giving rise to a kind of feltwork, which was densest at its point of attachment to the side of the jar. The area enclosed was a crescentic one bounded on its convex side by the glass: the apices of the crescent nearly met, and the imprisoned animal had secured free play over about two thirds the surface area of the bottom of the jar. The animals were observed to swim freely within their "nests" when completed.

Professor P. Martin Duncan's Exhibition.

The two microscopic preparations exhibited this evening (see p. 1) demonstrate the fact that each ambulacral ampulla in the Echini is supplied by one offshoot from the main ambulacral water-vessel.

This fact was discovered by G. Valentin, and was recorded in his 'Anatomie du genre *Echinus*,' 1842, and the diagram given in plate 7, fig. 136, of the work perfectly illustrated the meaning of the author.

This distribution of one vessel to each ampulla, supplying a tentacle, has been accepted and taught as true by all subsequent naturalists up to last year.

Last year an able French naturalist, studying at the Lacaze-Duthiers Marine Laboratory, not only stated that two vessels supplied each ambulacrum, but drew, more or less diagrammatically, a representation of the results of his work.

As I had never seen a second vessel coming off and entering an ampulla, I asked our President whether he had had any experience in the matter. His suggestion was to count the number of ampullæ in a part of an ambulacrum, and also the number of

lateral vessels which started from the main vessel to reach the ampullæ. This method will do when there is no overlap of ampullæ, and it proves that Valentin was correct. But the second vessel is drawn by the French observer as if it were placed over (or more properly, from the natural position within the test, within or internal to) the very visible ordinary vessel. It could hardly be counted.

I therefore dissected out a rectangular piece of soft parts which included several ampullæ, some length of main water-vessel, and all the lateral offshoots. The piece was transferred to absolute alcohol, stained with picro-carmine, and cleared in the usual manner. Owing to the action of the alcohol the originally flabby morsel was made more rigid, but very fragile. It was transferred in parts to the glass with great difficulty, for the preparation could not be teased out without endangering the perfection of the water-system. By using the flat remover some fairly good pieces were safely transferred.

In one preparation two ampullæ are seen, one to the right and the other to the left; each is supplied by a delicate water-tube, and the water-tubes spring from a small portion of the main water-vessel. In the second preparation two or three water-vessels are seen, one above the other, and their ampullæ have been removed. In both preparations there is no evidence of a second water-vessel springing from the main water-tube and passing to an ampulla.

So far as *Psammechinus*, *Strongylocentrotus*, *Salmacis*, and *Temnopleurus* are concerned, I have found Valentin's description true.

The power to be used is that conveyed by a lens of 1-inch focal distance, or one of ½-inch. A good hand-lens will almost suffice.

On the Northern Distribution of *Oxalis cernua*, Thunb.*

By the Rev. Prof. G. Henslow, M.A., F.L.S., F.G.S., &c.

[Read 2nd April, 1891.]

This plant is a native of the Cape of Good Hope, and has often been described by botanists who have studied the Cape flora †. It has become distributed not only on the islands of the Atlantic, as the Bermudas, Canaries, and Madeira, but along both the north and south coasts of the Mediterranean Sea. At the present day it is found at various places, from Egypt to Morocco, and from Gibraltar to the Greek islands. The question is, how did it come to be so widely distributed throughout the Mediterranean region?

* Thunberg, *Diss.* No. 12, t. 2. f. 2 (1794).

† *E. g.*, Harvey and Sonder, *Flora Capensis*, i. 348; and Thunb. *Fl. Cap.* ed. Schult. 537 (1825). Schultes describes *Oxalis cernua* as flowering at the Cape in June and July. It has completely changed this habit in the north, as it is in full blossom all through the winter, from November to April.

No botanical author previous to this century ever refers to it as growing in the northern hemisphere. The first to allude to it is Father F. C. Giacinto, who mentions the plant as being cultivated in the Botanic Garden at Valletta, Malta, in the year 1806. The title of his work is 'Index Plantarum Horti Botanici Melitensis, anno 1806.—P. F. Carolus Hyacinthus'*.

The next in date to allude to it is Prof. Viviani, who records it as growing in North Africa, viz.: "in pratis Cyrenaicæ," in 1824, and named it *O. libyca*.

A. De Candolle says, on the authority of Kelaart (*Fl. Calp.* 1846), that it was introduced into Gibraltar in 1826 ('Géographie Botanique,' ii. p. 724): A. P. de Candolle makes no mention of it, in his *Essai élémentaire de Géog. Bot.*, in Dict. des Sc. Nat. vol. xviii. (1820), as occurring in S. Europe.

The next to notice it is Prof. Ch. Stephanus Zerapha, a contemporary of Giacinto's in Malta, who published his 'Floræ Melitensis Thesaurus' in 1827.

It appears to have probably arrived in Egypt about that time, as Youssouf Effendy is known to have introduced the Mandarine orange from Malta about 1820. It only occurs, at the present time, in the orange-gardens of Cairo and Esneh.

The above facts would seem to hint at the probability of Malta having been the original source of its diffusion; and the following facts will, I think, establish it.

We have it on the authority of Zerapha that his contemporary, Dr. Giacinto, brought the individual plant from the Cape of Good Hope, which is spoken of as having been cultivated in Malta in 1806, for the information of his pupils; and Maltese botanists of a later date attribute the spread of it over the island, at least, to this source. Thus J. C. Grech Delicata says of *Oxalis cernua*, the "Haxixa ta l'Englisi," or the "English weed," as the Maltese now call it, in his 'Flora Melitensis,' p. 8 (1853):—"In campis et agris ubique. Indigena facta ab anno 1811."

That the subsequent general diffusion has had its origin in Malta appears to be satisfactorily proved by the structure of the plant itself. This species of *Oxalis* is naturally trimorphic at the Cape, as dried specimens in the Kew Herbarium and that of the Natural History Museum fully testify, examples of all three forms, as well as of half-ripe fruiting plants, being preserved. On the other hand, it has never been known to bear fruit in the northern hemisphere; the flowers, with their pedicels, after expansion disarticulate, leaving scars on the peduncle. Moreover, the short-styled form is the only one described as occurring anywhere around the Mediterranean. This is certainly the only one in Malta, as I can myself testify from numerous examinations of plants from all parts of the island.

* A copy of this work is in the public library at Valletta; and I take this opportunity of thanking Dr. A. Caruana Gatto for kindly making researches for me among the publications therein contained.

Prof. Viviani thus describes it in his 'Floræ Libycæ Specimen, sive plantarum enumeratio, Cyrenaicam, Pentapolim, Magnæ Syrteos desertum et regionem Tripolitanam incolentium' — "Oxalis libyca, in pratis Cyrenaicæ . . . Capsulam maturam non vidi." He gives a full description as well as a plate (No. XIII.). The double form also occurs, as it does in Malta and the Cape, &c.

Of more modern writers, Moris, *Fl. Sard.* i. p. 363 (1837–1843), speaks of it as growing in Sardinia; and Munby mentions it as growing in Algeria in 1847.

Prof. F. Parlatore (1848), in his 'Flora Italiana,' describes it as growing at Castagno, near Naples, in the greater part of Sicily, in Corsica and Malta, as well as in Zante, near Smyrna, in Egypt and Algeria. In his description he says:—"Stylis distinctis, fere horizontalibus, capsula . . . seminibus . . .," stating that he has never seen the fruit.

Mr. John Ball described this species in 1878 under the name *O. sericea* ("Spicilegium Floræ Maroccanæ," Journ. Linn. Soc., Bot. vol. xvi. p. 388), and alludes to the three supposed species—*O. sericea*, L. fil.; *O. cernua*, Thunb.; and *O. compressa*, Jacq.—as being only one, inasmuch as these three are but the short-styled, mid-styled, and long-styled forms. Since he records the plant himself as *O. sericea*, this implies that it is the short-styled form which grows near the city of Tangier. It often occurs there also as double. Mr. Ball quotes the distribution given above, and adds:—"in insulis Canariensibus *, Madeira . . . in agro Tingitano et alibi in Africa boreali."

The last to allude to it, that I am aware of, are Ascherson and Schweinfurth. In the list of plants of "Middle North Africa" ('Kufra,' p. 513, 1881), the former describes it as growing in Cyrenaica, and regards it as a remarkable fact in geographical botany that this species should have two sources; for he appears to regard it as indigenous †. In their 'Illustration de la Flore d'Egypte' (1889), these joint authors simply record it as naturalized at Cairo and Esneh.

* It does not appear to have reached the Canaries before the year 1840; for it is not mentioned by Webb and Berthelot in their 'Histoire Naturelle des Iles Canaries.' According to Lowe only the double form is found at Madeira ('Manual of the Flora of Madeira, &c.' p. 100). The source of it in these islands was probably direct from the Cape of Good Hope itself, and quite independently of the Maltese origin.

In De Candolle's 'Prodromus,' vol. i. p. 696, *Oxalis cernua* is described "stylis brevissimis," which seems to imply that this author also only knew of the short-styled form.

Mr. N. E. Brown informs me that, contrary to Mr. Ball's views given above, "*O. cernua*, *O. sericea*, and *O. compressa* are three distinct species, and not sexual forms of one species, and each is heterostyled."

† "Das Vorkommen dieser Cappflanze, welche seit mehrern Decennien auf Culturboden des Mittelmeergebietes sich vielfach eingebürgert hat (ich sah sie in Sardinien, Unter- und selbst Oberägypten zu Esneh !!), an offenbar ursprünglichen Fundorten unsers Gebietes ist eine pflanzengeographisch sehr merkwürdige Thatsache, da derartige Uebereinstimmungen zwischen Nord- und Südafrika selten sind."

Having had an opportunity of examining *Oxalis cernua* in the Maltese Islands in 1890—as it is most abundant in Malta and Gozo, but does not occur in Salmone—and again in Egypt in 1891, since it flowers from November to April, I found, as stated, that the single form was invariably short-styled, the double form being common in Malta, but not nearly to the same extent as the single. Neither kind bears any fruit either in Malta or Egypt as far as I could discover.

The last place where I have seen it is Cannes, in 1892. I am informed by Dr. Battersby, of that town, that it has apparently decreased of late years. A single plant in the garden of M. A. Constant at Golf Juan was accidentally introduced with some palms, but from what locality it was not known. It was the short-styled form, as usual. It is not mentioned in M. A. Risso's 'Flore de Nice,' 1844; but M. Ardoino, in his 'Flore du Département des Alpes-Maritimes,' 1879, says:—"Cette plante du Cap de Bonne-Espérance que j'avais souvent remarquée dans les sentiers pierreux autour de Monaco, et qui me paraissait échappée des jardins, vient d'être retrouvée à Menton, à Villefranche, à Nice et à Cannes. Elle est en train de se naturaliser chez nous."

In the Botanic Garden attached to the School of Medicine in Cairo, I found *Oxalis cernua* cultivated in a pot, and a stray plant was growing in the garden. These two plants, however, were the long-styled form, and not short-styled, as all those I found in the orange-gardens in Cairo proved to be, and were doubtless introduced from Malta. Hence it would seem that while one plant was originally introduced from the Cape into Malta about 1806, another has comparatively recently been introduced from the same source into Cairo, whether accidentally with Cape plants or intentionally the present Director could not tell me.

The conclusion, therefore, seems to be convincing that, as the same features, as far as botanists have recorded their observations, appear to be characteristic of all the plants growing throughout the Mediterranean region, they have all been derived from the original individual specimen first brought to Malta by Prof. Giacinto at the beginning of this century.

That it should first reach the shores of Africa is only what would be expected, as the Maltese have long had communication in trade along the northern coasts *.

As the plant is never known to ripen its fruits in the northern hemisphere, though it does so at the Cape, where all three forms, as well as the "double" one, occur, it may be as well to describe the means by which its extraordinary multiplication takes place, for in Malta it is ubiquitous. It carpets the roadsides as well as all the exposed open ground around Valletta, and might be taken at a distance for turf. It insinuates itself between the loose stones

* The whole number of plants recorded by Ascherson in Tripoli and Cyrenaica is 917. Of these there are 217 wild plants common with Malta.

of which all the walls in Malta are composed, and appears at the surface like a green fringe around each stone. It covers the tops of the walls in many places, as well as the lofty fortifications. It not only forms luxuriant borders to the fields, but invades the cultivated soil; so that when, as is too often the case, the weeds are not uprooted, a field will look as yellow as an English meadow with buttercups. It is propagated entirely by bulbs. If a large plant be dug up in January, growing, we will say, amongst loose stony débris, it will be found to possess a long tapering *stem* *, throwing off thread-like lateral roots, and bearing minute leaf-scales with small white bulbils at intervals, as well as several larger ones at the crown below the cluster of leaves. The fine thread-like rhizome extends downwards, sometimes to a depth of more than a foot, and proceeds from a bulb of the previous season, from which this vertical subterranean stem has grown upwards. This bulb has outer, brown scales. Sometimes there are two bulbs, connected by the stem, included within the scales. The bulb itself consists of very thick scales, one overlapping the other, a cross-section of a scale having a crescent shape. In many instances, when the plant grows as above, the stem proceeds further downwards like a thread; but after a certain distance it suddenly increases in diameter, forming a short rod-like structure about $1\frac{1}{2}$ to 2 inches long, with a bulb at the end. This explains how it is enabled to reach great depths, from which new plants arise in a subsequent season. On the other hand, the great length of the subterranean stem explains how the plant is enabled, so to say, to "climb up" between the stones of the walls, thus accounting for the green fringe which is often seen all round the stones in the lower part of the walls in Malta.

Besides the bulbs thus formed in a vertical line, at all depths, the oxalis often produces runners above-ground. They only occur, however, on luxuriant plants, such as those growing by the watercourse in the Wied Encita, or in the rubbly ground within the ditches of the fortifications, &c., or, again, in the rich soil of the orange-gardens at Cairo. The runners, however, do not root like those of strawberries, but produce bulbs at the nodes, so that a number of young plants can be produced at a short distance from the site of the parent plant.

It affords certainly one of the most extraordinary instances of a very extensive multiplication, and that solely by the vegetative system, indicating the fact that the assumption that intercrossing of flowers by fertilization is necessary to ensure vigour is totally unfounded †. It might be thought that, as it is only the short-styled form which exists, the pollen might readily fall upon and pollinate the stigmas, thus assuring at least self-fertilization. It undoubtedly does fall down upon them, as there are ten anthers

* Not *root*, as described by Mr. Ball, *l. c.*

† Just as is the case with *Elodea canadensis* in this country.

well filled with pollen, which stand above the stigmas; but whether the latter be perfect or not has not been examined. At all events, seed is never set, so it is practically impotent.

The double form is very common, though not to the same extent, in Malta, and, as mentioned above, it occurs in N. Africa as well as in the Atlantic Islands. It often has rather smaller leaves, but I do not think this can be relied upon as a fixed character; the petals are sometimes more than fifty in number, and are of an orange-yellow in colour, those of the ordinary form being a golden yellow.

It may be added that the tendency to produce bulbs is to some extent dependent on the growth of the plant. The generally infertile calcareous ground of Malta, where it grows by the roadsides, &c., tends to induce the formation of bulbs, for they are much fewer on a plant which grows luxuriantly, when it spends its energies in the development of flowers and foliage. Thus, in the orange-gardens of Cairo it does not spread as in Malta, but the individual plants grow to a great size.

As an illustration of the production of bulbs under a check to vitality, I may add that when specimens are being pressed for a herbarium, a quantity of bulbs are always formed at the same time at the crown of the vertical rhizome; the vital energy, being checked above, now expends itself in the formation of bulbs until the whole plant is dead.

A final word on *Oxalis corniculata*, L. This species is very widespread, and botanists of the last century often allude to its extension in the Mediterranean regions. It is a native of Malta, but at the present time only to be found in gardens. It was the opinion of the late Dr. Gulia, Professor of Botany in the University of Malta, that *Oxalis cernua* had driven it away from the open ground. In Cairo, *O. corniculata* is abundant in the Esbekiyeh public gardens, where it occupies large patches in the "turf," the latter being principally composed of *Cyperus rotundus* and *Lippia nodiflora*, which it appears to displace. In the botanic garden at Cairo, the two species were actually growing intermixed as intruders in a border, and *O. cernua* was certainly overwhelming the *O. corniculata*.

Correction.

Dr. Robert Brown, F.L.S., writes with reference to the bust of Linnæus mentioned in the Proceedings for 1887–88, p. 105, and 1888–90, p. 27, as follows:—

"It seems to have been executed by a Danish sculptor named Prior, though under what circumstances has still to be learnt. If my information be correct, the bust was never actually cut in marble, nor cast in bronze. It never went beyond the plaster, and as Prior died within my memory, the portrait, which by all accounts is a good one, must have been a composition from paintings, engravings, or other busts and statues. . . . . At all events, Thorwaldsen had nothing to do with it."

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Donation in aid of Publications.

1890.		£	*s.*	*d.*
Nov. 6.	Collett, Brig.-General H. Contribution towards publishing a paper on a Collection of Plants from Upper Burma and the Shan States.....	50	0	0

PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

(SESSION 1891-92.)

November 5th, 1891.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. William Lindsay Brown was elected a Fellow.

On behalf of a number of subscribers, Mr. Carruthers presented to the Society a half-length portrait in oils of Sir John Lubbock, Bart., M.P., P.C., F.R.S., a former President, painted by Mr. Leslie Ward, and the remarks which he made on the services rendered to biological science by Sir John Lubbock drew from the latter a grateful acknowledgment of the honour conferred upon him.

Mr. E. M. Holmes showed some new Marine Algæ from the Ayrshire coast.

Mr. J. C. Grenfel showed some Diatoms with pseudopodia, illustrating his remarks with diagrams.

The President exhibited and made some observations on a tooth of the Walrus, which illustrated by the varying attrition of its surface the successive periods of growth.

Mr. R. V. Sherring called attention to a large series of framed photographs which had been taken under his direction in Grenada, and illustrated the general character of the West Indian Flora, as well as the physical features of that particular island.

Mr. J. E. Harting exhibited a specimen of Wilson's Petrel,

which had been picked up in an exhausted state in the County Down on the 2nd October last, and had been forwarded for inspection by Mr. R. Patterson, of Belfast. Mr. Harting gave some account of the species, and remarked upon the unusual number of Petrels, Shearwaters, Skuas, and other marine birds which had been driven inland to considerable distances by recent gales.

The following paper was then read:—

1. "A Theory of Heredity based on Force instead of a special form of Matter." By the Rev. Prof. Henslow, M.A., F.L.S.

November 19th, 1891.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Samuel Jennings exhibited a collection of Wild Flowers made by him in a recent tour through the Rocky Mountains, California, and Mexico.

