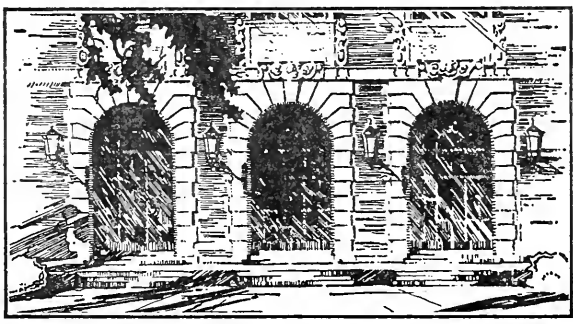


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PROCEEDINGS
OF THE
LINNEAN SOCIETY OF LONDON.

November 7, 1848.

Edward Forster, Esq., V.P., in the Chair.

A paper was read by F. J. Graham, Esq., F.L.S., "On the Injuries sustained by certain Plants from the attacks of parasitic Fungi, with particular reference to the Cause of the Potato Disease."

In order to demonstrate the subject more clearly, Mr. Graham exhibited drawings, with magnified figures of several species of parasites; and a great many specimens of different plants, both native and exotic, presenting a healthy appearance on those parts which were still free from the attacks of the different species of mildew to which they were subject, but at the same time showing the most indisputable signs of disease on those parts which were infested by tufts of mildew. The manner in which one plant in particular, Shepherd's Purse (*Thlaspi Bursa Pastoris*, L.), was affected, was very remarkable. Portions of the stems of this were covered, to the extent of two or three inches, with *Botrytis parasitica*, which caused them to become gouty or swollen to three times their natural size; and eventually these parts assumed a brown colour and a moist putrescent character, which could be traced down the stalks, and in many cases killed the plants. Transverse sections of these blotches, compared with similar sections of a blotch on the potato stalk, exhibited the same effects, the dark fluid having penetrated the tissues of both to a considerable extent. Of all the species of parasitic mildews which he has noticed, Mr. Graham considers those belonging to the genus *Botrytis* to produce the severest injuries; and it is an undisputed fact that the potato crops have been universally attacked, during the last three seasons, by *Botrytis infestans*.

As to the manner in which these parasites acquire their destruction. XXXVIII.—PROCEEDINGS OF THE LINNEAN SOCIETY.

tive power, Mr. Graham considers that it arises from the natural decay of their *mycelium* or internal filaments, which he has found traversing the tissues of plants, beneath the external tufts of mildew. That the tissues of plants are extensively permeated by this *mycelium*, has been frequently shown by the Rev. M. J. Berkeley and other mycologists; but the important fact that these roots (as they may be termed) *die* within the tissues of plants, along with their superstructure, assuming a dark colour in decay and ultimately dissolving into a viscous mass, has hitherto, Mr. Graham states, escaped the notice of authors. Decaying matter being thus secretly introduced, corrupts the adjacent tissues, and in many cases spreads over the entire plant and kills it. Mr. Graham states that he has arrived at this conclusion after repeated examinations under powerful microscopes, but that the effects are visible in some cases to the naked eye. Experiments made by enclosing tufts of mildew in the sap of those plants on which it grew, also exhibited the results above stated.

November 21.

Edward Forster, Esq., V.P., in the Chair.

Mr. A. Adams, F.L.S., presented specimens of the habitations of a species of Spider, collected by Captain Sir E. Belcher on the north-west side of Majambo Bay, in the Island of Madagascar, and communicated by him to Mr. Adams, with the particulars of their history. It appears that on this coast the north-east wind blows so constantly and to such a degree, that it would effectually destroy the more usual forms of web; to remedy which, the spiders of the locality collect together a number of small even-sized grains of quartz-sand, of which they fabricate a tolerably firm horn-shaped habitaculum, uniting them together by means of a fine loose web, which they hang from the low shrubs that grow upon the sand, and thus suspended defy the breeze and ride out the gale in safety.

Mr. J. Clarke exhibited specimens of *Filago Jussiaei* and *Melilotus arvensis*, found near Saffron Walden, Essex.