Prof. G. B. Howes exhibited some dissections of Fish Crania made by his pupil Mr. R. Burne, B.A., in which the parts of the skeleton were so displayed that they might be studied in relation to the rest of the head and to the leading cranial nerves.

Mr. Edgar F. Cooper exhibited specimens of a new variety of *Potamogeton* from Loughborough, lately described and figured by Mr. Alfred Fryer (Journ. Bot., Oct. 1891).

Mr. A. W. Bennett exhibited and made remarks upon some specimens of *Hydrodictyon utriculatum*, Roth (*H. reticulatum*, De Toni), and some drawings of anomalous *Cypripedium* and *Disa*.

The following papers were read:—

1. "Notes on the original Portraits of Linnæus made during a recent visit to Sweden." By William Carruthers, F.R.S., F.L.S.

2. "On a new Fossil Plant from the Lower Coal-measures." By Thomas Hick. (Communicated by William Carruthers, F.R.S., F.L.S.)

December 3rd, 1891.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Messrs. William Henry Blaber, Walter Scott Campbell, Charles Frost, James Keys, Thomas Morris Macknight, Albert Molineux, William Henry Williams Strachan, Henry Herbert Sutherland, and His Excellency Sir Walter Joseph Sendall were elected Fellows.

The Meeting having been declared special for the election of a Councillor in the place of Dr. P. H. Carpenter, deceased, the President announced that the Ballot would be taken to fill the vacancy thus caused, and would remain open till nine o'clock.

The President exhibited a series of specimens of a South-American Beetle, showing the extremes of variation of colour observable within the limits of a single species. He further exhibited a remarkable instance of protective mimicry in another species of beetle.

Mr. J. E. Harting exhibited a photograph of an abnormally situated nest of the Chimney Swallow (*Hirundo rustica*), which had been built for the second time on a swinging hook in an outhouse, and made some remarks on three recorded cases of Swallows nesting in trees, a most unusual habit.

The President announced the recent Bequest to the Society by the late Sir George MacLeay, K.C.M.G., of a marble bust of his father, the late Dr. William Sharp MacLeay, formerly a Fellow and Vice-President of the Society.

The following papers were then read:—

1. "A Contribution to the Freshwater Algæ of the West of Ireland." By W. West, F.L.S.
2. "The Tick Pest in Jamaica." By Dr. W. H. W. Strachan. (Communicated by W. F. Kirby, F.L.S.)

The Ballot for a Member of the Council having been closed, the President appointed Mr. Charles Jas. Breese, Mr. Thomas Christy, and Mr. Arthur Bennett, Scrutineers, and the votes having been counted and reported to the President, he declared Mr. George Brook to be duly elected.

December 17th, 1891.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. James Rodway was elected a Fellow.

Mr. George Claridge Druce exhibited specimens of *Sagina intima* (Don MS.), var. *alpina* (Syme), gathered on steep rocky places on the Cairngorm Mountains, and of *Illecebrum verticillatum* (Linn.), found near Wellington College, Berks.

Dr. R. C. A. Prior exhibited some fruits of the Baobab (*Adansonia*) and an undetermined species of Palm which had been sent from Matabele-land as good to eat, under the misleading names of "Cream of Tartar Fruit" and "Wild Orange." He read an extract from Oates's "Matabele-land," describing the

natural growth and appearance of the Baobab as observed in that country.

The Hon. W. B. Espeut exhibited some nests of Hummingbirds from Jamaica, and pointed out the variety of materials used by the same species, though placed in the same tree (a mangrove), the coloration in some cases being protective, in others not.

The following papers were read:—

1. "On two new Species of Cumacea from New Zealand." By G. M. Thomson, F.L.S.

2. "On the Development of the Head of the Imago of *Chironomus*." By L. C. Miall, F.L.S., and A. R. Hammond, F.L.S.

January 21st, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Messrs. Benjamin James Austin, Stanley Edwards, and Frederick Turner were elected Fellows, and Mr. Thomas John Moore, Curator of the Derby Museum, Liverpool, was elected an Associate.

On a motion by the President it was unanimously resolved that an expression of respectful sympathy should be conveyed to Her Majesty the Queen and to H.R.H. the Prince of Wales, on the loss sustained by the death of H.R.H. the late Duke of Clarence and Avondale.

Mr. F. Woodward exhibited microscopic sections illustrating the development of the teeth in the Marsupialia. He drew attention to Prof. Kukenthal's recent discovery of supposed rudimentary successors to all the teeth, thus showing that the adult set of teeth must be regarded as belonging to the first or milk-series, and not, as generally supposed, to the second or successional dentition. These statements he was able to confirm for the incisors and several upper molars of *Didelphys*. In the Phalanger (*Trichosaurus*) no trace of these structures was found in connection with the molar teeth, but they were present with the upper incisors. In no case did these rudimentary successional teeth pass beyond the condition of simple downgrowths from the enamel organs of the functional teeth.

Mr. J. W. Willis Bund exhibited a supposed hybrid between the Common and the Red-legged Partridge, but in the opinion of Ornithologists present it was regarded as merely a variety of the former species.

Mr. J. C. Mansel-Pleydell exhibited a pair of malformed horns

of the Roebuck found at Whatcombe, Blandford, Dorset, their peculiar growth resulting from exostosis consequent upon injury sustained while in the sensitive condition.

Mr. D. Morris communicated some further notes upon the Tick Pest in Jamaica, upon which an animated discussion took place.

The following papers were then read:—

1. "On the Development of the Caoutchouc-containing Cells of *Eucommia ulmoides*, Oliver." By Frederick Ernest Weiss, F.L.S.

2. "On the Lichens of Manipur." By Dr. Jean Müller. (Communicated by W. T. Thiselton Dyer, F.R.S., F.L.S.)

February 4th, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

John Rattray, Esq., was elected a Fellow.

The President read a letter from General Sir Dighton Probyn, conveying the thanks of the Prince and Princess of Wales for the expression of condolence with their Royal Highnesses in their severe bereavement which had been forwarded by him on behalf of the Society.

The vacancies on the list of Foreign Members caused by the deaths of Prof. C. J. von Maximowicz, Prof. Carl G. von Nägeli, Prof. Joseph Leidy, and Prof. Jean L'Armand de Quatrefages having been announced by the President, the following nominations were made on the recommendation of the Council, and the Certificates ordered to be suspended:—

Dr. William Gilson Farlow, of Harvard University.
Prof. Carl Eduard Goebel, of Munich.
Prof. Karl Möbius, of Berlin.
Prof. Christopher F. Lütken, of Copenhagen.

Mr. J. E. Harting exhibited Gould's coloured plate of a Humming-bird (*Phaethornis longuemareus*), of which species a pair had made their nest in the drawing-room of Mr. Hamilton, of Queen's Park, Trinidad. The nest was built in a Palm about 5 feet high, standing in a tub within the room. The first egg was laid on the 27th December last, the second on December 29th, and a young bird was hatched on January 12th. The circumstance was regarded as quite unprecedented, though Mr. D. Morris was able to quote a case which came under his own observation in Jamaica, wherein a Humming-bird had built its nest on the extremity of a saddle-bar in a verandah.

Mr. Harting also exhibited some life-sized photographs of the egg-cases of two species of Dog Fish (*Scyllium*), and made some remarks on the mode of deposition and period of incubation as observed in different aquaria.

The following papers were then read:—

1. "A Monograph of the Genus *Dianthus*." By F. N. Williams, F.L.S.

2. "On the Sponge-remains in the Lower Tertiary Strata near Oamaru, Otago, New Zealand." By G. Jennings Hinde, Ph.D., and W. Murton Holmes. (Communicated by W. Percy Sladen, Sec.L.S.)

February 18th, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Messrs. Charles Chilton, John Humphrys, and Frederick Arthur Askew Skuse, were elected Fellows.

The President exhibited specimens of *Cystocœlia immaculata*, an Orthopterous insect from Namaqualand, in which the female is far more highly coloured than the male, and made some remarks on the stridulating apparatus of the insect. He further exhibited specimens of a Crustacean, *Ocypoda ceratophthalma*, and communicated some interesting information thereon.

The following papers were then read:—

1. "On Bud-protection in Dicotyledons." By Percy Groom, B.A., F.L.S.

2. "A Revision of Colenso's New Zealand Hepaticæ." By Prof. F. Stephani of Munich. (Communicated by W. T. Thiselton Dyer, F.R.S., F.L.S.)

March 3rd, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

An acknowledgment from the Home Secretary, in reply to the address of condolence to Her Majesty the Queen on the death of His Royal Highness the Duke of Clarence and Avondale, was read from the Chair.

The President announced the presentation to the Society by Sir Joseph Hooker, M.D., K.C.M.G., of two medallion portraits of Sir James Ross and Dr. John Richardson, whose names were well known in connection with Arctic exploration. The Medal-

lions were executed in 1843 by the late Bernhard Smith. A vote of thanks to the donor was passed unanimously.

Mr. Clement Reid exhibited a collection of fossil plants and seeds which he had found associated with the bones of Rhinoceros and other Mammals in the neighbourhood of Selsea and West Wittering. By means of diagrams Mr. Reid showed the exact position of the bed, and described the condition in which the various specimens were deposited.

On behalf of Mr. W. E. Beckwith, of Shrewsbury, Mr. H. Seebohm exhibited a specimen of White's Thrush (*Turdus varius*) which had been shot near Shrewsbury on the 14th January last. He pointed out that this species, which inhabits Eastern Asia, belongs to the subgenus *Oreocincla*, an exclusively eastern group of Ground Thrushes, and is the only one which is palæarctic and migratory. It does not breed anywhere west of the Yenesei, and its occurrence in Europe is accidental. Mr. Seebohm added that it had been met with twice in France, four times in Italy, three times in Belgium, once or twice in Austria and Prussia, once in Norway, thirteen times in Heligoland (between 1827 and 1884), and about a score of times in the British Islands, including three occurrences in Ireland and one in the extreme south of Scotland.

On behalf of Mr. A. Craig-Christie, the Secretary exhibited some specimens, as was supposed, of *Lycopodium complanatum* collected in Scotland, on which it was suggested that the plant might be regarded as British. In the opinion, however, of Mr. James Groves, who had carefully examined the specimens, and of other botanists present, they were referable to *L. alpinum*. Mr. Groves pointed out the distinctive characters of both. Mr. Carruthers was of opinion that *L. complanatum* had been met with in the South of England, but not within the last 10 years. Mr. E. M. Holmes was under the impression that he had seen it growing a few years ago near Stroud.

The following paper was read:—

"On Variations in the Internal Anatomy and especially the Genital Organs of the *Gamasinæ*." By Albert D. Michael, F.L.S.

March 17th, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. E. M. Holmes exhibited specimens of *Phacelocarpus disciger*, a new species of seaweed from Cape Colony, collected by Dr. Becker near the mouth of the Kowie River. One of the specimens exhibited bore antheridia, which have not previously

been described in this genus. The species differs from those already known in bearing the organs of reproduction on the surface of the frond instead of on the margin.

Mr. Buxton Shillitoe exhibited and made some remarks upon the flowers of *Leucojum vernum* and *Helleborus viridis*, both gathered near Lyme Regis.

The following papers were read:—

1. "On the Resisting Vitality of the Spores of *Bacillus Megaterium* to the condition of Dryness." By Allan Peter Swan, F.L.S.

2. "Notes on the Zebras." By S. B. Carlill. (Communicated by W. Percy Sladen, Sec.L.S.)

April 7th, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Spencer Moore exhibited and made remarks upon some samples of Maté or Paraguayan Tea recently brought by him from South America.

Mr. J. Tristram-Valentine exhibited a skin of Grevy's Zebra, recently brought from Somali-land by Mr. H. D. Merewether, who had lately purchased it from a caravan arriving from the southern Dalbahanta country to the S.E. of Berbera. Although it corresponded in character and disposition of the stripes with the type specimen from Shoa, and with a skin in the British Museum from Berbera (Proc. Zool. Soc. 1890, p. 413), it differed in the stripes being brown upon a pale sandy or rufescent ground, instead of black upon a white ground. It was suggested that this might be the desert form, the type specimen representing the mountain form.

Mr. Tristram-Valentine also exhibited horns of Swayne's Hartebeest and Clarke's Antelope (both recently described species), which, like the Zebra-skin, had been recently brought from Somali-land by Mr. Merewether.

Mr. W. S. D'Urban exhibited specimens of the Shell Slug (*Testacella Maugei*) from Devonshire.

The following papers were read:—

1. "On the Phenomena concerned in the Production of Forked and Branched Palms." By D. Morris, F.L.S.

2. "On Gland-like Bodies in the Bryozoa." By A. W. Waters, F.L.S.

April 21st, 1892.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Henry Groves was elected a Fellow.

The President announced that the following Auditors to examine the Treasurer's Accounts had been nominated by the Council, and by show of hands these were unanimously elected:—

For the Council { Dr. John W. S. Meiklejohn. / Mr. Alfred William Bennett.

For the Fellows { Mr. Charles James Breese. / Mr. Albert D. Michael.

An example of an Australian bird (*Gymnorhina*) was exhibited on behalf of Mr. W. Else, Curator of the Torquay Museum. It had been lately shot near Tor Abbey, Devonshire, after having been observed all the winter, and had doubtless escaped from confinement.

On behalf of Mr. Charles Head of Scarborough, two specimens of the Whiskered Bat (*Vespertilio mystacinus*) taken in that neighbourhood were exhibited.

The following papers were read:—

1. "On a Botanical Collection made by Mr. A. E. Pratt in Western China." By W. Botting Hemsley, F.R.S., A.L.S.

2. "On the Relation of the Acarida to the Arachnida." By H. M. Bernard. (Communicated by A. D. Michael, F.L.S.)

A Circular from the Italian Botanical Society, inviting botanists to be present at the forthcoming Botanical International Congress to be held at Genoa in September next, was laid before the Fellows.

May 5th, 1892.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Messrs. Charles Arthur Barber, Frederick Enock, and Henry Power were elected Fellows; and Prof. William Gibson Farlow, Prof. Carl Eduard Goebel, Prof. Karl Möbius, and Prof. Christian F. Lütken were elected Foreign Members.

On behalf of Mr. Holt, Prof. G. B. Howes exhibited and made remarks on a very interesting collection of the metamorphosing larvæ of flatfish.

Mr. Curtis showed a photograph of sections of the Silver and Douglas Firs, illustrating the relative rate of growth in trees of the same age, growing in the same soil, and under similar conditions in all respects, the diameter of the one, *Abies Douglasii*, being nearly double that of the other.

Mr. George Murray exhibited spirit-specimens of *Ascothamnion intricatum*, an organism described as a Siphoneous Alga, but ascertained to be identical with an animal, namely *Zoobotryon pellucidum*, Ehrenberg. He also exhibited two specimens of a Palm (*Thrinax Morrisii*, C. H. Wright), peculiar to Anguilla in the Leeward Islands; and made remarks as to the results of the recent Cryptogamic collections made by Mr. W. R. Elliott for the West India Committee.

Mr. E. M. Holmes exhibited and made some observations on an abnormal development of the calyx in a Primrose.

The President exhibited and explained a collection of Lepidoptera containing several examples of mimicry between protected forms.

The following papers were read:—

1. "Lichenes Epiphylli Spruceani." By Dr. J. Müller. (Communicated by W. T. Thiselton Dyer, F.R.S., F.L.S.)
2. "Notes on the Saturniidæ, with descriptions of some new Species in the British Museum." By William F. Kirby, F.L.S.
3. "Studies in British Worms."—Parts I. & II. By the Rev. Hilderic Friend, M.A., F.L.S.

May 24th, 1892.

Anniversary Meeting.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Dr. John Meiklejohn, on behalf of the Auditors, presented the Treasurer's Annual Statement of Accounts, duly audited, as follows, p. 55.

The Secretary read his report of deaths, withdrawals, and elections, and the condition of the Library, as follows:—

Since the last Anniversary Meeting 27 Fellows have died, or their deaths been ascertained, viz.:—

Receipts and Payments of the Linnean Society, from May 1st, 1891, to April 30th, 1892.

Receipts.	£	s.	d.
Balance at Bankers' on 1st May, 1891	418	13	6
Interest on Investments	221	7	1
Admission Fees	120	0	0
Annual Contributions	1445	19	9
Compositions	330	0	0
Sales of Publications:—			
Transactions £45 11 4			
Journals 115 16 1			
Proceedings and Catalogues 1 9 3			
	162	16	8
Donations	137	11	4
	£2836	8	4

Payments.	£	s.	d.
Taxes and Insurance	19	1	3
Repairs and Furniture	63	0	9
Coals and Gas	79	4	9
Salaries	647	0	0
Library:—			
Books £237 14 4			
Binding 64 7 6			
	302	1	10
Expenses of Publications:—			
Printing £648 5 5			
Illustrations 261 15 3			
Distribution 70 18 3			
	980	18	11
Miscellaneous Printing and Stationery	52	10	8
Petty Expenses (including Tea and Postage)	86	5	0
Investments	200	0	0
Balance at Bankers' on 30th April, 1892	406	5	2
	£2836	8	4

Investments on the 30th April, 1892.

	£	s.	d.			£	s.	d.
Consols, 2¾ per cent.	4870	1	4	@	96⅜ p. c.	4693	10	6
Metropolitan 3½ per cent. Stock	1079	11	3	@	106 p. c.	1144	6	8
Great Indian Peninsula Railway 5 per cent. Guaranteed Stock	630	0	0	@	174½ p. c.	1099	7	0
Forth Bridge Railway 4 per cent. Stock	450	0	0	@	127 p. c.	571	10	0
					FRANK CRISP, *Treasurer.*	£7508	14	2

17th May, 1892.

Audited and found correct. { ALBERT D. MICHAEL, JOHN W. S. MEIKLEJOHN, W. PERCY SLADEN, CHARLES J. BREESE. } *Auditors.*

Prof. Peter Martin Duncan.
Mr. John Shaw.
Mr. Ferdinand Grut.
Mr. David Barclay Chapman.
Sir George MacLeay.
Surg.-Major Arthur Barclay.
Mr. Charles Smith Wilkinson.
Rev. Percy Watkins Myles.
Dr. Philip Herbert Carpenter.
Rev. Charles Popham Miles.
Mr. George Rogers.
Prof. Henry Nottidge Moseley.
Mr. Thomas Hyde Hills.
Mr. William Melles.
Dr. Charles Cogswell.
Mr. Thomas Higgins.
Mr. Walter Hood Fitch.
Sir William John MacLeay.
Mr. William Henry Hallett.
Col. James Augustus Grant.
Dr. George Henry Kingsley.
Mr. Henry Walter Bates.
Sir William Bowman.
Capt. William Chimmo.
Lord Arthur John Edward Russell.
Mr. Edward Milner.
Mr. Charles Knight.

ASSOCIATE.

Mr. Thomas Shearman Ralph.

FOREIGN MEMBERS.

Prof. Joseph Leidy.
Prof. Jean L'Armand de Quatrefages.
Dr. Sereno Watson.

During the past official year 8 Fellows have withdrawn, viz.:—

Mr. George Thom.
Mr. William Henry Miskin.
Rev. Andrew Johnson.
Hon. F. Stanley Dobson.
Mr. Francis Henry Hill Guillemard.
Mr. William Cash.
Rev. Canon James Baker.
Mr. Charles Bagge Plowright.

And 20 Fellows, 1 Associate, and 4 Foreign Members have been elected.

During the past year there have been received as Donations from private individuals to the Library 52 volumes and 150 pamphlets and separate impressions of memoirs.

From the various Universities, Academies, and Scientific Societies there have also been received in exchange and otherwise 173 volumes and 82 detached parts, besides 56 volumes and 31 parts obtained by exchange and donations from the editors and proprietors of independent periodicals.

The Council, at the recommendation of the Library Committee, have sanctioned the purchase of 227 volumes and 152 parts of important works.

The total additions to the Library were therefore 508 volumes and 415 separate parts.

The following is the number of books bound during the past year:—In half-morocco 223 volumes, in half-calf 21 volumes, in full cloth 91 volumes, in vellum 20 volumes, in buckram

7 volumes, in boards or half cloth 10 volumes, rebacked (half-morocco and cloth boards) 25 volumes, relabelled 40 volumes. Total 437 volumes.

The Secretary having read the Bye-Laws governing the elections,

The President opened the business of the day, and the Fellows present proceeded to ballot for the Council and Officers.

The Ballot for the Council having been closed, the President appointed Mr. Henry Trimen, Dr. Maxwell T. Masters, and Mr. Thomas Christy to be Scrutineers, and the votes having been counted and reported to the President, he declared the following Members to be removed from the Council, viz.:—Mr. Alfred William Bennett, Dr. Robert Braithwaite, Mr. George R. M. Murray, Prof. Francis Wall Oliver, and Dr. David Sharp. And the following to be elected into the Council, viz.:—Mr. E. A. L. Batters, Mr. William Carruthers, Mr. Herbert Druce, Mr. Spencer L. M. Moore, and Prof. Dukinfield H. Scott.

The Ballot for the Officers having been closed, the President nominated the same Scrutineers, and the votes having been counted and reported, he declared the result as follows:—

President, Prof. Charles Stewart.
Treasurer, Mr. Frank Crisp.
Secretaries { Mr. B. Daydon Jackson.
Mr. W. Percy Sladen.

The President then delivered the Anniversary Address, as follows:—

The President's Anniversary Address.

Amongst living organisms, it is only those which are green from the presence of chlorophyll, and a few Bacteria, that are capable of forming the complex substances composing their bodies from inorganic materials alone. All other creatures are directly or indirectly dependent on these for some of their food-materials.

Not alone are animals and plants thus largely dependent one upon another for food, for the importance of insect and, to a certain extent, of bird agency in conveying pollen for the fertilization of the seed has long been recognized. Animals also play an important part in the necessary dispersion of plants, the seeds and fruits of which are often specially modified by possessing hooks, barbs, &c., favouring their temporary entanglement amongst hairs or feathers. Besides the above-mentioned relationships between living things, we find many cases in which there is a very constant and close association of different forms, an association which we may, following Van Beneden, conveniently divide into three groups, viz.:—1st, Messmates or Commensals; 2nd, Mutualists or Symbiotic forms; 3rd, Parasites.

The definition of these groups will, of course, be arbitrary; they will often shade off into one another, and the precise position of any given example may be difficult to determine.

I propose to-day to describe a few more or less familiar instances of Commensal and Symbiotic forms. The term Commensal I apply only to those groups in which one organism, the self-invited guest, derives advantage from its host without being injurious to it.

A deep-water hexactinellid sponge, *Crateromorpha Meieri*, shaped like a wine-glass, has its main body three or four inches long, with its walls exceedingly loose, owing to the great development of its canal-system. In almost every example of this sponge may be found a remarkable worm, *Syllis ramosa*, which, I believe, was first described in the Journal of this Society by Prof. M'Intosh*. When young, the embryo worm seeks shelter in the canal-system of the sponge, where it is protected against its numerous enemies, since the spicules, and sometimes the flesh also, of sponges is objectionable to most animals. The water-currents in the sponge bring to the worm the necessary food and oxygen, so that there is no occasion for it to leave its home. By a continued process of budding the worm acquires a much-branched form, the branches extending into the various canals of the sponge and projecting into the interior of its cup. The form of the worm is quite incompatible with a free life, but admirably fits it for its residence.

One of the Polychætous worms, *Eunice phylocorallia*, has been recently described by Miss Buchanan; it has only been found associated with a coral, *Lophohelia prolifera*. The presence of the worm in one place amongst the branches of the coral induces an extension of the cœnenchyma around it, forming a tube in which the worm dwells in safety, deriving additional protection by the surrounding hard branches of the coral with their stinging polypes.

Crustacea, like the Annelida, form the favourite prey of many animals; we accordingly often find that they seek protection by associating themselves with some other organism. Thus, in the well-known instance described by Semper, we find a small crab, *Haplocarcinus marsupialis*, when quite young taking up its abode in the fork of the branches of a coral, either a species of *Seriatopora* or *Pocillopora*. The coral is stimulated to increased growth and forms a gall-like structure; in a cleft at the bottom of this the crab dwells in security, feeding on such animals as may wander into the space above, which is enclosed by the over-arching branches of the coral.

The numerous species of *Pergoma* (one of the Cirripedia) find protection by developing each in its own particular coral.

Coronula, another member of the same group of Crustacea, is fixed in a very beautiful way to the skin of certain species of whale, gaining thereby free locomotion.

* Journ. Linn. Soc., Zool. vol. xiv. p. 720.

The small soft-shelled pea-crab, *Pinnotheres*, is only found sheltered in the mantle-cavity of some Lamellibranch, to which the ancients thought it acted as a sort of watch-dog, by administering a nip to give warning of approaching danger.

The genera *Pontonia* and *Jypton*, again, are only found similarly protected in the interior of some animal. Of the latter genus, *Jypton spongicola* is only found concealed in the cavity of a sponge, which it closely resembles in colour and degree of transparency, and has a curious habit of making a sharp noise by snapping its chelæ, apparently with the object of frightening away its enemies.

Amongst the Lamellibranchiata, *Montacuta* is found on the spines of *Spatangus*, gaining protection and free locomotion. *Modiolaria marmorata* buries itself in the tough test of an Ascidian.

Amongst Gastropods are many examples of associated forms which may probably be considered as instances of Commensalism, although the nature of their food being undetermined, they may perhaps prove to be parasites, no apparent injury to their hosts being evident.

Thus *Capulus crystallinus* is often found attached to the under or actinal surface of the starfish *Linckia multiformis*; *Styliger Turtoni* on our common *Echinus miliaris*; *Amphiperas acicularis* on a Gorgonia, *Pterogorgia pinnata*. It is interesting to notice that the shell of this Gastropod has a similar purple colour to the Gorgonia.

To turn now to fish. The various species of *Fierasfer* are well known to seek shelter in the interior of sea-cucumbers: thus *F. acus* may often be seen in the aquaria at Naples hovering about *Holothuria tubulosa*, and on the slightest alarm plunging head first through the mouth or anus of the Echinoderm, to emerge again when its enemy has departed. *Stromateus microchirus* and the young of many other fish may constantly be found swimming under the umbrella of the larger Medusæ, the urticating nature of their host defending them against their numerous enemies. Mr. Saville Kent has also called attention to two species of *Amphiprion*, viz. *A. bicinctus* and *A. Kenti*, which are only found swimming freely in the digestive cavity of a large sea-anemone, the first in *Discoma Haddoni*, the second in *D. Kenti*.

We will now turn to some instances of Symbiosis, that is, of forms associated for mutual advantage. In Lichens we have familiar examples of such association, the nature of which was first pointed out by Schwendener, his views being accepted by most, although still denied by some lichenologists. According to him the green cells, the gonidia of lichenologists, are algæ which can live independently, but in the lichen are associated with a fungus which can only maintain its life by their aid. Again, the nodes on the roots of the Leguminosæ are due to a fungus by whose aid the higher plant is believed to be able to avail itself of atmospheric nitrogen.

Certain yellow and green cells found in many animals are in most cases symbiotic algæ. The yellow cells (*Philozon*, Geddes ; *Zooxanthella*, Lankester) are examples. They are common in Radiolaria, in *Orbitolites* amongst the Reticularia, and in the Infusorian *Ceratium*; in the Hydroids, *Velella* and *Cassiopeia*. They are also found in a particular variety of *Anthea cereus* and in *Gorgonia verrucosa*.

Green cells, *Zoochlorella* (Brandt), *Chlorella* (Beyerinch), are met with in *Stentor*, *Hydra*, *Convoluta*, &c. For purposes of mutual advantage we find the alga *Struvia delicatula* associated with a Halichondrine sponge ; *Trentepohlia spongophila* with the sponge *Ephydatia fluviatilis*. *Marchevetia spongioides* (a red alga) is similarly invested and modified in growth by a sponge.

Time will only allow of my mentioning two other instances of symbiosis between plants and animals. There is the well-known instance of the plants *Myrmecodia* and *Hydnophytum*, the lower parts of whose stems are swollen and hollowed out into a series of intercommunicating chambers which open externally, in the first instance, near the roots, and afterwards by additional openings at their sides ; there is thus formed a natural formicarium utilized by three species of ant, viz., *Pheidole megacephala*, *Cremastogaster deformis*, and *Iridomyrmex cordatus*. These ants defend the plant, and have entirely lost the power of making a home for themselves.

The bull's-horn acacia, *Acacia cornigera*, described by Belt, is a most perfect instance of a plant modified in special relation to the requirements of ants (*Pseudomyrmex bicolor*). Honey-glands on the upper surface of the leaf-stalk supply the ants with food, which is supplemented by little fruit-like bodies borne on the extremities of the leaflets, which contain oil and granules of aleurone, the hollow spines at the base of the leaf serving as a home. It is impossible, within the limits of this Address, to consider the numerous examples of symbiosis between animals, of which hundreds of most interesting cases are known.

The Address was illustrated by coloured chalk drawings.

Dr. Richard C. A. Prior then moved the following resolution, viz. :—"That the thanks of the Society be given to the President for his excellent Address, and that he be requested to allow it to be printed." This, having been seconded by Mr. John Jenner Weir, was carried unanimously.

The obituaries of deceased Members were then laid before the Meeting by the Senior Secretary.

Obituary Notices.

By the death of Arthur Barclay at Simla on the 2nd August last, this Society has lost one of its youngest Members and most zealous workers. He was born at Edinburgh, 3rd August, 1852,

and studied at the Universities of Edinburgh and Glasgow, at which latter he gained the Gold Medal for Botany in 1871. At Glasgow he graduated three years later, and then pursued further studies at Würzburg, in 1875 entering the Indian Medical Service, next as civil surgeon at Jessore, but gave this up on being appointed Professor of Physiology at the Medical College, Calcutta. At the time of his death he was Secretary to the Surgeon-General and Sanitary Commissioner, and had but just concluded his travels with the Leprosy Commission, of which he was Secretary.

The memoirs he published are to be found in the Scientific Memoirs of the Medical Officers of the Army of India, in the 'Journal of Botany,' and, perhaps the most important of all, in our own Transactions.

He was elected Fellow in 1890; and the papers from his pen already alluded to gave promise of a career of great activity and research, which his unlooked for and early death has destroyed.

Henry Walter Bates was born at Leicester on February 8th, 1825. Brought up by his father for a business career, he was apprenticed, on leaving school at the age of fourteen, to a local manufacturer. Notwithstanding his long working-hours, which extended from 7 A.M. to 8 P.M., young Bates lost no opportunity of improving his mind and of making up for the deficiencies of his education, often studying till midnight, and often rising at daybreak to snatch the time before his daily work began.

His taste for natural history, and especially for entomology, developed speedily, and was without doubt fostered by his friendship with Edwin Brown. He became an ardent collector of Coleoptera, and published notes in the 'Zoologist' upon the species occurring in the neighbourhood of Leicester and in Charnwood Forest, his first communication appearing in 1843, when he was about 18 years of age. About 1845 he made the acquaintance of Alfred Russel Wallace, who was then an English master in a school at Leicester, interested in botany, but who was led by the enthusiasm of his new-found friend to take up the study of entomology.

On the death of the manufacturer to whom Bates had been apprenticed, he left Leicester, and obtained a clerkship in the office of the Messrs. Allsopp, of Burton-on-Trent; but the occupation was not congenial to him, and he subsequently abandoned commercial pusuits on the invitation of Mr. Wallace to join him in an exploring expedition to the Amazons.

The two friends arrived at Para in April 1848, and made joint collections in that neighbourhood for nearly a year, when they decided to separate. Bates left Para in November 1851 on his now classical journey to Tapajos and the Upper Amazons, which occupied seven years and a half, and during which he experienced numberless privations and hardships. The narrative of his adventures is given in his delightful book 'The Naturalist on the Amazons,' which was published at the special instigation of

Mr. Darwin; and is not only one of the most fascinating works of travel ever written, but a monument of English pluck and perseverance.

During his travels, Bates sent home a number of articles and extracts from his journal, which were published in the 'Zoologist' between 1849 and 1858. In 1859 he returned to England, after eleven years' absence, and energetically commenced the working-out of his collections, which comprised over 14,700 species, of which no less than 8000 were new to science. Amongst the papers which he then wrote one of the most important is certainly his famous memoir entitled "Contributions to an Insect Fauna of the Amazons Valley," which was published in the 'Transactions' of this Society in 1862, wherein the theory of mimicry of protective resemblances was first formulated. In 1864 he contributed to the 'Journal of Entomology' an important paper on the Classification of the Rhopalocera, which has been described as "the most philosophical and natural system yet attained in the arrangement of any Order of the Insecta." He subsequently published a magnificent work on Coleoptera, which occupies three quarto volumes in Messrs. Godman and Salvin's 'Biologia Centrali-Americana.' He wrote a volume on "Central America, West Indies, and South America," which forms part of Stanford's 'Compendium of Geography and Travel;' and he edited for Messrs. Cassell a valuable series of volumes entitled 'Illustrated Travels.' In addition to all this, he was the author of a great number of papers, chiefly on entomology, which have appeared in the publications of this and other scientific societies and in various serial journals.

In 1864 Bates became Assistant Secretary of the Royal Geographical Society, and continued to hold the post until his death; the universal esteem and the appreciation in which he was held is eloquently recorded in the 'Proceedings' of that Society.

He was elected a Fellow of this Society in 1871. He was also a Fellow of the Royal Society and of the Entomological Society (of which he twice filled the office of President). One of his most valued honours was the Order bestowed upon him by the late Emperor of Brazil in recognition of his services as an explorer.

By the death of Henry Walter Bates on February 16, 1892, science loses not only a great traveller, but a philosophic naturalist of the first rank, and one for whose memory it has been claimed that he was probably the greatest, and certainly the most loved and respected, entomologist of his time.

Sir William Bowman was born at Nantwich on July 20th, 1816. He was educated at Hazelwood School, Birmingham, and afterwards as a pupil at the Birmingham General Hospital. In October 1837 he entered King's College Hospital, and two years later was appointed Demonstrator of Anatomy. In 1840 he was elected Assistant Surgeon to that Hospital, and in 1846 to a

similar post in the Royal London Ophthalmic Hospital. In 1851 he became full Surgeon, a position which he also soon afterwards attained in King's College Hospital. After practising for some years as a general surgeon, he was induced, by the advice of his friends, to devote himself entirely to the diseases of the eye. In this branch of surgery he has established a brilliant and well-earned reputation, both as an operator and as the successful introducer of novel modes of treatment.

As a microscopist his manual dexterity was remarkable; and to him is due the credit of being the pioneer of microscope work in the Medical School of King's College. His capacity for close and careful observation was probably in a large measure inherited from his father, Mr. John Eddowes Bowman, who attained considerable distinction as a naturalist.

Sir William Bowman contributed to the Royal Society some important researches, which are now ranked as brilliant discoveries, on the structure and movements of Voluntary Muscle, which were followed later by equally valuable investigations on the structure of the Kidney, of the Mucous Membrane of the Alimentary Tract, and other anatomical subjects, especially on the Liver and the Eye.

He was elected a Fellow of the Royal Society in 1841, and subsequently served in the office of Vice-President. He received one of the Royal Medals in 1842. Honorary degrees were conferred upon him by the Universities of Cambridge, Dublin, and Edinburgh; and he was a Member of numerous medical and scientific societies both in this country and abroad. In 1884 he was created a Baronet in recognition of his professional eminence.

He was elected a Fellow of this Society in 1866. He died on March 29, 1892, at Joldwynds, his house near Dorking, from an attack of pneumonia.

Philip Herbert Carpenter, the fourth son of the late Dr. William B. Carpenter, C.B., F.R.S., was, in every sense of the word, a naturalist by birth. He inherited to a remarkable degree the love of nature, the clear logical reasoning, and the power of ready exposition so eminently characteristic of his distinguished father. Born at Westminster on February 6th, 1852, he was educated at University College School and Cambridge, where he entered as Scholar of Trinity College in 1871, and graduated in the First Class of the Natural Science Tripos in 1874, proceeding to the further degrees, M.A. in 1878 and D.Sc. in 1884. Between 1875 and 1877 he studied at the University of Würzburg, and in the latter year was appointed Science Master at Eton, a post which he held until his death. Apart from his academic training, Herbert Carpenter may be said to have been brought up in the very atmosphere of research; for at the age of sixteen he accompanied his father on the celebrated deep-sea dredging-cruize of H.M.S. 'Lightning;' and in 1869 and 1870 he took part in the

explorations carried out by the 'Porcupine.' And, again, in 1875 he was one of the scientific party on board H.M.S. 'Valorous' which accompanied Sir George Nares' Arctic Expedition as far as Disco, for the purpose of sounding and dredging in Davis Strait and the North Atlantic.