Mr. J. Hogg, F.R.S., F.L.S., exhibited dried specimens of a plant which he regarded as a double variety of *Matricaria Chamomilla*, L., found by himself on the sandy road-side near Whitburn, Durham, together with a coloured drawing of the natural size. He stated, in a

communication accompanying the exhibition, that he had never before observed any similar variety of the species above named, nor could he find any account of its having been known to vary with a double flower. Sir J. E. Smith, however, in his 'English Flora,' states of *Anthemis nobilis*, that "varieties with double flowers are common in gardens;" and in Smith's own herbarium, in the Museum of the Society, are two specimens of *Pyrethrum inodorum*, var. *flore pleno*, the flowers of which very strongly resemble those exhibited. These were found in Norfolk by Mr. Crowe in 1799, and are mentioned in the 'English Flora' as "a double variety, having a multiplied radius and an obliterated contracted disk." In the present example Mr. Hogg states that "the external white petals, or rather the florets of the radius, are altogether larger and stronger; they are much elongated, strap-shaped, less narrow, with their margins somewhat folded inwards, and are rather more numerous than those in the ordinary single flower, from which they also differ by being sometimes bilabiate; whilst the disk itself is greatly contracted and reduced, and its tubular florets appear to have become very small and abortive; thus apparently indicating that the florets of the radius have become lengthened and enlarged at the expense of those of the disk." Mr. Hogg adds, that in general appearance these large double flowers of *Matr. Chamomilla* resemble the common white double flowers of the genus *Chrysanthemum*.

Read the commencement of a memoir "On the Anatomy and Physiology of *Physalia*, and on its place in the System of Animals." By William Huxley, Esq., Assistant-Surgeon of H.M.S. Rattlesnake. Communicated by the President.

December 5.

E. Forster, Esq., V.P., in the Chair.

Thomas Robert N. Morson, Esq., was elected a Fellow.

Mr. J. O. Westwood, F.L.S., exhibited a new species, of large size, of the genus *Achias*, Fabr., of which two species only were hitherto known.

Read the conclusion of Mr. Huxley's memoir on *Physalia*, commenced at the last Meeting.

The specimens of *Physalia* on which Mr. Huxley's observations were made, were collected on board the Rattlesnake, between the 25th of February and the 3rd of March, between lat. 25° and 37° S. and long. 5° and 7° W. They varied in size from $\frac{1}{8}$ in. to 2 in. in the long diameter of the float. The author first describes the general appearance of the specimens, of which he doubts whether the largest were adult, and then proceeds to a minute examination of their details, dividing them for this purpose into the float or air-bladder, and the appendages of greater or less length which depend from it when the animal is in its natural position at the surface of the water. The smaller specimens he states to be the best adapted for examination.

The float is described as consisting of an outer coat, an inner coat and an air-sac contained within them, attached only to one spot of their parietes, and there communicating with the exterior by a small constricted aperture, which was always found on the upper surface. The disposition of the appendages is very irregular, but the larger tentacles are generally placed more externally, the smaller and nascent organs more towards the centre. These appendages are of three kinds, and consist of stomachal sacs, tentacles and cyathiform bodies. Of each of these the author gives a detailed description in their more perfect form, as well as in their undeveloped state as nascent organs; and then proceeds to inquire, first, what is the physiological importance of the organs described, and secondly, what zoological place should be occupied by an animal provided with such organs so disposed.

Each of these questions the author treats at considerable length. Of the function of the stomachal sacs in receiving the prey there can be little question; but it may be doubted whether the digested nutritive matter circulates in the ciliated water-carrying canals or is absorbed into totally different channels. In the latter case the purpose of the stomachal villi would plainly seem to be to absorb nutritive matter and convey it through their central canal to the wide interspace existing between the outer and inner membrane; but the author states that he has never seen in this interspace any corpuscles analogous to those described by Will as blood-corpuscles. He suggests that the villousities noticed by Dr. Milne-Edwards in the stomachal sacs of *Apolesia* are the same organs, and not ovaries as Dr. Milne-Edwards considers them; and observes that similar organs exist in a *Diphya* (*Eudoxia*), hereafter to be more fully described. The function of the tentacles, both as prehensile and defensive organs, admits of little doubt; and on this subject the author notices an erroneous view of M. Lesson, who describes them merely as

ducts for conveying an (hypothetical) acrid fluid from an (hypothetical) poison-gland. He also controverts M. Lesson's opinion that certain of the colourless tentacles are to be regarded as branchiæ; being quite convinced that there is no difference between these and the ordinary tentacles except in the absence of colour. As regards the function of the cyathiform bodies, he has no other than analogical evidence to offer. The only organs in the *Acalephæ* with which he conceives them to have any resemblance are the natatorial organs of the *Physophoræ*. But their little adaptation to a similar purpose, and the entire absence even of their rudiments in young *Physaliæ*, discourage this comparison; while on the other hand they bear a singular resemblance to the female generative organs of a *Diphyæ*, and this resemblance extends even to the younger stages of both.