With such an education and an inborn love for natural history, it is not surprising that Herbert Carpenter devoted himself with enthusiasm to the work by which he has built up an imperishable reputation. He was led to attach himself to the study of Echinoderm Morphology, and especially to the selection of the Crinoidea as the subject of his life's work, whilst studying in the laboratory of Prof. Semper at Würzburg in 1875. Semper and Ludwig having criticised certain statements of Dr. W. B. Carpenter regarding the anatomy of *Antedon*, Herbert Carpenter not unnaturally made himself acquainted with the points under discussion as well as with the preparations upon which the views of his father's critics were based; and this resulted in the publication of two papers wherein the contending opinions were reconciled. Further work in the same direction, upon material furnished by Prof. Semper, followed, and led to the production, after two years of careful investigation, of Herbert Carpenter's important memoir "On the Genus *Actinometra*," which was published in 1879 in the 'Transactions' of this Society. Once launched in these studies, which Carpenter grappled with such vigour and enthusiasm, the direction of his life's work seemed determined. The preparation of the Report upon the Comatulæ collected by the 'Challenger' Expedition was placed in his hands by Sir Wyville Thomson; and on the latter's death in 1882, the Report on the Stalked Crinoids, which Thomson had himself intended to write, was also entrusted to Carpenter. These two magnificent monographs, which appeared in 1884 and 1888, are masterpieces of careful investigation, and are works upon which British science will long look with pride.

Between 1875 and the time of his death a long array of papers on recent and fossil Crinoids, as well as on general Echinoderm morphology, were produced, which are printed in the publications of this Society, and of the Royal, Geological, and Zoological Societies, and in various English and foreign journals open to such contributions. In addition to this, Carpenter was joint author with Mr. Robert Etheridge, junr., of the Catalogue of the Blastoidea in the British Museum, which is a model of careful descriptive palæontology. The number of our Journal which, by a sad coincidence, was published on the day of his funeral, contained his last three papers. One of these treated of certain points in the Morphology of the Cystidea and is a memoir full of mature knowledge and critical reasoning, based on extensive observation, which shows how ably he was proceeding to fulfil the expectations of palæontologists towards preparing a monograph on that difficult group also.

He was elected a Fellow of the Royal Society in 1885; and he

served on the Library Committee and Council of this Society from 1887 to the time of his death.

Herbert Carpenter was a man of remarkable industry and perseverance, ever full of enthusiasm in his work; few who have done so much appeared to have a future before them so promising of rich results. His sad and untimely death on the 22nd of October, 1891, at the early age of 39 has removed a leader from the ranks of British biologists whose loss will be mourned by all to whom his genial disposition and sterling goodness had bound him.

Capt. William Chimmo was born in 1828, and entered the Royal Navy in 1841. He obtained the rank of Lieutenant in 1850, and of commander in 1864; and he retired with the rank of post-captain in 1873. He served in the first and second China wars, against pirates in Borneo, and for six and a half years was engaged in the 'Herald' in the search for Sir John Franklin. Afterwards he led the successful search for Mr. Gregory and his exploring party in Torres Straits. In addition to this, he distinguished himself by the important physical and biological observations which he made during the various surveying expeditions on which he was subsequently employed for a long series of years by the Hydrographical Department. Accounts of these are published in the 'Journal' and 'Proceedings' of the Royal Geographical Society; and he also published as separate works the 'Voyage of H.M.S. *Torch* from Sydney to the Gulf of Carpenteria and Batavia' (London, 1857), and the 'Natural History of the *Euplectella aspergillum* (Venus's Flower-Basket) from the Philippine Islands,' with plates (1878).

Captain Chimmo was Secretary to the Hydrographer of the Admiralty from 1856 to 1858.

He was elected a Fellow of this Society in 1877. He was also a Fellow of the Royal Geographical, Astronomical, and Meteorological Societies. He died on 30th of October, 1891.

Peter Martin Duncan was born at Twickenham on April 20th, 1824. After passing the early stages of his education at the Grammar School of his native village and at a school in Switzerland, he entered, in the autumn of 1842, the Medical Department of King's College, London, where he worked with distinction. He took his M.B. (London) degree in 1846; and in 1849 he was elected an Associate of his College.

His duties as a medical practitioner began at Rochester, where he acted as assistant to Dr. Martin until, on the purchase of a practice at Colchester, he commenced on his own account. Whilst settled in Colchester he took an active interest in politics and in municipal affairs, which resulted in his election in 1857 to the Mayorality of the borough, a testimony to his popularity as well as to the appreciation in which he was held by his fellow townsmen. His energetic personal endeavours to improve the

institutions of the town are perpetuated in the admirable arrangement of the Museum, which was carried out under his directions in a manner far in advance of that met with in similar provincial collections. He was also one of the founders of the Essex Archæological Society.

The devotion of such portions of his time as could be spared from professional duties to the Municipality naturally left few opportunities for original research. Nevertheless his first published paper, entitled "Observations on the Pollen-tube, its Growth, Histology, and Physiology," appeared in 1856; and much scientific work, which bore fruit subsequently, was certainly undertaken during his residence in Colchester. About 1860 he took a practice at Blackheath, where he was able to give more time to purely scientific work, devoting himself especially to the study of Corals; and he was finally led to practically abandon medical practice in order to devote himself entirely to original research. After leaving Blackheath he settled near Regent's Park, and in 1864 he was appointed one of the Honorary Secretaries of the Zoological Society, an office he held for seven years; and in 1866 he was elected Fellow of the Royal Society. In 1870 he was called to the Chair of Geology at King's College; and a Fellowship was conferred in 1871. Shortly afterwards he accepted also the Professorship of Geology at Cooper's Hill, both of which appointments he held until his death. In 1872 he was elected Vice-President of the Geological Society, an office which he held until his election to the Presidency in 1876 and 1877. In 1881 he was awarded the Wollaston Medal, the highest honour which the Geological Society can bestow. He served on the Council of the Royal Society from 1876 to 1878; was President of the Geological Section of the British Association in 1879, and of the Microscopical Society from 1881 to 1883. He served on the Council of this Society from 1888 to 1891, and was Vice-President in 1890 and 1891; and in 1890 was invited to accept the Presidency, an office which unfortunately he felt obliged to decline on account of his then delicate state of health. He died after a long and painful illness on the 28th of May, 1891.

The amount of work accomplished by Prof. Duncan was enormous; and his wide range of interests, as well as his grasp of detail in many diverse spheres of knowledge, was remarkable. His first published paper, which appeared in 1856, was botanical, as previously mentioned, and between that date and 1874 he produced several papers on vegetable physiology; and still later he worked out the parasitic Algæ which he had discovered in some Silurian corals. Duncan's chief biological work, however, was zoological, the Corals and the Echini being the special subjects of his research; and his first important work was a series of memoirs on the Fossil Corals of the West Indies, certainly the most valuable contribution which had been made up to that time to our knowledge of the later Tertiary Corals. This work was followed by a long list of memoirs descriptive of the Coral

faunas (especially the fossil) of England, Malta, Australia, Tasmania, Java, India, and Arabia. His work on the Echinoidea, which was not less important and thorough, commenced with the forms associated with the Corals he had described from Australia and Arabia, and culminated in the monographs of the Tertiary Echinoidea of India, published in conjunction with a friend, in the 'Palæontologia Indica,' between 1882 and 1886.

Prof. Duncan's palæontological work was by no means confined to mere descriptive morphology and taxonomy; for there is scarcely one of his papers in which he does not discuss the affinities of the faunas concerned, and the light they throw upon the physical geography of the past. Bearing upon this aspect of his work, and upon the relationship of zoological evidence to geological problems, may be mentioned his papers on "The Physical Geography of Western Europe during the Mesozoic and Cainozoic Periods elucidated by their Coral Faunas," "The Formation of main Land Masses," and "The Fauna of Alpine Lakes." The views expressed in the last two memoirs are no less original than striking.

In addition to his palæontological work, he made many contributions to zoology, chiefly on Corals and Echini, but also on Ophiuroidea, Sponges, and Protozoa. Two of his most valuable works, both of which were published by this Society, are the "Revision of the Madreporaria," issued in 1885, and the "Revision of the Genera and Great Groups of the Echinoidea." These two masterly memoirs may be said to contain the summary of his life's work on the groups with which they deal. The Revision of the Madreporaria consisted of diagnoses of every genus of Coral (excepting the Rugosa) and of a classification which has not yet been superseded. The Revision of the Echinoidea treated of that group in a similar manner, and made a great advance in our knowledge in a number of important details. The application of his own brilliant discoveries on the structure of the ambulacra, of the perignathic girdle, and of other anatomical characters enabled him to place the classification on a surer footing than has previously existed, by substituting order for chaos, and a natural arrangement for arbitrary grouping.

In addition to his special work, Prof. Duncan undertook a large amount of popular literary work. He edited the six volumes of Cassell's 'Natural History,' the recent issues of Lyell's 'Student's Elements,' and the 'Micrographic Dictionary;' and he wrote, amongst other things, a 'Primer of Physical Geography,' a 'Manual of Geology for the Indian Civil Service,' a volume of biographies entitled 'Heroes of Science,' and a small popular Natural History treatise, 'On the Sea-Shore,' as well as numerous scattered papers, pamphlets, and addresses. The list of his works in the Royal Society Catalogue are 92 in number up to 1883, without including those written in conjunction with others.

Prof. Duncan was an able lecturer and a successful teacher.

He was also a firm friend and a wise counsellor, whose keen sense of humour and genial kindness were alone sufficient to ensure popularity. Apart from the record left by his work in the annals of Science, his memory will be cherished by his fellow-workers as that of a friend, beloved as well as honoured.

In the death of Walter Hood Fitch the present generation has to mourn the loss of a botanical artist whose productions are almost inseparably connected with the memories of the botanists now living and of the magnificent activities of Kew.

Born at Glasgow in 1817 on 28th February, young Fitch was in early years set to work designing patterns for textile fabrics, filling up his leisure by gluing down plants for the recently appointed Professor, Dr. William Hooker, who was so struck by some copies of outline plants he made from a volume which had been lent, that he paid for the release of Fitch from the print-works where he was serving his indentures.

Henceforward Fitch was associated with Sir William Hooker in his botanical publications, and in the 'Botanical Magazine' his name first appears in 1834. He migrated with Sir William to Kew in 1841; and in that place he ended his days on January 14th, 1892.

It would be a long task to recite all the botanical works which were illustrated by Fitch's ready and truthful pencil; not only a very large number of the 'Botanical Magazine' plates were his, but those also for the 'Icones Plantarum,' the quartos of Sir Joseph Hooker of his 'Antarctic Travels,' the folios of 'Victoria Regia,' of Elwes's monograph of *Lilium*, the 'Illustrations of Himalayan Plants,' and Seemann's 'Herald' and 'Flora Vitiensis;' while our own Transactions and Journals afford ample proofs of the deceased artist's power.

He became Fellow 7th April, 1857; his botanical commemoration is to be found in *Fitchia*, a Composite. He leaves a widow and several sons, one of whom has already drawn several plates for our Journal; and a nephew, whose connexion with the artistic work of the Society is of very long standing.

Col. James Augustus Grant was a son of the Rev. James Grant, the parish minister of Nairn, where he was born on April 11th, 1827. He received his education at the Grammar School of Aberdeen and the Marischal College. In 1846 he was gazetted Ensign in the 8th Native Bengal Infantry, present at the siege of Multan in 1847, and the battle of Gujerat in the next year. In 1857, his regiment having mutinied, he was attached to the force under General Havelock for the relief of Lucknow, was wounded while in command of the rear-guard, and was blockaded in that place for two months; the following year he was sent home on sick leave.

On his return to this country he found his old friend Captain

Speke was preparing to go back to Central Africa, to the south shore of the Victoria Nyanza, to trace, if possible, its connexion with the Nile. Grant volunteered to accompany him, and went as second in command of the expedition. They left England in 1860 and returned in 1863, having succeeded in their wishes, and Grant brought with him a large collection of objects of natural history, plants in particular. His volume 'A Walk across Africa,' which appeared in 1864, supplements the record by Speke. The plants he brought home were sent to Kew for identification, and were in the first instance worked over by Mr. Hemsley, and when revised by Dr. Thomas Thomson were appended as a supplement to Speke's 'Journal of the Discovery of the Source of the Nile.' A full botanical account of the collection was drawn up by Professor Oliver, and forms part of the 29th volume of our 'Transactions,' the cost of the plates being borne by Captain Grant.

The regretted death of his companion Speke took place in 1864, and immediately after Grant was offered the post of Consul at Fernando Po; this he did not accept, but the next year he was appointed second in command of the 4th Ghoorka regiment, then in the Himalayas. He served under Lord Napier of Magdala in the Abyssinian Expedition, and early in 1868 he retired from the Army.

He was elected Fellow of this Society March 16th, 1871: was also a Fellow of the Royal and Royal Geographical Societies, and the recipient of many distinctions, including his service medals, others from the King of Italy, the Pope (Pio Nono), and the Patron's Medal of the Royal Society (1865). He died at his residence, Househill, Nairn, on February 11th, 1892, from congestion of the liver.

Ferdinand Grut was born at St. Peter's Port, Guernsey, on January 19th, 1820. He was educated at Edinburgh Academy and University, and on leaving took a clerkship under his father, Nicholas Grant, who was then Secretary to the "Palladium" Insurance Office. In 1852 he became Secretary to "Marshall's Charity," an institution which had for its object the augmentation of the stipends of small Church livings. This position he held until his death.

He was a devoted Entomologist, and had formed a large collection of Coleoptera. It is through his long official connection with the Entomological Society that his name will be best remembered. His election dates back to 1846; he was on the Council in 1856, and again from 1868 up to his death. He held the office of Vice-President in 1863; was one of the Secretaries from 1871 to 1877, and Honorary Librarian from 1878 to 1891. Mr. Grut was also for many years Secretary to the Entomological Club.

He was elected a Fellow of this Society in 1872, and frequently attended the Meetings. He died on July 19th, 1891.

George Henry Kingsley, son of the Rev. Charles Kingsley, and brother of the well-known writer of the same name, was born at Barnack, in Northamptonshire, in 1827. He was educated at King's College, and studied medicine first at St. George's Hospital and afterwards in Edinburgh and Paris, graduating M.D.

He was an accomplished linguist, a keen sportsman, and an accurate observer; he was also an ardent student of Elizabethan literature. He was the author of a delightful sketch of highland stalking gossip, as well as of a volume of travel and adventure in the Southern Seas, conjointly with the Earl of Pembroke, which has passed through a number of editions. He translated a book of German Tales; and he edited one of the Early English Manuscripts from the famous collection at Bridgwater House.

He was elected a Fellow of this Society in 1856, but has not contributed any paper to our publications. He died suddenly of heart-disease at Cambridge on February 5th, 1892.

Joseph Leidy was born at Philadelphia on September 9th, 1823. In consequence of the taste he showed for drawing at the age of sixteen, it was his father's intention to educate him as an artist, but owing to the interest the boy took in natural objects, and to his aptitude for dissection and anatomy, it was determined that he should study medicine. With that object in view he entered the University of Pennsylvania in 1842, and graduated M.D. in 1844. After practising for about two years, he decided to abandon that side of his profession, and to devote himself to original research and to teaching. He was appointed Prosector to the Chair of Anatomy in his own University, and ultimately, on the death of Dr. Horner in 1853, was elected Professor of Anatomy, a position he held with the most distinguished success until his death, a period of nearly forty years.

The wide range of subjects to which Leidy devoted his attention is highly remarkable, and fully justifies the reputation accorded to him by his fellow-countrymen as their most distinguished biologist. He was not only a master of the comparative anatomy of recent forms of life, but has been aptly described as the Cuvier of American palæontology. He was, in addition, a recognized authority upon the Protozoa, as well as upon the Entozoa, and his knowledge of conchology, botany, and mineralogy was profound.

The list of his various papers and publications reaches the extraordinary number of 553. Amongst such an enormous catalogue of works it is almost impossible to specify the most important, but certainly amongst the chief should be mentioned his 'Elementary Treatise on Human Anatomy' (1861), his 'Contributions to the Extinct Fauna of the Western Territories' (1873), and his 'Freshwater Rhizopods of North America' (1879).

In addition to his other appointments, Dr. Leidy held the

post of Professor of Natural History in Swarthmore College, and in 1884 he was made Director of the Biological Department of the University of Pennsylvania and Professor of Zoology and Comparative Anatomy. He was President of the Academy of Natural Sciences of Philadelphia. He was a Foreign Member of the Geological Society, and was awarded the Lyell Medal in 1884. In 1886 the degree of LL.D. was conferred upon him by Harvard University; and in 1888 the Cuvier Medal was bestowed upon him by the Academy of Sciences of Paris. He visited Europe on four occasions; and he was elected into innumerable Academies and learned Societies in his own country and all over the world.

He was elected a Foreign Member of this Society in 1872. He died on April 30th, 1891; beloved by all who knew him, it has been truly said of this great man that he never made an enemy or lost a friend.

Sir William Macleay was born at Caithness on June 13th, 1820, and he was educated there and at the University of Edinburgh. In 1839 he emigrated to Sydney to join his uncle, the late Mr. Alexander Macleay, who for a number of years occupied the position of Colonial Secretary of New South Wales. In 1854 he was elected member of the Old Legislative Council, and at the introduction of responsible government, was returned to the First Legislative Assembly. He occupied a seat in the Legislature for more than thirty years, and during that period he was a persistent advocate of all that tended to the progress of his adopted country.

Sir William Macleay was a munificent patron of natural science, and exerted himself greatly to promote its encouragement in the Colony. In 1874 he purchased and fitted out a vessel for a scientific expedition to New Guinea, and the valuable collection of specimens then obtained forms part of the Macleay Museum of Natural History, which he presented to the University of Sydney. The value of the collection was estimated at £23,000, and in addition to this a sum of £6000 was given by Sir William Macleay to provide for the salary of the Curator.

It was mainly through the efforts of Sir William Macleay that the Linnean Society of New South Wales was founded in 1875, and from that time until his death he was its principal support. He first supplied the rent for the habitation of the Society, and contributed almost entirely the funds requisite for the purchase of a reference library. He subsequently not only erected at his own expense the building which the Society now occupies, but he has also transferred the building and the lease of the ground upon which it stands to the Society, together with a sum of £14,000 by way of endowment. To quote from the speech of one of the Presidents of the Society, Sir William Macleay also bore the greater part of the expenses of the Society's publications, supplied the salaries of its officers, fur-

nished its specialists with abundant funds for their investigations and their maintenance, and equipped the Society's rooms with fittings, furniture, and apparatus for scientific research. Furthermore, he was the chief instrument in obtaining the charter of the Society, and he arranged to bequeath the sum of £35,000 for the establishment of four "Linnean Fellowships" of the annual value of £400 each.

He was a Fellow of the Senate of the University of Sydney, and he was Chairman of the first Fisheries Commission appointed under the Fisheries Act. About three years ago the honour of knighthood was conferred upon him.

He was elected a Fellow of this Society in 1866. He died on the 7th of December, 1891. By the death of Sir William Macleay, Australia loses a benefactor whose memory Science will long delight to honour.

Henry Nottidge Moseley, the son of the late Rev. Henry Moseley, F.R.S., Rector of Olvaston and Canon of Bristol, was born at Wandsworth on November 14th, 1844. He was educated at Harrow and Oxford, where, under the late Prof. Rolleston, his remarkable powers of observation and investigation were nurtured and developed. He took his degree in 1868, and afterwards studied medicine successively in Vienna, London, and Leipzig. His first scientific memoirs were published whilst at Leipzig, 'On the Nerves of the Cornea of Mammals,' and 'On the Circulation in the Wing of the Cockroach.'

In 1871 he went as a member of the Government Eclipse Expedition to Ceylon, where, in addition to the spectroscopic observations with which he was charged, he also made a large collection of Land-Planarians. The anatomy of these he worked up afterwards at Oxford, and the results were published in the 'Philosophical Transactions' of the Royal Society. In 1872 he was appointed one of the naturalists to the 'Challenger' Expedition, and maintained that post throughout the voyage. In addition to his zoological work, he undertook the collecting of plants whenever the Expedition touched land; and whilst at the Admiralty Islands he made important anthropological studies on the inhabitants. At the Cape he set himself to find and collect *Peripatus*, and from the study of living specimens he was enabled to throw important light upon the anatomy and development of that imperfectly-known animal, his investigations being embodied in a memoir sent home during the cruise and published in the 'Philosophical Transactions.' To the 'Challenger' series of Reports he contributed the memoirs on the Hydroid, Alcyonarian, and Madreporarian Corals collected during the voyage.

In 1879 he published his 'Notes of a Naturalist on the 'Challenger,'' which contains a vast mass of valuable notes and observations on geographical, ethnological, biological, and physical subjects.

On the return of the 'Challenger' Moseley was elected

Fellow of Exeter College, Oxford, where he resided for about three years working up the results of the Expedition. He was elected Fellow of the Royal Society in 1877, and in 1879 was appointed Assistant Registrar to the University of London, which post he held until 1881, when, on the death of Prof. Rolleston, he was elected to the Linacre Professorship of Human and Comparative Anatomy at Oxford. The duties of this post were fulfilled with most remarkable devotion and energy for about six years, until ill-health compelled him to retire for a rest, and he was unhappily never able to resume his work.

In 1884 he was President of the Biological Section of the British Association at its meeting in Montreal, and whilst there the degree of LL.D. was conferred upon him by the McGill University. He twice served on the Council of the Royal Society. In 1878 he published a small work on 'Oregon, its Climate, Resources, People, and Productions,' and to the publications of the Royal, of the Zoological, and of this Society, as well as to various scientific Journals, he contributed many papers embodying the results of his biological investigations.

He was elected a Fellow of this Society in 1880. He was also a Fellow of the Zoological and Royal Geographical Societies, and a Corresponding Member of the Geological Society of California. He died on November 10th, 1891, after a long and trying illness.

Rev. Percy Watkins Fenton Myles was born at Kilmoe, co. Cork, on February 27th, 1849, received his early education at Tipperary Grammar School, and proceeded to Trinity College, Dublin, where he graduated B.A., was ordained deacon in the Church of England in 1870, and priest in 1873. After holding several curacies he settled at Ealing in 1874, and devoted great energy to fostering local natural history, amongst other things helping to establish the Selborne Society, and editing its journal, 'Nature Notes,' in conjunction with Mr. James Britton.

His most important published work is the pronouncing dictionary which was appended to Nicholson's 'Dictionary of Gardening,' and his review of Bennett and Murray's 'Handbook of Cryptogamic Botany,' which came out in the September number of the 'Journal of Botany,' 1889.

He was elected Fellow, December 15th, 1887, and was a constant frequenter of our meetings. He was first seized with a premonitory illness in 1890, from which he partially recovered, but a second attack in June of last year warned his friends that the end was not far off, and on 7th October, 1891, he died, his funeral taking place at Hanwell.

Jean Louis Armand de Quatrefages was born in 1810, and studied medicine at Strasburg. He settled as a medical practitioner at Toulouse, and was appointed Professor of Zoology there. In 1855 he was elected to the Chair of Anthropology

and Ethnology at the Jardin des Plantes, Paris. He was admitted to the Academy of Sciences in 1852, and was an honorary member of many learned societies. Amongst his numerous works perhaps the most celebrated are his 'Crania Ethnica' and 'Études des Races Humaines.' He was also the author of a large number of important memoirs on various branches of zoology, especially on Annelides, Echinoderms, and Molluscs, upwards of 140 papers being cited in the Royal Society's catalogue.

He was elected a Foreign Member of this Society in 1875. He died January 21st, 1892.

Lord Arthur John Edward Russell, the second son of Major-General Lord George William Russell, was born in 1824. He was educated abroad, and did not enter any English University. As a young man he travelled extensively in Europe and the East, and even visited America, a comparatively uncommon undertaking in those days. Destined for public life, his career as a politician was commenced under the guidance of his uncle, Lord John Russell, the well-known statesman, to whom he acted in the capacity of private secretary from 1849 to 1854. In 1857 he entered Parliament as the representative of the borough of Woodstock, a seat which he retained until his retirement in 1885.

As the natural outcome of his early training, foreign affairs specially attracted Lord Arthur Russell's attention; but he also interested himself more or less actively in questions affecting the relations of the State to religion and education. His knowledge of the inner life of the various social and political circles on the Continent, as well as in England, was extensive, and made him "a man worth knowing," apart from his own genial kindness of disposition and sound judgment.

Lord Arthur Russell's relation to Biological Science was that of a patron and admirer rather than a contributor. His fondness for natural history associated him with this Society, into which he was elected as a Fellow in 1875, and he served on the Council from 1888 to 1890. He was also a Fellow of the Zoological Society; and he held the office of Foreign Secretary to the Royal Geographical Society from 1875 up to the time of his death, which took place on April 4th, 1892.

Sereno Watson, who was elected Foreign Member of this Society so recently as May 1st, 1890, died at Cambridge, Massachusetts, on March 9th, 1892, from the effects of an attack of influenza, which had caused a dilatation of the heart.

He was born at East Windsor Hill, Connecticut, on December 1st, 1826, and after graduating at Yale in 1847, he became a school-teacher in the Eastern States, and then a tutor in Iowa University, at the same time studying medicine, continuing those special studies from 1853 to 1855 with his brother at Quincy, Illinois, with whom he practised for two years following the last-mentioned date. From 1856 to April 1861 he was Secretary

to the Planters' Insurance Company at Greensborough, Alabama, and then for some years became literary assistant to Dr. Henry Barnard, of Hartford, Connecticut.

Although he had a leaning to botany, dating from his medical training, yet it was not till he was fifty-one years of age that he took up its pursuit seriously. In 1867 he was attached as a volunteer botanist to the Expedition under Clarence King, which was detailed to explore the 40th parallel, with Prof. W. W. Bailey as botanist in charge. In March 1868 Prof. Bailey resigned his position, and Watson stepped into his place. The results of the Expedition are to be found in the fifth volume of the official report, which was principally worked up in the Yale Herbarium, with occasional visits to the Harvard Herbarium to verify certain types of western plants.

In 1870 he was appointed keeper of the Harvard Herbarium, then under the control of our honoured Foreign Member, the late Asa Gray, whose successor he became. Thenceforward science has benefited by numerous memoirs from his pen, and up to the time of his death no less than 18 contributions to American Botany have appeared, mostly in the Proceedings of the American Academy, many of which are elaborations of large and difficult genera. In 1878 he published the first, and unhappily the only, part of his 'Bibliographical Index to North-American Botany,' containing the Polypetalæ. The 'Synoptical Flora' then joins on, and it was hoped that Dr. Watson would complete the work by issuing his account of the Incompletæ and Monocotyledones, left unfinished by Dr. Gray's death; but it was not to be so; and we have yet to lament the fragmentary state of American phytology for that part of its flora.

The 'Botany of California' was largely due to Dr. Watson, who took a share in the first volume, and a still larger one in the second; he also completed the publication of Lesquereux's 'Manual of the Mosses of North America,' which the author's failing health did not permit him to do himself; and, with Professor Coulter, he brought out in 1889 a new edition, the sixth, of Gray's 'Manual of the Botany of the States.'

This large amount of work was possible partly on account of the very few holidays he allowed himself. In 1886 he was present at a meeting of this Society, but he only spent a few days in this country, less than a week in all. A trip he made to Guatemala in 1885 for collecting was rich in results, but he contracted malarial fever, from the effects of which he suffered during the remainder of his life.

He was buried on March 11th by his own request in Mount Auburn Cemetery, Cambridge, Mass., the pall-bearers being his colleagues in the University.

Charles Smith Wilkinson was born in Northamptonshire in 1843. His family having emigrated to Melbourne in 1852, in 1859 he was appointed to the Geological Survey of Victoria.

In 1874 he became Geological Surveyor to the Department of Lands, New South Wales, and in the following year he was appointed Government Geologist for New South Wales, an office which he filled until his death.

His great experience in practical geology and mining was highly appreciated in the Colony. His numerous geological and other scientific papers are chiefly to be found in Official Reports.

He was elected a Fellow of this Society in 1881, and was also a Fellow of the Geological Society. He was President of the Linnean Society of New South Wales in 1884, and of the Royal Society of New South Wales in 1888. He died on August 23rd, 1891.

The Linnean Gold Medal for the year was then presented to Dr. Alfred Russel Wallace, who, in appropriate terms, expressed the gratification with which he received it.

The President announced the gift to the Society, by Dr. Richard Alexander Prior, of an oxy-hydrogen lantern for use at the evening meetings, and moved that the cordial thanks of the Society be given to Dr. Prior for his valuable present, which motion was carried by acclamation.

June 2nd, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the Anniversary Meeting were read and confirmed.

Dr. John Rudd Leeson, Prof. William B. Scott, and Messrs. Edward Heron-Allen, H. A. James, and Robert Hedger Wallace were elected Fellows.

Mr. Thomas Christy moved that a special vote of thanks be accorded to the President and Officers of the Society for their valuable labours during the past Session, and this, having been seconded by Mr. Charles Breese, was carried unanimously.

The President nominated Mr. William Carruthers, Mr. Charles Baron Clarke, Mr. Frank Crisp, and Dr. St. George Jackson Mivart to be Vice-Presidents during the ensuing year.

Mr. H. Bernard exhibited specimens and made remarks on the probably poisonous nature of the hairs and claws of an Arachnid (*Galeodes*).

On behalf of Captain Douglas Phillott there was exhibited a curious case of malformation in the beak of an Indian Parrakeet (*Palæornis torquatus*). The upper mandible was so abnormally decurved as almost to penetrate between the rami of the lower

mandible, and although the bird was apparently in good health at the time it was shot by Captain Phillott at Dera, Ismail Khan, Punjab, in March last, it was evident that had it not been killed then, death must soon have ensued from a severance of the trachea by the sharp extremity of the prolonged mandible.

Mr. D. Morris exhibited specimens of plants yielding Sissal Hemp from the Bahamas and Yucatan, and pointed out their distribution and mode of growth. He also exhibited and described the preparation of a gut-silk from Formosa and Kiungchow.

Mr. Scott Elliot gave a brief account of a journey he had recently made to the West Coast of Africa, and described the character of the vegetation of the particular region explored and the plants collected by him.

Mr. Jenner Weir exhibited and made some remarks on a species of *Psyche*.

The following papers were read:—

1. "On the Disappearance of Desert-Plants in Egypt." By E. A. Floyer, F.L.S.
2. "Further Studies on Insect Colours." By Frank Hill Perry Coste, F.L.S.

A demonstration with the oxy-hydrogen lantern recently presented to the Society by Dr. Richard C. A. Prior then took place, a number of slides of birds illustrating the subject of mimicry and protective coloration being shown by Dr. R. Bowdler Sharpe.

June 16th, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Messrs. Francis Joseph Clarke, Theodore Cooke, and James Mellor were elected Fellows.

Mr. F. Enock exhibited some specimens of the Mustard Beetle, and gave an account of its recent depredations as observed by himself. So numerous was it, that in walking down a single row of mustard, a distance of sixty-five yards, he had captured with a butterfly-net upwards of 15,000, as he subsequently ascertained by counting a portion and weighing the remainder. The crop of mustard thus affected he regarded as entirely destroyed.

Mr. R. I. Pocock exhibited and made some remarks upon a species of *Peripatus* (*P. juliformis*) from St. Vincent, of which five specimens had been collected by Mr. H. H. Smith for the

Committee investigating the fauna and flora of the Lesser Antilles. The species was originally described so long ago as 1826 by the Rev. L. Guilding (Zool. Journ. vol. ii.), but from that time until the present no additional specimens had been found there. As Guilding's types had been lost and his descriptions were wanting in detail, this re-discovery was of considerable interest.

Mr. George Murray exhibited and described the type of a new Order of Algæ, to which the name of *Splachnidium rugosum* was given.

The following papers were read:—

1. "A Contribution to Indian Carcinology." By Prof. J. R. Henderson, F.L.S.
2. "The Thames as an Agent in Plant Dispersal." By H. B. Guppy. (Communicated by W. B. Hemsley, F.R.S., A.L.S.)
3. "On some Abnormal Developments of the Flowers of *Cypripedium*." By Miss F. M. Ewart. (Communicated by Prof. F. Wall Oliver, F.L.S.)
4. "Supplementary Notes on the Fauna of the Mergui Archipelago." By R. I. Pocock. (Communicated by W. Percy Sladen, Sec.L.S.)

A further demonstration with the oxy-hydrogen lantern recently presented by Dr. Prior then took place, a series of microscopic slides showing sections of fossil plants being exhibited by Mr. Carruthers, and a second series comprising various microscopic objects were described by the President.

Donations to Library, 1891–92.

Volumes and more important Pamphlets, exclusive of exchanges, chiefly from private individuals.

Annals and Magazine of Natural History. 6 ser. Vols. vii., viii. 8vo. Lond., 1891. **Dr. W. Francis.**

Annals of the Royal Botanic Garden, Calcutta. Vol. iii. 4to. Calcutta, 1891. **Dr. G. King.**

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—— Zur Lichenenflora von München. 8vo. München, 1891. **Author.**

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Bund, J. W. Willis. A List of the Birds of Worcestershire and the adjoining Counties. 8vo. Worcester, 1891. **J. E. Harting.**

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Donation in aid of Publication.

1891.		£	*s.*	*d.*
July 20.	Elliot, G. F. Scott. Contribution towards a paper on Madagascar Plants ...	60	0	0

Donation for purchase of Lantern.

1892.				
March 4.	Prior, Dr. R. C. A.	50	0	0

INDEX TO THE PROCEEDINGS.

SESSIONS 1890–91, 1891–92.

Note.—The name of the Chairman at each Meeting is not indexed.

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PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

(SESSION 1892-93.)

November 3rd, 1892.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The President read a letter from the Committee appointed to promote the erection of a monument to the memory of the late M. de Quatrefages, soliciting contributions in furtherance of their object.

The Rev. Prof. Henslow exhibited an instrument used in Egypt for removing the end of the Sycamore Fig, and gave some account of the mode of cultivation.

Mr. A. Smith Woodward exhibited and made remarks on some supposed fossil Lampreys (*Pseudospondylus Gunni*) from the Old Red Sandstone of Caithness.

The Rev. E. S. Marshall exhibited some hybrid Willows from Central Scotland believed to be rare or new to Britain.

Mr. G. N. Douglass exhibited the train of a Pea-hen which had assumed the male plumage. The bird, which was reared at the Castle Farm, Tilquhillie, near Banchory, N.B., was believed to be about 30 years old at the time of its death, and for some years previously had not laid any eggs. In the opinion of the exhibitor and others present, the phenomenon was correlated with disease of the ovaries. Similar cases had occurred with fowls, pheasants, and black grouse, but very rarely with Pea-fowl.

Mr. C. T. Druery exhibited some new examples of apospory in

Ferns, viz. a specimen of *Athyrium Filix fœmina*, var. *clarissima*, with pinnæ showing development of prothalli by soral apospory, and a seedling *Lastræa Pseudo-mas*, var. *cristata*, showing prothalli developed aposporously over general surface of frond (panapospory).

Mr. J. E. Harting exhibited some live specimens of the Short-tailed Field-Vole (*Arvicola agrestis*), and gave an account from personal inspection of the serious damage done by this little rodent upon the sheep pastures in the Lowlands of Scotland.

Mr. A. B. Rendle exhibited some seedling plants of the Sugar-cane which had been raised in this country by Mr. Veitch.

The discussion on several of these exhibits having continued until a late hour, a paper by Prof. Henslow, on "A Theoretical Origin of Endogens through an Aquatic Habit," was, by consent, adjourned to the next Meeting on November 17th.

November 17th, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Frederick William Leslie was elected a Fellow.

The President having announced a proposal by the Council to present a congratulatory Address to the Rev. Leonard Blomefield (formerly Jenyns), M.A., F.L.S., on the occasion of the 70th anniversary of his election as a Fellow of the Society, and in recognition of his continuous and useful labours as a Zoologist, it was moved by Sir William Flower and seconded by Dr. St. George Mivart, that the Address be signed and forwarded as proposed. This was carried unanimously. In moving the resolution Sir William Flower took occasion to sketch the scientific career of Mr. Blomefield, who is now in his 93rd year, and to recapitulate the works of which he is the author under his earlier and better-known name of Jenyns. The Address, which was illuminated on vellum, was then signed by the Fellows present.

Mr. George Murray then exhibited and made remarks upon *Halicystis*, a genus of Algæ new to Britain, the species shown being *H. ventricosa*, from the West Indies, and *H. ovalis*, from the Clyde sea-area.

The following papers were read :—

1. "On a Theoretical Origin of Endogens through an Aquatic Habit." By Rev. G. Henslow, M.A., F.L.S.
2. "On the Buprestidæ of Japan." By George Lewis, F.L.S.

December 1st, 1892.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Arthur Philip Green, Mr. Albert Frank Stanley Kent, the Rev. Andrew Bayne Morris, Mr. Horace Woollaston Monckton, and Mr. Frederick Gymer Parsons were elected Fellows.

The President read a letter of thanks from the Rev. L. Blomefield, in reply to the congratulatory Address which had been voted to him and signed by the Fellows at the last Meeting, as follows :—

"Belmont, Bath, November 22nd, 1892.