Mr. Huxley concludes by referring *Physalia* to the position assigned to it by Eschscholtz among *Physophoræ*, and near *Discolabe* or *Angela*. In fact, he regards *Physalia* as in all its essential elements nothing but a *Physophora*, whose terminal dilatation has increased at the expense of the rest of the stem, and hence carries all its organs at the base of this dilatation.

The paper was illustrated by pencil drawings of the structures described.

Read also a translation* from the Swedish, of "Almanac notes for the year 1735, by Charles von Linné."

* *Note by Dr. Wallich.*—The Council of the Society did me the honour at the end of last session to entrust the duty of translation to my care. It has been made in the first instance from a communication by Joh. Aug. Holmström, in "Botanical Notices" edited by Al. Ed. Lindblom, No. 12 for December 1845, pp. 210–218, with the following motto and preface. Mr. Bentham having pointed out to me that there existed a German translation by Dr. Beilschmid in the *Flora* for February 1847, pp. 97–104, I have gladly availed myself of this additional aid. Nor have I altogether neglected to consult the precious little relic itself, now in the Society's possession, although of course without any other result than that of verifying the fidelity of Mr. Holmström's edition. All the notes are his with very few exceptions, which have been duly marked. I have taken the liberty of frequently leaving Linnæus's abbreviations *in statu quo*, and very rarely indeed altered his orthography.

"Parva hæc quippe, et quanquam paucis percentantibus adorata, tamen ignorantibus transcurra."—*Apuleius, Florida.*

Every, even the smallest memorial of a truly and through all ages great man, possesses its value, and deserves to be secured from decay and oblivion. It is on that account that I have thought it my duty to publish these notes of the 'Princeps Botanicorum,' which have accidentally come into my hands. Although containing nothing

new, or of great importance, they furnish several valuable data connected with, perhaps, the most remarkable year in the life of Linné; they exhibit, in various points, traces of the peculiar *näiveté* of his style, and are therefore, in respect to character alone, not without their value.

The annotations are written on ten pages, interleaved in an almanac having the following title: "Almanach på Åhret efter Jesu Christi nåderika Födelse 1735. Til Skara Horizont, etc. Utreknad och steld af *Birger Vassenio*, samt vidare fortsättjande af underrettelsen til Retta Tanckar am thenna Synliga Werldennes Systemate, allar Sammanhang.—Skara, Herm. Arnold Möller." 16mo. (Almanac for the year 1735 from the gracious birth of J. C. For the horizon of Skara, &c. Calculated and regulated by Birger Vassenius, together with further instructions concerning right ideas of the system or structure of this visible world.)

The volume is quite complete and well-preserved. It appears, even during Linnæus's lifetime, to have come into the possession of strangers, and to have been taken into the country and used there, through a succession of years, in lieu of a new almanac; for we find, in three several places, remarks made by peasants' wives on sundry matters. One of its latest male or female owners has even altered with ink the year printed on the title-page for that of 1765. Thus the little brochure has passed into the possession of several individuals, without any of them being aware, or caring, by whom the many notes were added. These notes are numerous, and constitute almost an entire diary, during the first months of the year; after which they become less and less frequent, ceasing altogether in the months of October and November. The complaint of A. Afzelius (in Linné's *Eg. Ant.* pl. loc.*), that it is difficult to decipher the handwriting of Linnæus, is often verified here. Yet I think I have hit on the right meaning in most instances. With respect to some of the most difficult places, Professor J. H. Schröder has afforded me explanation with his accustomed sagacity.

The notes are now published with as much accuracy as was possible, even as to spelling and grammar. The words which have been added by way of explanation are included within brackets. Italics indicate that abbreviations have been filled up †. A few notes have been subjoined.

* Linnæus's Personal Notes, edited by A. Afzelius.—N. W.

† Except on the first mention of a name, I have thought it best to leave the abbreviations unsupplied.—N. W.

(JANUARY.)

O! Ens entium miserere mei!

1. Christmas dinner with alderman Dan. Moræus.
2. called on *Sara Lisa*¹, in a Lapland dress.
3. the same, absentibus parentibus.
4. prepared a new edition of *Systema Mineral*.²
5. Assessors Benzelstierna and Kolmeter³ called on me.
6. Christmas party at alderman Anders Jers.
7. dined with assessor Kolmeter.
8. commenced writing *Sponsalia plantar*.⁴
9. continued.
10. called on S. L. M. and had a little fun.
11. tried Anders Jers's well.
12. dined at Morbygden with B. Forsling.
13. called on S. L. M., and at Kongsgården⁵, and on me assessor Moræus.
14. Christmas party at Troilli's, surveyor of mines.
15. ——— ——— — the provost's at Fahlun with S. L. M.
16. dinner at secretary Neuman's.
N.B. a day of immortal commemoration, of final settling with S. L. M.
17. wrote to baron Koskul, dean Sandel, magister Linder.
18. dined with the lieutenant of the province (Landshöfdingen).
19. Lars Petter⁶ dined at a party at engineer (Konstmäster) Trygg's. Betted two tankards of rhenish wine, that there will be a christening (barnsöl) in 4 years.
20. wrote to J. Moræus, S. S.⁷ about S. L. M. Explicitly solicited (her hand).
21. wrote to S. L. M.
22. called on — — —, gave annulum.
23. reciprocation by mother-in-law.
24. wrote to the Society⁸ cum lachesi Lapponica.
25. remained quiet.

¹ Daughter of John Moræus, town-physician (*Stadsphysicus*), brother of the above-mentioned. She was afterwards married to Linnæus on the 26th June, 1738.

² Probably a revision, in manuscript.

³ The future brother-in-law of Linnæus, married to Anne Christina, the younger daughter of John Moræus.

⁴ Published as a disputation at Upsala, in 1746, 4to.

⁵ North- or Fahlun-Kongsgård.

⁶ Quis?

⁷ Socero Suo?

⁸ The Society of Sciences at Upsala, which had defrayed Linnæus's recent journey into Lapland (in 1732.—B.).

26. noon¹ (at) alderman Lundström's (with) Näsman, controller, and Anders and Iöns Williamsons.
27. received from J. Mor. responsio concerning 3 ☉² secundum abitum. seven temptations!
28. called on Troilli, surveyor of mines; Strömberg, controller; Trygg.
29. called on S. L. M. concluded Floram Dalekarlicam³.
30. dined with the lieutenant of the province.
31. wrote to Doctor Celsius, Spelin and Neander about employment.

(FEBRUARY.)

1. attended a woman in childbirth.
2. dined with the provost of Fahlu; in the evening (at) Schultze's, accountant.
3. at the Kongsgård and (with) S. L. M. Gave obligatio scripta fidei.
4. was with a sick person at Morbygden.
6. received letters from Celsius, Spelin, Neander, Liungwal (and) Sophia Littorin.
7. wrote to Spelin, Liungwal, Tegnelin.
8. — — in the evening (with) S. L. M.
9. in the afternoon at a frolic at Morbygden.
10. — — evening (with) S. L. M.
11. with S. L. M. until X o'clock in the evening.
12. paid visits with Browallius⁴.
13. paid a visit to F. Ehrenholm absente S. L. M. received letters from Spelin, Osængius, Ahlgren.
14. wrote to dean Sandel (and) Anna Maria Linnæa⁵.
16. dined with surveyor of mines Troill and parents-in-law.
17. Surv. of min. Borgenström (and) Svaben called on me⁶.
18. took leave of father-in-law.
19. took leave of S. L. M., who wrote the oath⁷.

¹ Probably dined.—N. W.

² Years. This stipulation is notorious. Miss Hedin, Minne (Souvenir) of Linné, i. p. 47.

³ Not published.

⁴ "At that time domestic chaplain and tutor in the family of Reuterholm, lieut. of the province, afterwards professor and bishop at Åbo."—Linnæus's Personal Notes, p. 22.

⁵ Linnæus's sister, married to G. Hök, afterwards dean at Wiresta.

⁶ Surv. of mines Anton Svab. After this follow two illegible words.

⁷ See 3rd of this month. This *reciprocal* obligation by a written oath was not known before.