"My dear Mr. Harting,

"Thank you very much for your letter received on Saturday, and yet more for the very valuable congratulatory Address from the Members of the Linnean Society generally, which came safe to hand yesterday evening. In respect of this last, I hardly know in what terms to make any adequate reply, or therein express what I feel in the way of gratitude and thankfulness for so high a mark of esteem on the part of the Society with which I have had so little intercourse for a long time back. True it is that my connection with the Society, as far as membership goes, has now lasted for the long term of seventy years, longer, perhaps, than in the case of any other member; but it grieves me to think how little I have done personally for the interests of the Society, how trifling the contributions I have formerly made to its publications. When I open and inspect the Journals which it puts forth from time to time (still so liberally sent to me as they appear) and see the remarkable work being done by others, often most elaborate researches into the minute structure of the lower forms of animal and vegetable life, my own doings in Zoology and Botany, fond as I am of the subject, even now in extreme old age, seem as nothing. Yet the retrospect is not without other reminiscences of a more pleasurable character. It brings to my recollection departed friends whose names may be found in the older lists of the Society, with some of whom I joined in the pursuits that gave us so much pleasure, but who have long since been called to their rest; I yet remain. If I cannot claim acquaintance with many of the Fellows of the present day, I shall always hold in grateful remembrance those who were instrumental in getting up the congratulatory Address just received, which shall always have a place on the walls of my study, where there are several portraits of old Linnean Society Members, including those of Mr. Macleay (father of Mr. Alexander Macleay), who was, if I remember right, Secretary to the Society on the evening on which I was admitted, Mr. Lambert, V.P., being in

the Chair. Once more expressing my gratitude for the great honour that has been done to me.

"Believe me, dear Mr. Harting,
"Sincerely yours,
"LEONARD BLOMEFIELD."

Messrs. H. and J. Groves exhibited specimens of several Irish Characeæ collected during the past summer. *Nitella tenuissima*, from Westmeath and Galway, had not been previously recorded from Ireland, and a large form of *N. gracilis*, from two lakes in Wicklow, had been only once previously met with. Referring to the former, Mr. H. Groves remarked that, although it might be expected to occur in all the peat districts, it had only been found in two widely separated localities in England, viz., in the Cambridgeshire Fens and in Anglesea.

Mr. Arthur Lister made some remarks on the nuclei of Mycetozoa, exhibiting some preparations under the microscope.

Mr. E. Cambridge Phillips forwarded for exhibition a hybrid between Red and Black Grouse, which had been shot in August near Brecon.

Mr. J. E. Harting exhibited and made remarks on some Coleopterous larvæ which had been vomited by a child at Tintern, and had been forwarded by the medical attendant, Dr. J. Taylor Brown, for identification. The precise species had not been determined, but it was considered to be allied to *Blaps mortisaga*. Mr. Harting drew attention to the fact that cases of voiding Coleopterous larvæ were mentioned by Kirby and Spence ('Introduction,' 7th ed. p. 71), and by the late Dr. Spencer Cobbold in his work on 'Parasites' (1879, p. 269).

Mr. D. Morris exhibited some tubers of *Calathea Allouia*, eaten as potatoes in Trinidad, where it is known as "Tapa Nambour."

The following papers were read:—

1. "Notes on *Œcodoma cephalotes* and the Fungi it cultivates." By John H. Hart, F.L.S.

2. "On a small Collection of Crinoids from the Sahul Bank, North Australia." By Prof. F. Jeffrey Bell. (Communicated by W. Percy Sladen, Sec.L.S.)

3. "Descriptions of 26 new Species of Land-shells from Borneo." By Edgar A. Smith. (Communicated by W. Percy Sladen, Sec.L.S.)

December 15th, 1892.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Lewis A. Bernays, Dr. George Godfrey Gray, and Mr. William Whitwell were elected Fellows.

The President announced the death of Mr. H. T. Stainton, a Fellow and former Vice-President of the Society, and a distinguished Entomologist.

Mr. D. Morris exhibited a series of Botanical Photographs from the West Coast of Africa, and gave some interesting details about the appearance and mode of growth of some of the more remarkable forest-trees and plants of that region.

The Secretary exhibited a large collection of photographs of typical Lichens, which had been recently presented to the Society by Prof. Arnold of Munich.

On behalf of Mr. George Swainson, Mr. A. R. Hammond exhibited a microscope-slide projected on the screen showing an aquatic Dipterous larva belonging to the genus *Dixa*. He referred to the different views which had prevailed concerning this or similar larvæ: Réaumur and De Geer having assigned the prolegs to the dorsal surface; while Staeger and Meinert, on the contrary, regarded that to which they were attached as the ventral aspect of the larva. The question was one which could be most conclusively settled by the determination of the position of the ventral cord in living specimens. It was pointed out that the comb-like anal plates possessed features which in allied forms were characteristic not so much of the larval as of the pupal stage of development.

The following papers were read:—

1. "Notes on the Genera of Taxaceæ and Coniferæ." By Dr. Maxwell T. Masters, F.R.S., F.L.S.
2. "Note on the Affinities of the Genus *Madrepora*." By George Brook, F.L.S.
3. "Note on the Lens of the Albino Rat." By Prof. Richard J. Anderson, F.L.S.

January 19th, 1893.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following Resolution was put from the Chair and carried unanimously:—

> "The Linnean Society desires to record its sense of the loss Science has sustained by the deaths of Sir Richard Owen and Prof. Westwood, and also its gratification at their names having been numbered among the Fellows during their scientific career for the periods of 56 and 64 years respectively."

Mr. George Brook showed photographs of Corals which he had lately taken and had reproduced by permanent process at a cost below that of lithography, with the added advantage of permitting amplification by a hand-lens.

The following papers were read:—

1. "On the Auditory Organs of the Angel Fish, *Rhina squatina*." By Charles Stewart, Pres. Linn. Soc.
2. "The Plants of Milanji collected by Mr. A. Whyte, and described by Messrs. J. Britten, E. G. Baker, and A. B. Rendle." By W. Carruthers, F.R.S., F.L.S.
3. "Report on the Botany of the District traversed by the Anglo-French Sierra-Leone Boundary Commission." By G. F. Scott Elliot, F.L.S.

February 2nd, 1893.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. John Percival was elected a Fellow.

The vacancies on the list of Foreign Members caused by the deaths of Dr. Hermann Burmeister and Mr. Sereno Watson having been announced by the President, the following nominations were made on the recommendation of the Council, and the certificates ordered to be suspended:—

Prof. Dr. Carl Claus of the University of Vienna.
Monsieur Casimir de Candolle of Geneva.

The following papers were read:—

1. "Report on the Entomostraca from the Gulf of Guinea collected by J. Rattray." By Thos. Scott, F.L.S.
2. "Two new Species of *Rhax*." By H. M. Bernard. (Communicated by W. Percy Sladen, Sec.L.S.)
3. "On the Division of Nuclei in the Mycetozoa." By Arthur Lister, F.L.S.
4. "On the Structural Differentiation of the Protozoan Body as studied in Microscopic Sections." By J. E. S. Moore. (Communicated by Prof. Geo. B. Howes, F.L.S.)

February 16th, 1893.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Richard Spruce was elected an Associate.

Mr. Clement Reid exhibited and gave an account of some

seeds of *Paradoxocarpus carinatus*, an extinct Pliocene and Pleistocene plant from the Cromer Forest-bed. He also showed and described some examples of *Potamogeton headonensis*, a new type of Pond-weed from the Oligocene strata of Hordle Cliff in Hampshire.

Mr. J. E. Harting exhibited some dried plants of a so-called Greek Tea, *Sideritis theezans*, Boiss., which, during his recent visit to Thessaly, he had found to be extensively used there as an infusion in lieu of tea. He also exhibited some photographs of Thessalian scenery, showing the geological and botanical character of the country bordering the great plain of Larissa.

Dr. Otto Stapf pointed out on the map the scene of Dr. Bornmueller's recent botanical explorations in Persia, and gave some account of the flora of that region so far as has at present been ascertained.

The following papers were read:—

1. "On the Life-history of the Æcidium on *Paris quadrifolia*." By C. B. Plowright and W. Thomson. (Communicated by the President.)
2. "Contribution to the Natural History of the Flower.—No. I." By J. C. Willis, M.A. (Communicated by Francis Darwin, F.R.S., F.L.S.)
3. "Studies of British Worms.—Part III." By the Rev. Hilderic Friend, F.L.S.

March 2nd, 1893.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Surgeon-Major Kanoba Ranchoddâs Kirtikar, the Rev. James Lamont, Mr. Lewis Ough, and Mr. Walter George Ridewood were elected Fellows.

A series of Resolutions passed at the recent Jubilee of the Rothamsted experiments were read from the Chair for the information of the Fellows, and subscriptions in aid of the proposed Memorial were invited.

Mr. Miller Christy exhibited some photographs of the American Bison taken from living wild animals, and gave some account of the present restricted distribution of the species.

The following papers were read:—

1. "On the Behring Sea Islands and their Flora." By J. M. Macoun. (Communicated by Prof. J. Macoun, F.L.S.)
2. "On the Flora of the Eastern Coast of the Malay Peninsula." By H. N. Ridley, M.A., F.L.S.

March 16th, 1893.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Richard Thomas Baker, the Rev. John Bufton, Mr. John Taylor, and Mr. William Henry Wilkinson, were elected Fellows, and Mr. Thomas Moore was elected an Associate.

A curious freshwater Alga growing in a perfectly spherical mass without any visible point of attachment, and described as an ægagrophilous condition of *Cladophora*, was exhibited by Mr. A. W. Bennett, who stated that specimens had been found in English and Welsh lakes as well as in Sweden, and that the peculiar form of growth was difficult to explain. Mr. G. R. Murray suggested that it might be due to the action of a current which would cause a continuous revolution of the mass.

Mr. R. I. Pocock exhibited a nest, so called, of a Myriapod received from Sierra Leone, and formed of a clayey earth which had become hardened by exposure. It was suggested that it was not a nest formed by the creature itself, but rather a case fashioned by Ants for the purpose of entombing their enemy.

The following papers were read :—

1. "Botanical Results of the Sierra Leone Boundary Commission." By G. F. Scott Elliot, F.L.S.
2. "Contributions to the Arthropod Fauna of the West Indies." By R. Innes Pocock. (Communicated by the President.)
3. "Some Points in the Anatomy of *Melongena melongena*." By J. H. Vanstone. (Communicated by Prof. George Bond Howes, F.L.S.)

April 6th, 1893.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Messrs. Frederick Harry Baker and Richard Spiers Standen were elected Fellows.

The President took occasion to refer to the great loss which Botanical Science had sustained by the death, on April 4th, of Prof. Alphonse de Candolle of Geneva, an announcement which was received with profound regret. M. de Candolle was the Senior Foreign Member of the Society, having been elected in May 1850, and was the recipient of the Society's Gold Medal in 1889.

Mr. Clement Reid exhibited and made some remarks upon the fruit of a South European Maple (*Acer monspessulanum*) from an interglacial deposit on the Hampshire coast.

Mr. R. Lloyd Praeger, who was present as a visitor, exhibited some rare British plants from the county Armagh, and gave an account of their local distribution.

The following paper was read:—

"On a Collection of Plants from the region of Lhassa, made by Surgeon-Captain W. G. Thorold in 1891, and a further Collection from the Kuen-lun Plains made by Capt. H. P. Picot in 1892." By W. Botting Hemsley, F.R.S., A.L.S.

Dr. H. C. Sorby gave a demonstration with the oxy-hydrogen lantern, and exhibited a number of slides which he had prepared of small marine organisms, many of them extremely beautiful, mounted transparently so as to show the internal structure.

April 20th, 1893.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Mr. Aubyn B. R. Trevor-Battye was elected a Fellow.

The President announced that the following Auditors to examine the Treasurer's Accounts had been nominated by the Council, viz.:—

For the Council { Dr. John W. S. Meiklejohn.
Mr. E. A. L. Batters.

For the Fellows { Mr. Charles James Breese.
Mr. Thomas Christy.

On Mr. Breese stating his inability to attend, the name of Mr. W. F. Kirby was, with that gentleman's consent, substituted for it, and the Auditors thus nominated were, by show of hands, unanimously elected.

The President took occasion to notice the retirement of Mr. F. H. Kingston after 36 years' service as Lodge Keeper, and presented him with a testimonial in the shape of a cigar-case containing £35 in Bank Notes, which had been subscribed on his behalf by all the Societies in Burlington House. The presentation was suitably acknowledged by the recipient.

Mr. J. E. Harting exhibited some photographs of Burlington House with the gateway as it existed before the rebuilding in

1868, and showing the old colonnade, which had since been demolished and was lying still uncared for in Battersea Park.

The following papers were read :—

1. "The Subterranean Crustacea of New Zealand, with some Remarks on the Fauna of Caves and Wells." By Chas. Chilton, F.L.S.

2. "Notes on the Anatomy, Physiology, and Histology of the Chernetidæ, with special reference to the Rudimentary Stigmata and to a new form of Trachea." By H. M. Bernard. (Communicated by W. Percy Sladen, Sec.L.S.)

May 4th, 1893.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Messrs. John Buchanan and Charles Henry Nichols were elected Fellows.

Prof. Dr. Carl Claus, of Vienna, and Monsieur Casimir de Candolle, of Geneva, were elected Foreign Members.

Dr. Bowdler Sharpe exhibited some new and rare birds from Borneo, and made remarks upon the singular distribution of the genera to which they belonged. On behalf of Miss E. M. Sharpe he also exhibited the sexes, larvæ, and cocoons of a rare Silkworm Moth (*Gonometa fascia*) from Lagos.

Prof. J. Bretland Farmer exhibited under the microscope some preparations showing attraction spheres in spores of Hepaticæ, and gave the result of his recent researches on the subject.

Mr. Thomas Christy exhibited some curious variations in foliage in plants of a *Sterculia* from Brazil reared from the same pod, and showed also a specimen of *Erythroxylon Coca* in fruit.

Mr. W. Botting Hemsley showed two British plants which were interesting on account of the localities, viz. *Empetrum nigrum* from Dorset (where Mr. C. B. Clarke had seen it growing on Poole Harbour spit, though it had not been included hitherto in the county flora), and *Scilla nutans*, with prolonged bracts, usually regarded as an introduced garden form, which had been found growing apparently wild in a wood near Ashford, Kent.

The following paper was read :—

"On the Nervous System of *Myxine glutinosa*." By Alfred Sanders, F.L.S.

May 24th, 1893.

Anniversary Meeting.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The Treasurer presented the Annual Statement of Accounts, duly audited, as shown on p. 12.

The Secretary read his report of deaths, withdrawals, and elections, and the condition of the Library, as follows :—

Since the last Anniversary Meeting 16 Fellows had died, or their deaths had been ascertained, viz. :—

Rev. Robert Collie.
Mr. Charles Faunce De Laune.
Mr. Lewis Llewellyn Dillwyn.
Dr. Frederick D. Dyster.
The Hon. W. Bancroft Espeut.
Mr. Robert D. Fitzgerald.
Mr. Edward Forster.
Mr. Harry Berkeley James.
Rev. Robert Whitaker McAll.
Mr. William Matchwick.
Sir Richard Owen.
Mr. Henry Tibbats Stainton.
Mr. Thomas Jonathan Symonds.
Dr. Forbes Watson.
Prof. John Obadiah Westwood.
Rev. William Woolls.

Associate.

Mr. Thomas John Moore.

Foreign Members.

Dr. Hermann Burmeister.
Monsieur Alphonse de Candolle.

During the past year 22 Fellows had withdrawn, viz. :—

Mr. John Henry Baldock.
Mr. Charles A. Barber.
Mr. W. Bowles Barrett.
Rev. J. Louis Bedford.
Mr. John T. Carrington.
Mr. Thomas Bonner Chambers.
Mr. Richard Benyon Croft.
Mr. Leopold Field.
Mr. J. Starkie Gardner.
Mr. J. Lawrence Hamilton.
Mr. Josiah Marshall Heath.
Rev. Charles Henry Lang.
Mr. Robert Lendenfeld.
Mr. C. G. Warnford Lock.
Dr. George Williams Parker.
Mr. Francis Taylor Piggott.
Rev. George Edward Post.
Rev. Stuart O. Ridley.
Mr. Stuart M. Samuel.
Mr. E. W. H. Schenley.
Mr. Henry G. W. Stephens.
Dr. Peter Yates.

And 22 Fellows, 2 Associates, and 2 Foreign Members have been elected.

Receipts and Payments of the Linnean Society, from May 1st, 1892, to April 30th, 1893.

Receipts.	£	s.	d.
Balance at Bankers' on 1st May, 1892	406	5	2
Interest on Investments	222	12	1
Admission Fees	168	0	0
Annual Contributions	1556	13	6
Compositions	135	0	0
Sales of Publications:—			
Transactions £48 7 10			
Journals 93 14 7			
Proceedings and Catalogues 10 4			
	142	12	9
	£2631	3	6

Payments.	£	s.	d.
Taxes and Insurance	19	1	3
Repairs and Furniture	99	14	11
Coals and Gas	58	18	11
Salaries	732	8	4
Library:—			
Books £298 9 5			
Binding 75 7 3			
	373	16	8
Expenses of Publications:—			
Printing £490 8 4			
Illustrations 345 15 9			
Distribution 54 16 6			
	891	0	7
Miscellaneous Printing and Stationery	45	18	4
Petty Expenses (including Tea and Postage)	80	5	5
Investments	100	0	0
Balance at Bankers' on 30th April, 1893	229	19	1
	£2631	3	6

Investments on the 30th April, 1893.

	£	s.	d.			£	s.	d.
Consols, 2¾ per cent.	4970	16	4	@	99⅝ p. c.	4927	6	4
Metropolitan 3½ per cent. Stock	1079	11	3	@	105¾ p. c.	1141	12	8
Great Indian Peninsula Railway 5 per cent. Guaranteed Stock	630	0	0	@	171½ p. c.	1080	9	0
Forth Bridge Railway 4 per cent. Stock	450	0	0	@	133 p. c.	598	10	0
						£7747	18	0

FRANK CRISP, *Treasurer.*

Audited and found correct. 18th May, 1893. { THOMAS CHRISTY, EDWARD A. L. BATTERS, JOHN W. S. MEIKLEJOHN, W. F. KIRBY, W. PERCY SLADEN. } *Auditors.*

During the past year there had been received as Donations from private individuals to the Library 64 volumes and 110 pamphlets and separate impressions of memoirs.

From the various Universities, Academies, and Scientific Societies there had also been received in exchange and otherwise 205 volumes and 64 detached parts, besides 49 volumes and 16 parts obtained by exchange and otherwise from the editors and proprietors of independent periodicals.

The Council, at the recommendation of the Library Committee, had sanctioned the purchase of 309 volumes and 183 parts of important works.

The total additions to the Library were therefore 627 volumes and 373 separate parts.