20. at 10 oclock, left Fahlun with Clas Sohlberg.
21. dined with Swedenstierna (at) Högfors, arrived at Nya Elfsborg.
22. dined with Lybecker, surveyor of mines, arrived at Nora.
23. } remained at Knutsby with surv. of mines Christiernin.
24. }
25. was at the sulphur mine at Dylta, arrived at Örebro.
26. left Örebro.
27. went through Askersund; at noon with pastor Tiselius.
28. through schenninge, arrived at Wislena.

(MARCH.)

1. went to schenninge, called (on) Menlös, pastor loci.
2. — — ———, at church, dined at Wislena.
3. called on Mag. Knop. Dinner at Bishop Benzelius's.
4. went to Wislena, called on professor Hermens.
5. remained.
6. went through Schenninge and Wastena, visited the church.
7. through Omberg to the end of Östergiötland.
8. in Småland through grenna, Skiersadd to Jönkiöping.
9. at church in Jönkiöping.
10. dined at dean junbeck's.
11. left; remained at Wrekstad.
12. came to Wexiö.
13. dined at assessor Rothman's.
14. — — general Koskul's.
15. — — Höken's¹.
16. — — treasurer Bergman's.
17. — — assessor Rothman's.
18. dined with treasurer Bergman.
19. went to stenbrohult.
23. Browall's letter dated the 7^h March arrived.
24. wrote to inspector Sohlberg, Brovall and S. L. M.
26. we were at möckelsnäs.
30. Browall's letter of 21 March arrived.
31. Doctor Rothman called on me at stenbrohult.

(APRIL.)

3. Rothman left; was at Diö.
6. feasted at Möcklanäs with Ekelund (and) Hök.
7. feasted at stenbrohult with brother-in law (and) Törnquist.

¹ Linnæus's brother-in-law.

8. feasted at Diö with brother-in-law.
9. ——— — Dito — ————— and Unner.
13. Mag. Hök left us at stenbrohult.
15. took leave of stenbrohult and its inhabitants, arrived at the Ry iron mine at Unner's.
16. at noon at grotteryd; arrived at the inn at Markary.
17. arrived at Helsingborg.
18. Day of prayers; went across the sound after evening prayer.
22. embarked at Helsingör.
24. sailed past Zealand (and) Copenhagen.
25. got sight of german ground.
26. S. L. M's birth-day. 1716¹.
26. arrived at Lybeck.
27. at church at Lybeck.
28. went to Hamburg.
29. inspected the town of Hamburg.
30. called on prof. Koul.

(MAY.)

1. Prof. Koul called on me. visited Sprekelsons Hort.
2. inspected Nators cabinet and Hydram.
3. at the Resident's², and Sprekelson's.
4. dined at Schöning's and entertained Kohl (and) Jenes³.
5. (walked) with Sprekelson in hort. 1 ducat.
12. at a dinner party at Sprekelsons.
13. Carl *Linnæi* birth-day⁴.
13. wedding at Schönnings.
14. 35 doler 7 öre silvercoin due to me⁵.
15. visited Anderson's cabinet, drank 75 years old Rhenish wine.
16. took leave of Hamburg for Altona.
17. at 9 oclock †⁶ embarked.
18. arrived at stören, remained at wewelsflyt.
19. at church at wäfwelsflyt, detained by contrary Δ ⁷.
26. the environs of groeningen in sight.
27. saw gröningen.

¹ By a singular conceit of Linnæus ("quam sunt lusus pueriles amoris"!), the name and year of birth of his betrothed are written with reversed letters and cyphers.—The pedigree in Personal Notes gives another day, namely the 28th April.

² Should this be the President's, as Dr. Beilschmid translates it?—N. W.

³ More correctly Jänitsch, Gottfr. Jac., physician. Compare Personal Notes, pp. 23 and 83; Hedin, i. p. 50.

⁴ This entry, too, is made with larger, reversed letters.

⁵ Quis? ⁶ † daytime.

⁷ Δ wind.

28. got sight of Wästfriesland. refreshment at Stiernkoog¹.
29. remained right opposite Stiernkoog.
30. went across the sea, saw omerland, an island² of 3 miles. very near being wrecked.
31. at 5 oclock in the morning passed by Harlem³ a small sea-town; at noon (passed) Yorge. in the evening (at) Enkhysen, situated on our left. At noon a terrible hurricane with rain, wind, thunder, lightning. Haddervik to the eastward, we could not see. Enkhysen was the first (pretty place⁴) of Holland.

(JUNE.)

1. obliged to continue off Enkhysen untill noon, on account of the storm and contrary wind. afterwards on our right saw Horn, a town.
2. arrived early in the morning at Amsterdam; in the afternoon I saw Hortum Medicum there.
3. called on prof. botanices Burman, and at his library.
4. inspected Seba's incomparable dispensary.
5. dined at Burman's, (in) the evening went to Hadderwik.
6. at 3 oclock in the morning arrived at Hadderwik. inspected the academy. Heard prof. Lom's introduction.
7. post Examen creatus fui Candidat. medic.
8. Recepti a Promotore Diss.⁵ meam censuratum et typographo tradidi imprimendam.
9. } audiavi Lectiones privatas Prof. de Gorter.
10. }
12. Linnæus Doctor Creatus fuit Harderovici⁶.
13. left Hadderwik in the evening.
14. arrived at Amsterdam.
15. was at the plantations and saw crowds of people.
16. took 7 ducats, total 8 ducats⁷.
18. went to Leyden.
19. saw Hortum academicum.
20. called on prof. v. Royen.
21. saw the library.
27. Artedi arrived at Leiden. saw the Arboretum of Boerhaave.
30. sent Systema Naturæ to the press⁸.

¹ Schiermonigkoog.² Ameland.³ Harlingen.⁴ These very indistinct words are given conjecturally.⁵ Nova hypothesis de febrium intermittentium natura. Diss. grad. Harderovici, 1735, 4to.⁶ The 13th, according to Pers. Notes, p. 24. ⁷ Compare 5th May.⁸ The printing commenced; see further on, the 15th July and 2nd (13th) December.

(JULY.)

14. (3. *old style*¹) botanized on the sea-shore.
 6. went to Amsterdam.
 8. went to Leiden.
 15. completed the *Systema nat.*²
 16. wrote to Rothman and my father.
 17. went to Ytrecht. inspected Hort. Acad.
 18. went to Leiden with Gronov. and Mouschenbr.
 22. went to Amsterdam, stayed with prof. Burm.
 28. *literæ ad uxorem*³.
 29. sent to press *Bibliotheca Botanica*⁴.

(AUGUST.)

12. (1. *old style*) received a bill of exchange for 200 Dollar silvercoin from Sohlberg.
 13. (2. o. s.) went to Cliffort.
 14. (3. o. s.) returned home.
 17. (6. o. s.) went to Leiden.
 19. (8. o. s.) arrived at Amsterdam.
 (18.) Appointed *Præfectus Horti Cliffortiani*.
 19. wrote to Inspector Sohlberg, Browall (and) S. L. M.

(SEPTEMBER.)

13. took charge of *præfecturam horti Cliffort*.
 27. } (16–17. o. s.) *herâ 1 noctis Artedius* was drowned at Am-
 28. } sterdam.

(DECEMBER.)

13. (2. o. s.) *Promotio cum Kappa Lugduni*⁵. Concluded the printing of *Systema Nat.*⁶

¹ This and some of the subsequent dates are according to the *new style*, quoted in a separate column in Vassenius' Almanac. In these cases I have added the old style dates within brackets.

² Finished the manuscript.

³ *Jocose ita dixit. Cic.*

⁴ Left the press only in 1736 at Amsterdam, small 8vo.

⁵ *Cappa* (medieval Latin), doctor's gown. See Du Fresne, *Gloss. Lat. i.* p. 856, et *Gloss. Græc.* p. 584. Spering ad *Testam. Absolonis*, p. 105.

⁶ The printing finished. This editio princeps, which is very rare in Sweden, has the following title: *Caroli Linnæi Systema Naturæ, sive Regna tria Naturæ, systematice proposita per Classes, Ordines, Genera, et Species. Lugd. Bat. ap. Haak, 1735. Fol. maj.—14 pages.* The original manuscript is preserved at the *Carolinska* Institut, at Stockholm. Comp. Beckman's *Minnen* (Recollections), p. 112.

December 19.

The Lord Bishop of Norwich, President, in the Chair.

Mr. J. O. Westwood, F.L.S., exhibited five new species of *Pausisidæ* from Mozambique, belonging to the collection of A. Melly, Esq.; also five Australian species of *Adelotopus*, a genus closely allied to *Pseudomorpha*, Kirby in Linn. Trans.