The following is the number of books bound during the past year:—In half-morocco 273 volumes, in half-calf 5 volumes, in full calf 11 volumes, in full cloth 124 volumes, in vellum 17 volumes, in buckram 7 volumes, in boards or half-cloth 12 volumes, relabelled (half-morocco and cloth backs) 31 volumes. Total 480 volumes.

The Senior Secretary having read the Bye-Laws governing the elections,

The President opened the business of the day, and the Fellows present proceeded to ballot for the Council and Officers.

The Ballot for the Council having been closed, the President appointed Mr. Frederick Justen, Mr. Albert D. Michael, and Mr. John Jenner Weir, Scrutineers, and the votes having been counted and reported to the President, he declared the following Members to be removed from the Council, viz.:—Mr. Charles Baron Clarke, Mr. Arthur Lister, Dr. John W. S. Meiklejohn, Dr. St. George J. Mivart, and Mr. Spencer Le Marchant Moore. And the following to be elected into the Council, viz.:—Mr. John Gilbert Baker, Dr. Albert C. L. G. Günther, Mr. George R. M. Murray, Dr. Richard C. A. Prior, and Mr. Howard Saunders.

The Ballot for the Officers having been closed, the President nominated the same Scrutineers, and the votes having been counted and reported to the President, he declared the result as follows, viz.:—

President, Prof. Charles Stewart.
Treasurer, Mr. Frank Crisp.
Secretaries { Mr. B. Daydon Jackson.
Mr. W. Percy Sladen.

The President then delivered the Anniversary Address, as follows:—

Presidential Address.

I propose on this occasion to say a few words on a subject of considerable interest, namely, some of the many means by which sound is produced by animals. It is clear that this is an exceedingly important question, for, in ourselves, we know that it is largely owing to the fact of that complex sound-production which we call speech that we hold our present, more or less, prominent position amongst our fellow creatures of this world. We know, also, that the production of sound must be of considerable importance amongst other and lower forms, for so many have that power; and it is without question that those who can intentionally produce sound have also the apparatus by which it can be heard. The simplest form, perhaps, in which sound is produced is by mere percussion, the striking of a portion of the body upon some other external material—either the ground, or rock, or wood; or a sudden striking of two portions of the body together, as we do when we clap our hands as a sign of applause, or when we snap our fingers, and so forth. The clapping of the hands in this country is recognized mainly as a sign of applause, whereas in most parts of the East we know that it is a customary mode of summoning an attendant to minister to our wants. Now there is an animal, a small Macrurous crustacean (*Alpheus*), which is fairly common over the world. One species, *A. megacheles*, may not unfrequently be taken in burrows in hte sand in Guernsey and Jersey, and in tropical countries this genus is even still more abundant. It is about 2 inches in length, and has the usual appearance of a Macrurous crustacean (*e. g.* Lobster). The left nipper is peculiarly modified, having a process of the propodite hollowed out into a sort of groove, and the dactylopodite, which can be closed upon it, is provided with a smooth prominence that fits accurately into the groove when the nipper is closed. Now if this little crustacean be annoyed by any intruder in its burrow, or be caught by some collector, the first thing it does is to suddenly close this nipper, and produce a noise as sharp and as loud as that made by snapping the finger and thumb, or made by the breaking of a piece of glass. It is evident that it is rather as a warning to an enemy to frighten it off than for any other purpose; at all events, it is under such circumstances of alarm that the animal produces this sound. It has not been heard to do it under more peaceful conditions; but when frightened or disturbed it invariably makes it. The first occasion on which I heard this done it was not this particular genus, but a very closely allied species, *Typton spongicola*. It is a smaller crustacean than the *Alpheus*, and was found in the hollow cavity of a brown sponge. On turning over the sponge to look for the crustacean, the first indication I had of my friend was this sharp noise deep down in the interstices of the sponge. On tearing it open I found the animal was coloured the same as the sponge, and was evidently endeavouring

to frighten me away from my purpose by making this particular sound. It is not necessary to dwell longer on this mechanism, which has so close a resemblance to that which we ourselves use in many acts of life.

I will now pass on to speak of a different contrivance present in certain Crustacea, producing a sort of creaking sound, which is made by what is known as a stridulating-, or creaking-apparatus. Perhaps, on the whole, the simplest form of this stridulating- or creaking-apparatus is that met with in a common tropical crab known as *Matuta picta*. The upper border of the propodite of both chelæ has two file-like surfaces which can be rubbed against the carapace, producing a creaking sound very much of the same character as would be caused if a piece of iron held in a vice were filed. We have here, then, a very simple form of stridulating-apparatus in this *Matuta*. A somewhat more complex one is met with in a tropical crab which is known as *Ocypoda ceratophthalma*. This crab has a very square carapace, and the eye-stalks are prolonged beyond the eye itself. Sometimes the left chela, sometimes the right, is very large, and has a curious ridge, which extends from above downwards on the surface of the propodite nearest the carapace, provided with a most regular and beautiful set of file-like teeth. The upper portion of the ridge is provided with coarse teeth, but in the lower portion we find that the teeth are very much finer. In this case we probably have a stridulating-apparatus which is capable of giving out two different kinds of sound. It is probable that the coarser toothed region will give out a deeper note than the finer region. It is hardly likely that the same note would be produced, because I take it that these stridulating-organs are to be compared, as regards the mechanism of sound-production, rather to a Savart wheel than to any other sound-producing organ; that is to say, the resultant note is determined by the number of blows given by these teeth, and will depend then upon the rapidity with which the toothed surface is drawn over some other part of the body, and also on the number of teeth upon that surface.

There is one still more perfect stridulating-organ in the Crustacea, which, though not presenting the complexity that we see in the case of the *Ocypoda*, yet offers a very curious problem, of which I can give no solution, and I shall be very glad if any of the Fellows here can throw light on the subject. In the case of a very common crustacean indeed—the common spiny lobster (*Palinurus vulgaris*), familiar to most of us as so often displayed on our fish-stalls,—this spiny lobster has a very complex organ for the production of sound. Those who have been around our Cornish coast and have seen the large store-boxes in which these and other Crustacea are kept until they are required for the market, may have noticed, when these store-boxes are brought out in order to yield up their contents for sale, a creaking sound like a colony of frogs croaking. This croaking sound is produced by the great antennæ of this *Palinurus vulgaris*

rubbing against a process between them. I have one here, which is, however, not alive, but the mechanism of the sound-production being still intact, and the body preserved in glycerine and spirit, I think you will be able to hear the sound which these curious creatures can produce when they are annoyed or disturbed in any way. In life the crustacean would be found to raise alternately first one and then the other antenna, and the curious creaking sound is made.

Unlike most Crustacea, in *Palinurus* the first joint of the antennæ (which may be distinguished by the opening of the antennary gland, or kidney) is fused with the carapace and its fellow of the opposite side. The second joint is closely articulated with the first externally but loosely on its inner side. This second joint has its upper and inner border prolonged to form a semicircular chitinous disc, which firmly grasps the upper border of a wedge-shaped process formed either by the antennulary sternite or fused first joints of the antennæ, and which lies between the antennæ. This wedge-shaped process has its base above, with its lateral smooth surfaces forming part of a circle, of which the external point of articulation of the antenna is the centre. Close to its lower or posterior border is a shallow groove. The chitinous process of the upper border of the antenna has an oval file-like surface on its inner side, the direction of the teeth being that in which it is moved. The file is guided by a tubercle at its proximal border that fits the groove. The direction of the teeth of the file corresponding with its direction of motion is the exceptional feature referred to, there being apparently a condition of minimum friction between the file and the surface on which it rubs.

So far as I am aware, the sound-producing organ is in most cases present in both sexes in Crustacea.

Amongst Myriapoda, I only know of two examples possessing sound-producing organs. In the male of *Sphærotherium*, from Madagascar, a chelate organ (not supposed to be an appendage) is situated on each side of the anal opening. It has a file on that part which is in contact with the overlying tergum, this latter being roughened by minute elevations against which the file rubs.

The other case is that of *Eucorybas crotalus*, from Natal; in this the three terminal joints of the last two appendages are flattened out into leaf-like structures, which are said to produce a sound either by being rattled together or upon the ground.

In insects there are many cases in which, without special structure, sound is produced by snapping the jaws, bringing other parts suddenly together, or striking with the head, &c., some resounding neighbouring body, as is the case with the death-watch, &c.

Many beetles are provided with a stridulating-apparatus, present in both sexes: the file-surface is on the abdomen and thigh in *Lomaptera*; in *Necrophilus* two files on the abdomen are rubbed by the elytra; in *Batocera* a file on the metathorax is rubbed by the mesothorax, &c.

Amongst the Orthoptera a stridulating-organ is commonly present, but in the male only. The grasshopper has long been known to make its chirping sound by rubbing the file, on the inner surface of its posterior femora, against the elytra as they lie by the sides of the abdomen, the insect standing on its two anterior pairs of legs when performing. In *Cystocœlia immaculata* the abdomen of the male is immensely distended with air, and its second segment has a curved ridge of eight teeth, the curve having the femorous articulation as its centre; the part of the femur in contact with this ridge is provided with a finely toothed process. In *C. sexguttata* the abdominal file resembles that on the chela of *Ocypoda*, the lower portion having the teeth from five to six times as close as the upper.

In the crickets and their allies the stridulating-organ is found on the overlapping portions of the elytra—the left having the file on its under surface and at right angles to the axis of the body, the right having a smooth ridge above in the axis of the body, and with a tense resonating membrane on its outer and posterior side; the membrane is, in *Pseudophyllus* and *Macrolyristes*, partly covered by a fold projecting from its inner border, which may act like the sounding-board over a pulpit.

Amongst the Hymenoptera certain ants in Central Africa were heard by Dr. Livingstone to emit a sharp creaking sound; a special ridged surface on the two peduncular segments of the abdomen has since been described.

The most powerful and complex sound-producing organ in insects is found in the Cicadidæ; it is of an entirely different type to all previously considered. If we take as our example one in which all parts are about equally developed, as, for instance, *Cicada australasiæ*, we shall find on the upper and lateral surface of the first abdominal segment a convex ridged membrane—the drum; to the middle of its inner surface is attached the short and delicate tendon of a conical muscle that arises from the sternites of the first and second segment; the contraction of this muscle pulls in the drum, the sudden recoil of the drum exciting the sound-wave. The drum is concealed and protected by a forward projection of the anterior border of the second segment, named the cover. The ventral surface of the second segment, or the membrane between it and the first, has a portion of the cuticle exceedingly thin and tensely stretched; this forms the mirror; it is often so thin as to decompose the light like a soap-bubble; it acts as a resonating organ in conjunction with the general body of the insect. The mirror is protected by a broad plate-like prolongation of the metathorax called the operculum. At the anterior border of the operculum is a strong spine, 'pessellum,' projecting from the first joint, 'trochantin,' of the hind leg; it is thought that it checks undue depression of the operculum. In *Thopha* the chamber bounded by the cover is very large, forming large pockets extending far backwards on either side of the abdomen. In *Dundubia* the operculum projects

backwards often beyond the abdomen. In *Cystosoma* and *Pydna* the cover is completely absent, and the abdomen greatly distended with air.

The Cicadidæ, then, are provided, so far as the male is concerned, with a sound-producing apparatus which is probably more powerful than any contrived by man. If we consider that, putting aside the whole body of the instrument, the actual machine itself, and not the general resonant body, is not more than a quarter of an inch across; yet the sound produced by a few of these insects congregated together is so intense, so loud, that it is quite impossible to hear one's self speaking; and it is said that at a very long distance indeed it is just as if you were in some manufacturing town, and the whirl of machinery was going on with the fullest vigour. I have also heard the note described as being the same as that produced if one attempted to sharpen the edge of a large sheet of tin across the surface of a very rapidly revolving grindstone. I must say, I do not think I should like a musical instrument of that character.

I should probably weary you if I were to describe the sound-producing organs of fish, which are of a type different from any other sound-producing organs; but I will just point out the one musical instrument which, so far as I am aware, corresponds with these stridulating-organs. We find this stridulating musical instrument of man's invention, to the best of my knowledge, only in New Guinea, and there it is not often met with. One of the native tribes use a very curious musical instrument indeed. They take a gourd, which they hollow out after cutting a hole at one end. Next they take the bone of a bird, and notch it all over the surface so as to make it very rough; they then plug the end where they have cut it, and fasten in a small delicate spine-like bone. This musical instrument is played thus:—It is held so that the hand should not check the vibration; the bone is put into the hollow vessel and is rubbed against the edge of the opening so that it makes a creaking sound. It is precisely equivalent, in all the fundamental features, to a stridulating-apparatus. The violin does not exactly correspond, but I think the instrument just described really does.

Dr. Robert Braithwaite then moved the following resolution, viz.:—"That the thanks of the Society be given to the President for his excellent Address, and that he be requested to allow it to be printed." This, having been seconded by Sir J. R. Gibson-Maitland, was carried unanimously.

The Linnean Gold Medal for the year was then presented to Prof. Daniel Oliver.

The PRESIDENT, in presenting the Gold Medal of the Society to Prof. Oliver, said:—

It is now my exceedingly pleasing duty, acting on behalf of the Society, to present, to that gentleman who has been considered by your Council a worthy recipient of the Gold Medal, that most honourable distinction; and, Professor Oliver, on handing you the Gold Medal of the Linnean Society, it is my pleasing duty to recall to the memory of the Fellows present your many labours in Botany, which have more particularly induced the Society to confer upon you this appreciation of your work. First of all I would call attention to the very varied character of your botanical work. In 1850 you discovered a species of *Najas* in Ireland; in 1859 you published in our 'Transactions' a paper on the Structure of the Stem in certain Caryophylleæ and Plumbagineæ, illustrated with plates drawn by yourself; and in 1862 you contributed to the 'Natural History Review' a Memoir on the Structure of the Stem in Dicotyledons, with a critical Bibliography of the subject. Your series of eighteen papers in the 'Journal' and in the 'Transactions' of this Society deal with all branches of Botany; several, including the whole of the 29th volume of our 'Transactions' with its plates, illustrate the Flora of Africa; you have paid detailed attention to the Olacineæ, the Hamamelidæ, and other imperfectly understood Orders. Your artistic talents enabled you to illustrate these Memoirs beautifully and accurately. The second point I would mention is the high excellence of this work. The investigations of more recent workers have confirmed the accuracy of your observations and conclusions established in these memoirs, in Hooker's 'Icones Plantarum,' which you have now edited for three years wholly yourself, and elsewhere. Then also, in 1862, when geologists were discussing the Atlantis hypothesis, you showed in the 'Natural History Review' that the Macaronesian Flora told against the hypothesis, but that a close connection existed between the Flora of Macaronesia and that of temperate North America. The third point is that much of your work is, as yet, unpublished; it is enshrined in the Kew Herbarium, where it has been almost wholly prepared. The last point I need touch upon is your educational works; your 'Elementary Botany' is the most useful educational work we have, and has led many to further study. Among the many successful pupils you have trained as Professor of Botany for thirty years at University College, London, not the least distinguished has been your successor in the Professorial Chair.

PROFESSOR OLIVER.—I need hardly say that I am very deeply sensible of the singular honour which you and the Council do me. I should be very sorry to say any word which might savour of criticism, or call in question the discretion of the Council, but I may be allowed to say this, that I am very conscious that I am sadly undeserving of this distinction. So far as my work is con-

cerned, in the main it has been done solely in the discharge of my official duties at Kew, where I have myself obtained help from friends and colleagues, amongst others our distinguished Fellows Sir Joseph Hooker, the late Mr. Bentham, and from my old colleague and our much honoured friend Mr. Baker. For my own part the worst of it is that I feel that I cannot consider myself worthy of this honour; for this reason, that I am almost absolutely destitute of the great hankering after research—the getting behind things—characteristic of modern research; I am generally content to enjoy them in a passive sort of way. Another act similar to this came to me some years ago at the hands of the President of the Council of the Royal Society, who conferred a Royal Medal upon me. Instead of exchanging it for some apparatus for research, some rare book, or some powerful lens, I exchanged it for a little water-colour drawing. I can hardly persuade myself that I am a scientific man, and therefore having any claim upon the Society. It remains for me to thank you and the Council heartily for the honour which you have done me.

The obituary notices of deceased Fellows and Foreign Members were laid before the Meeting by the Secretaries.

Obituary Notices.

Hermann Carl Conrad Burmeister was born at Stralsund in 1807. He studied Medicine at Halle, and graduated as Ph.D. in 1829. In 1842 he was elected to the Chair of Zoology at Halle in succession to Professor Nitzsch, and he held that post until 1848. He then visited Brazil, and in company with Lund, the Scandinavian naturalist, explored a large tract of country and made extensive collections. On returning to Europe his specimens were deposited in the Halle Museum, and the results of the journey were published in the 'Systematische Uebersicht der Thiere Brasiliens,' and the 'Erläuterungen zur Fauna Brasiliens.' Burmeister did not, however, remain long in Halle, but again returned to South America and became Director of the Museum of Natural History at Buenos Ayres, a post which he held until shortly before his death. He published, in 1861, his 'Reise durch die La Plata-Staaten,' which is regarded as the standard work on the Vertebrates of the Argentine Republic. During the last thirty years he has studied with unremitting zeal the Fossil Mammalia of the same country, the results of his work being mostly published in the 'Anales del Museo Público de Buenos Aires.' He was also the author of a large number of papers on Zoological subjects communicated to various European scientific societies and journals. He was elected a Foreign Member of this Society in 1851. He died at Buenos Ayres on the 2nd of May, 1892.

With the death of Alphonse de Candolle another link is severed with the old school of systematic botanists, which have formed so brilliant a line from the days of Jussieu onwards, and of whom so few now remain. Biology has now necessarily become so specialized that we shall never again see quite the same race of giants which flourished in the middle period of this century.

The subject of our notice was born in Paris, where his father, the celebrated Auguste Pyrame de Candolle, was for the time being. His family came originally from France, when the revocation of the edict of Nantes drove so many of her worthiest sons to enrich the national life and industries of more tolerant countries. He was born on 27th October, 1806, and although brought up in the very atmosphere of Botany, he was trained for the law, after taking his degree of Bachelier ès Sciences at the University of Geneva in 1825. In 1829 he received the degree of LL.D. after passing through the full curriculum of legal studies, and on this occasion published a thesis on the prerogative of pardon, of remarkable power. It may be possibly due to this early training in a rigid school of logic that the bent of his later years was so often shown in deciding technical questions of nomenclature, as well as being due to his life-long career as one of the editors of the 'Prodromus.' In 1831 he was appointed honorary Professor of Botany in the Academy of Geneva, and associated with his father in the administration of the botanic garden, and also had charge of the botanical excursions with the students. Four years later he was raised to the rank of ordinary professor in the room of his father, who resigned on account of his health and the severe demands made upon his strength by the 'Prodromus.' From 1841, when the decease of his father threw the full burden of the 'Prodromus,' the chair of botany, and the oversight of the botanic garden on him, he carried out his duties in this varied aspect till 1850, when certain events in the city of Geneva caused his retirement and the full devotion of his powers to non-official work.