Mr. Westwood also exhibited a piece of Memel timber used in submarine erections at Southampton, destroyed by *Chelura terebrans*, a crustaceous animal not hitherto observed in England, although previously found in Ireland and Scotland.

Mr. Adam White, F.L.S., exhibited three curious species of *Hemiptera* belonging to the genera *Scaptocoris* and *Petalochirus*. He made some remarks on fossorial insects in general, illustrating them with specimens of a New Zealand Mole-Cricket and of a new genus of *Carabidæ*, allied to *Scarites*. He particularly described a new species of *Scaptocoris* (*S. Amyoti*) from Northern India, remarkable inasmuch as it forms a second distinct species of a very striking genus hitherto known to occur only in Brazil (*S. castaneus*, Perty).

Read a paper, entitled "Experiments and Observations on the Poison of Animals of the Order *Araneidea*." By John Blackwall, Esq., F.L.S. &c.

After referring to the fabulous accounts of the singular effects said to be produced in the human species by the bite of the Tarantula, and of the serious and sometimes fatal consequences attributed to that of the Malmignatte, Mr. Blackwall proceeds to consider the validity of an opinion prevalent among arachnologists of the present day, that insects pierced by the fangs of spiders die almost instantaneously. He states that in the summer of 1846 he commenced an experimental investigation of the subject, the particulars of which he communicates, arranging his experiments under four distinct heads, corresponding to the objects upon which they were made, namely the human species, spiders, insects, and inanimate substances. The experiments are detailed at length, and the following are the principal results.

First, as regards the effect of the bite of spiders upon the human species. The species selected was *Epeira Diadema*, and Mr. Blackwall states the legitimate conclusion deducible from various experiments to be, that there is nothing to apprehend from the bite of the

most powerful British spiders, even when inflicted at a moment of extreme irritation and in hot sultry weather, the pain occasioned by it being little if any more than is due to the laceration and compression which the injured part has sustained.

Under the second head, the observations were made on a male and female of *Tegenaria civilis*; on two females of *Segestria senoculata*; twice on females of *Ciniflo atrox* and females of *Lycosa agretica*; on a female *Epeïra Diadema* and a female *Cælotes saxatilis*; on two females of *Epeïra Diadema*; and lastly on a female of *Epeïra Diadema*, which in a state of high exasperation bit itself. Extensive mechanical injuries, Mr. Blackwall states, commonly prove fatal to spiders, whether received in conflicts with their congeners or otherwise; but no evidence supplied by his experiments indicates that the fluid emitted from the orifice in the fangs of the *Araneidea* possesses a property destructive to the existence of animals of that order when transmitted into a recent wound.

Thirdly, as the result of numerous experiments on insects, made with *Epeïra Diadema*, *Segestria senoculata*, *Epeïra quadrata*, *Tegenaria civilis*, and *Agelena labyrinthica*, the author comes to the conclusion that they do not present any facts which appear to sanction the opinion that insects are deprived of life with much greater celerity when pierced by the fangs of spiders than when lacerated mechanically to an equal extent by other means. It is true however that the catastrophe is greatly accelerated if the spiders maintain a protracted hold of their victims, but this is obviously attributable to the extraction of their fluids, which are transferred by often-repeated acts of deglutition into the stomachs of their adversaries.

Fourthly, in his experiments on inanimate substances, Mr. Blackwall found that litmus-paper presented to spiders belonging to several genera when in a state of extreme irritation, and moistened by the transparent fluid which issues under such circumstances from the fissure near the extremity of their fangs, invariably became red as far as the fluid spread, clearly proving that this secretion, although tasteless, is an acid. On the other hand, the fluid which flows from the mouth, as also that contained in the stomach and that which is discharged from wounds inflicted on the body or limbs, were found by the same chemical test to be alkaline. Turmeric paper, on the contrary, was rendered brown by the application of the fluids from the mouth and stomach, and restored to its original colour by the agency of the fluid secreted by the so-called poison-gland, thus affording complete confirmation of the respectively alkaline and acid natures of these several secretions.