The first botanical work of our author was his admirable 'Monograph of the Campanulaceæ' (Paris, 1830), which may be taken as a model of patient and zealous devotion to working out a group of plants, in the method of the father's 'Systema,' extended and improved; of this work Mr. Bentham has recorded his opinion that by it Alphonse de Candolle has shown his right to rank as one of the first of living systematists. From this time it is impossible to enumerate the many important productions which came from his pen, they are well known to every working botanist, and need only be briefly referred to here. A noteworthy volume was that on the geography of plants published in 1855 under the title of 'Géographie botanique raisonnée,' which still remains a trustworthy guide, although the advance of knowledge since then has made a portion somewhat obsolete. In the 'Prodromus,' besides the general conduct of the whole

from the seventh volume, Alphonse de Candolle must be credited with the writing of 46 orders in whole or part, and of the Smilaceæ in the 'Monographes' (the succeeding series to the 'Prodromus,' of which seven volumes are extant). His 'La Phytographie, ou l'art de décrire les Plantes' (Paris, 1880), is a volume which is singularly interesting on account of the many by-ways of botanic lore into which it strays and the charm of its style. In this he adverts to some of the points raised since the publication of the 'Lois de Nomenclature botanique,' which itself was the re-issue of a draft set of rules submitted to the Botanic Congress assembled in Paris in 1866 and came out the year following. Opinion has differed as to some of the 'laws' here promulgated, but the majority of the methods advised are excellent, and it would be strange if they were not, as they may be held to embody the experience of the de Candolles, father and son, for three quarters of a century.

For some years past Alphonse de Candolle had relinquished actual work on plants owing to his sight showing traces of the advance of age, but he retained to the last his vivid interest in all questions which agitated botanists of the present day, and his letters to within a very short period of his decease showed no sign of feebleness. But towards the end of last year he acknowledged, in correspondence with his intimate friends, that without any actual illness he had felt an actual step downwards in respect of strength; still, with his hale old age, his family hoped that the return of spring would enable him to shake off these symptoms. Early this year he had an attack of that mysterious and prostrating complaint, the influenza, which, followed by acute pneumonia, terminated fatally on the 4th April, 1893. The news, which first arrived through a press agency, was received the following evening in this room with every feeling of profound regret.

The honours conferred on A. de Candolle were numerous, every civilized country seemed solicitious of enumerating him among those whom it delighted to honour. Doctor of Geneva, Oxford, Cambridge, Bâle, Heidelberg, and Bonn, recipient of many foreign orders, Foreign Member of Academies and Societies, a list of which would require some pages of this record, we must not omit to recall that he was elected Foreign Member of this Society so far back as 1850, and thus for some years past has been our Senior Foreign Member; in 1888 he received the Linnean gold medal, his grandson being present to receive it on his behalf.

A full enumeration of the honours borne by the deceased, and an equally full bibliography, has been published by Dr. Christ, in the current number of the 'Bulletin de l'herbier Boissier,' pp. 203–234.

The Rev. Robert Collie was born in Aberdeenshire not far from Balmoral, and was trained for the ministry of the Presbyterian Church, ordained about 1856, and, after spending ten

years in England, was commissioned by the Free Church of Scotland to proceed to New South Wales. On his arrival in the Colony he remained three months at Grafton, and then was elected minister of the Newtown Church, where he lived until his death, at the Manse, on the 18th April, 1892, having been seized by paralysis during a lecture on the evening of June 19th, 1891, from which he never recovered. His connection with this Society dates from 1874.

Robert Douglas Fitzgerald, Deputy Surveyor-General of the Colony of New South Wales, died at his residence Hunter's Hill, near Sydney, on August 13th, 1892, after a short illness, in his 62nd year.

He became known botanically by his visit with Mr. Charles Moore to Lord Howe's Island, the flora of which spot was till then very imperfectly known, and the endemic forms of plants there found were then made public. The work by which his reputation will be deservedly sustained is his splendid monograph on the Australian Orchids, which began to be issued at Sydney in 1876, and was not completed at the time of his death. The admirable drawings in this folio were the product of his own pencil, and are such as only a naturalist on the spot could have produced. A trifling blot in it is that, in consequence of the order adopted in the issue of the parts, the citation of the plates can only be made by a most cumbrous method, a fault which is but too common with authors whose attention is concentrated upon the subject matter of their studies to the exclusion of minor details. He was elected Fellow in 1874.

Thomas John Moore was born in London in 1824, and at the age of nineteen was appointed assistant-curator of the Earl of Derby's Museum at Knowsley. When this collection was bequeathed to the Corporation of Liverpool in 1851, Mr. Moore became curator, and he has held that post for forty years, until his retirement on account of failing health in 1891. To his constant care and energy Liverpool is in a large degree indebted for the excellence of its museum, which now ranks as one of the finest provincial institutions. Mr. Moore contributed numerous notes on Zoological subjects to scientific journals, and he was a generous helper to many workers. He took an active part in popularizing science, the Liverpool Free Public Lectures from 1865 to 1884 being organized by him. He was also an enthusiastic supporter of all local projects devoted to the encouragement of research.

He was elected an Associate of this Society on January 21st, 1892; and he died on the 31st October of the same year.

Sir Richard Owen, the youngest son of the late Mr. Richard Owen, of Fulmer Place, near Slough, Buckinghamshire, was born

at Lancaster on the 20th of July, 1804. He was educated at the Lancaster Grammar School, and from there went to Edinburgh to study medicine, matriculating in 1824. In 1825 he visited Paris, where he made the acquaintance of Cuvier and other distinguished anatomists of that day. In 1826 he came to London and attended the medicine school of St. Bartholomew's Hospital, where he acted as one of the prosectors to the celebrated Abernethy. He was entered as a Member of the Royal College of Surgeons in the same year, and in 1827 he began practice on his own account in Serle Street, Lincoln's Inn Fields.

Young Owen had originally intended to enter the Navy Medical Service, but he relinquished that idea on the advice of Mr. Abernethy, who had discerned Owen's special ability as an anatomist, and who, subsequently (in 1828), interested himself in procuring for his old pupil the apointment of Assistant Curator of the Hunterian Museum at the College of Surgeons; Mr. Clift, a near relative of Hunter, being the chief Curator. The duties attached to the post included the preparation of a descriptive Catalogue of the contents of the great and justly celebrated collection. This colossal work Owen had the satisfaction of completing, his labours being given to the world in a series of nine monumental volumes whose production had occupied him from 1828 up to 1856.

In 1834 Owen was elected to the newly established chair of Comparative Anatomy in St. Bartholomew's, and in 1836 he succeeded Sir Charles Bell as Professor of Anatomy and Physiology to the College of Surgeons. In the same year he was also elected to the Hunterian Professorship, and on the death of Mr. Clift, whose daughter he had married in 1835, Owen succeeded to the post of principal Curator of the Museum.

During the progress of his work at the College of Surgeons, Owen made very extensive series of dissections of animals obtained from the Zoological Society's Gardens in Regent's Park, the results being embodied in a large number of valuable papers published in the Proceedings of the Zoological and other Societies. The amount of work produced during this period was enormous; amongst some of the more important publications may be mentioned his 'Odontography,' the 'Lectures on Comparative Anatomy,' 'The Archetype and Homologies of the Vertebrate Skeleton,' 'On the nature of Limbs,' on 'Parthenogenesis,' on 'The British Fossil Reptiles,' on 'The Gigantic Fossil Birds of New Zealand,' on 'The Fossil Mammals of Australia,' and on 'The Great Megatherium of America.'

In addition to this great amount of work in his own field of study, Owen sat on various Health and Sanitary Commissions appointed by Government; and he was also one of the Commissioners for the Great Exhibition of 1851; and in all of these capacities he rendered valuable services to the nation at large.

In 1856 Owen's long connection with the College of Surgeons was severed by his appointment as Superintendent of the

Department of Natural History in the British Museum. For many years previously additional space for storing and exhibiting the National Collections had been most urgently needed, and the want had been repeatedly and pressingly emphasized in the annual reports of the several Keepers. The new Chief applied his whole force of influence and intellect to obtain a worthy habitation for the treasures under his charge, the result—after many struggles between politicians and departmentalists—being the sanction to the necessary parliamentary grant in 1872, the erection of the present range of buildings at South Kensington, and the removal of the Natural History Department from Bloomsbury. With consummate energy Owen superintended the new arrangement of the collections, which were opened to the public in the spring of 1881, and thus saw the accomplishment of an undertaking of which alone any man might be more than justly proud.

He resigned his position as Director in 1883. Notwithstanding his official duties, the period of 1856–80 was no less prolific in papers and memoirs than the previous years had been. Amongst these may be mentioned his large series of Monographs on British Fossil Reptiles and on the Cetacea of the Red Crag, which appeared in the annual volumes of the Palæontographical Society, the memoir on the Fossil Reptiles of South Africa, and his Rede lecture 'On the Classification and Geographical Distribution of the Mammalia,' and his 'Manual of Palæontology.' His papers published in the Proceedings of learned Societies are more than 400 in number, and embrace subjects belonging to nearly every class of the animal kingdom.

He was elected a Fellow of the Royal Society in 1834, and in 1842 received the Royal Medal, and in 1846 the Copley Medal. In 1851 the King of Prussia conferred upon him the Ordre pour le Mérite, and in 1855 the Emperor of the French the Cross of the Légion d'Honneur. In 1873 the Emperor of Brazil gave him the Imperial Order of the Rose, and the Queen conferred upon him the Order of the Bath, of which Order he was made a Knight Commander in 1883 on his retirement from the post of Superintendent of the Natural History Museum. In 1882 the King of Italy sent him the Order of St. Maurice and St. Lazarus. The Universities of Oxford, Cambridge, and Dublin conferred on him honorary degrees; and his name occurs on the lists of the honorary or corresponding members of most of the European and American Societies. He was President of the British Association in 1857; and he was elected President of the Palæontographical Society in 1877 in succession to Mr. Bowerbank and held that post until his death. In 1859 he was elected a Foreign Associate of the Institute of France in succession to Robert Brown; and Foreign Associate of the Paris Academy of Medicine in 1874 in succession to Baron Liebig. He was elected a Fellow of this Society in 1836; and on the Hundredth Anniversary Meeting, on the founding of the Linnean Medal,

he was the first recipient. He died on December 18th, 1892, in the 89th year of his ags.

Owen's stupendous industry, vast wealth of knowledge, and marvellous power of interpretation have left an indelible mark upon the Science of the century, and entitle him to be ranked as one of the greatest anatomists of the age.

Henry Tibbats Stainton, the eldest son of Mr. Henry Stainton of Lewisham, was born in London on August 13th, 1822. He was educated at home, but finally entered King's College for a short time before going into business under his father. He early acquired a taste for entomology, probably owing in great part to his acquaintance with the Rev. William Johnson. From the first his attention was directed to the Micro-Lepidoptera, and in 1848 he published in the 'Zoologist' a "Monograph of the British Argyromiges." This was followed in 1849 by "An Attempt at a Systematic Catalogue of the British Tineidæ and Pterophoridæ," with a Supplement in 1851; the volume on "Tineina" in the 'Insecta Britannica' series in 1854; 'A Manual of British Butterflies and Moths,' 2 vols., 1857 and 1859; 'The Natural History of the Tineinæ,' in 13 vols., 1855–73, a work in four languages, published with the assistance of his friends Mr. J. W. Douglas, Prof. Zeller, and Prof. Frey. He was the author of many papers on entomological subjects (including a number of local faunas) published in the Proceedings of Societies. He established several serial entomological publications, and he exerted himself enthusiastically to spread and popularize his favourite studies.

In 1848 he joined the Entomological Society, and held the post of Secretary in 1850–51 and of President in 1881–82. He was elected a Fellow of the Royal Society in 1867, and was a Member of the Council in 1880–82. He became a Fellow of the Linnean Society in 1859, held the post of Secretary from 1869 to 1874, and was a Vice-President in 1883–85. He was Secretary of the Ray Society from 1861–72; and he acted as Secretary of Section D at the Meetings of the British Association for the Advancement of Science in 1864, and from 1867–72.

He was instrumental in founding the Zoological Record Association in 1871, and acted as Secretary until the publication was taken over by the Zoological Society in 1886.

Stainton will long be remembered as a genial and generous friend, and a painstaking industrious worker. He died at Lewisham on December 2nd, 1892.

John Obadiah Westwood was born at Sheffield on December 22nd, 1805. He was educated for the law, and practised for a short time as a solicitor. His love for Natural History led him, however, to relinquish his profession and to accept an appointment at Oxford concurrently with the presentation of the Hopeian collection to the University Museum.

He was joint author with Bate of the 'History of the British Sessile-eyed Crustacea.' It was, however, to Entomology that

Westwood devoted his long life and careful research. His 'Arcana Entomologica' and 'Cabinet of Oriental Entomology,' 'The Genera of Diurnal Lepidoptera,' and his 'Introduction to the Modern Classification of Insects,' may be justly mentioned as classical volumes. He was also the author of a large number of papers published in the Proceedings of various scientific Societies.

In addition to his entomological work Professor Westwood was an ardent antiquarian, and his works entitled 'Palæographia Sacra Pictoria' and 'Lapidarium Walliæ' are testimonies of his industrious and careful study.

He was elected Fellow of this Society on the 1st of May, 1827. He was one of the founders of the Entomological Society, and he received the Royal Society's Gold Medal for his entomological researches.

Professor Westwood was eminently lovable as a friend and enthusiastic as a worker. He passed away, the Nestor of his beloved science, on January 2nd, 1893, in the 87th year of his age.

Dr. William Woolls was born in March, 1814, at Winchester, Hampshire, and was one of a numerous family, his father being in business in that city; he owed his early training chiefly to two clergymen, the Rev. Thomas Scard, master of Bishop's Waltham School, and Rev. Thomas Westcombe, minor canon of the cathedral. His father dying when William Woolls was only sixteen, he had to turn his thoughts to some means of livelihood, and tried for a cadetship in the Honourable East India Company's service, but failing, he resolved to try his fortune in the Colony of New South Wales, and landed in Sydney at the age of 17. Some poems composed during his voyage attracted the attention of Bishop Broughton, by whom he was recommended to the Rev. Robert Forrest, the first head-master of the King's School at Parramatta, and in 1832 Woolls accepted an assistant mastership in the school. On leaving Parramatta he came to Sydney and supported himself for some time by journalistic work and private tuition, when Mr. W. Cope, head-master of Sydney College, offered him the post of classical master there, which offer was accepted. A disagreement between Woolls and the managing committee of Sydney College having arisen, he resigned and returned to Parramatta, where he opened a school on his own account, remaining here for some years, though he was pressed to take orders in the Church of England. Woolls's first introduction to natural history was through a former head-master of the King's School, the Rev. James Walker, and he eagerly followed it up, becoming acquainted with the leading naturalists of Australia. His work on the plants of Parramatta was published by the University of Göttingen, from whom he received the degree of Ph.D. His life passed tranquilly until, at the mature age of 59, in the year 1873, he was admitted to holy orders by the late Bishop Barker, and he was appointed to the incumbency of Richmond, Tasmania, and shortly after-

wards to the Rural Deanery of the same district. After ten years of hard work in this place, he retired to Burwood, near Sydney, giving assistance to the incumbent. A few days before his death he was stricken with paralysis, and passed away on March 14th, 1893.

Dr. Woolls was elected Fellow in 1865; besides his contributions to contemporary literature, he was a prominent member of the Linnean Society of New South Wales.

June 1st, 1893.

Prof. Charles Stewart, President, in the Chair.

The Minutes of the Anniversary Meeting, 24th May, were read and confirmed.

Messrs. Richard Assheton, Walter Godfrey Axford, Joseph Gabriel, and Harold W. S. Wager were elected Fellows.

The President nominated Mr. John Gilbert Baker, Mr. William Carruthers, Mr. Frank Crisp, and Dr. Albert C. L. G. Günther to be Vice-Presidents for the ensuing year.

Dr. John Lowe exhibited specimens of *Hibiscus Rosa sinensis* and *Abutilon frondosum* (?), in which the petals had been punctured by the Blackcap (*Sylvia atricapilla*), causing the exudation of a viscid secretion, attractive to insects on which the bird preys. This habit of the Blackcap is believed to have been previously unrecorded. The observations in question were made at Orotava, Teneriffe, during the month of March last.

The President announced that a letter had been received from the Lower Rhine Natural History and Medical Society, inviting the attendance of Fellows at their 75th Annual Meeting to be holden at Bonn on the 2nd July next.

The following papers were read:—

1. "On some Polynesian Plants collected by J. Lister." By W. B. Hemsley, F.R.S., A.L.S.
2. "A Revision of the Fossil Genus *Nipadites*, Bowerb." By A. B. Rendle, F.L.S.
3. "Observations on the Temperature of Trees in Colorado." By Dr. Carl Baur. (Communicated by Dr. M. T. Masters, F.R.S., F.L.S.)
4. "On the Manner of Feeding in *Testacella scutulum*." By Wilfred Mark Webb, F.L.S.

June 15th, 1893.

Prof. CHARLES STEWART, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Messrs. Frederick J. Jackson and Henry Halero Johnston were elected Fellows.

Mr. A. W. Bennett exhibited some curious examples of revivification in plants, and made some remarks on the tentacles of *Drosera rotundifolia* and *D. longifolia*, specimens of which were exhibited under the microscope.

The following papers were read:—

1. "On the Botany of Mount Kina Balu." By Dr. Otto Stapf. (Communicated by W. T. Thiselton Dyer, C.M.G., F.R.S., F.L.S.)

2. "Notes on the British Tunicata."—Part II. By Prof. W. A. Herdman, F.R.S., F.L.S.

3. "On the Anatomy of a Plant from Senegambia." By Miss A. L. Smith. (Communicated by G. F. Scott Elliot, F.L.S.)

4. "On the African Species of the Genus *Ficus*." By George F. Scott Elliot, F.L.S.

5. "Contributions to the Embryology of the Amentiferæ." By Miss M. Benson. (Communicated by Prof. F. W. Oliver, D.Sc., F.L.S.)

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INDEX TO THE PROCEEDINGS.

SESSION 1892–93.

Note.—The name of the Chairman at each Meeting is not indexed.

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