Mr. Blackwall concludes his paper by proposing the name of *falces* for the instruments by which spiders seize and destroy their prey; the term *mandibles* being obviously improper for organs which do not, as Mr. W. S. MacLeay has plainly shown, constitute any part of the oral apparatus; and that of *chelicera*, proposed by M. Latreille, implying an hypothetical analogy to the antennæ of hexapod insects, from which they differ so widely both in structure and in function. He adds, that he has observed the labrum in a low state of development in species belonging to numerous genera, and that it is attached by its base to the superior surface of the palate, but that the extremity, which is free and usually round or somewhat pointed, can be slightly elevated, depressed, extended, retracted and moved laterally at will; and mentions that Professor Owen has detected a rudimental labrum in spiders of the genus *Mygale*. To apply the term *mandibles* to organs originating above the labrum, and therefore not situated within the mouth, is evidently erroneous; and the author ventures to anticipate, upon anatomical considerations, that future investigations will lead to the conclusion that the mandibles of the *Araneidea* are confluent with the palate.

January 16, 1849.

E. Forster, Esq., V.P., in the Chair.

James Hepburn, Esq., and Frederick Salmon, Esq., were elected Fellows.

Read the commencement of a memoir "On the Anatomy of *Diphyes*, and on the unity of Composition of the *Diphyidæ* and *Physophoridæ*." By William Huxley, Esq., Assistant-Surgeon of H.M.S. Rattlesnake. Communicated by the President.

February 6.

E. Forster, Esq., V.P., in the Chair.

Adam White, Esq., F.L.S., exhibited a numerous series of drawings, chiefly from the monuments lately brought from Nineveh by Dr. Layard, and read the first portion of a memoir on the animals sculptured thereon.

A series of specimens of the natural order *Cycadeæ* was exhibited, and a portion of them presented to the Society, by James Yates, Esq., F.R.S., F.L.S. &c.

In his catalogue of these specimens Mr. Yates followed the arrangement and adopted the names of Miquel in his 'Monographia Cycadearum,' 1842, and of Brongniart in the 'Ann. des Sc. Naturelles,' sér. 3. tome 5, 1846.

In the course of his communication the author offered the following remarks:—

Genus CYCAS.

Cycas revoluta.—Since the year 1799, when a female plant of this species flowered at Farnham, as described by Sir James Edward Smith in the 6th volume of the Linnean Transactions, a considerable number of the same sex have flowered in this country. Five individuals might be mentioned, which are now in a flowering state. On the other hand, only one male plant is known to have flowered in our island. This was formerly at York, and is now in the Botanic Garden at Sheffield. Its cone, or rather spike, nearly a metre in length, is preserved in the museum of the Yorkshire Philosophical Society, and exhibits in a very striking manner the affinity of this genus to the rest of the *Cycadæa*, whilst the female cone of *Cycas* differs greatly from that of all the other genera.

Genus MACROZAMIA.

Macrozamia spiralis.—The genus *Macrozamia*, the scales of whose cone, whether male or female, are distinguished by terminating in a single spine, directed upwards, appears to be very closely allied to the *Dioon* of Professor Lindley. It is difficult to distinguish the young seedlings of these two genera. The only perceptible difference is, that in *Macrozamia* the leaflets are contracted at the base, and are more remote from one another than in *Dioon*. Also in both of these genera the leaves of the young plants differ most remarkably from those of the same plants in the adult state. *Macrozamia*, as well as *Dioon*, approaches *Cycas* in the circumstance, that the leaflets are decurrent, whereas in the remaining genera, *Encephalartus*, *Zamia* and *Ceratozamia*, they are not at all decurrent, but are contracted at the base and join the midrib of the leaf by a distinct articulation. The decurrent leaflets of *Macrozamia spiralis* are especially apparent in the young plants.

Genus ENCEPHALARTUS.

Encephalartus brachyphyllus.—A male plant flowered last year at Chatsworth. The cone appeared early in May, and was full-grown in two months.

Encephalartus Altensteinii.—There are at Chatsworth two splendid specimens of this species, which are labeled as such. Some of their leaves are two metres long. One of these two specimens has thrown out bulbs, producing offsets of considerable size. On comparing the leaves of the offsets with those of the parent plant, the former are observed to be much more spinous and smaller than the latter, the number of the leaflets also being much less. This individual therefore affords a decisive proof that such diversities in the leaves may depend upon the age of the plant, or upon other circumstances. Hence it may be inferred, that many individuals, which in our conservatories are distinguished by other names, and especially many of those called "*Zamia pungens*," or "*Encephalartus pungens*," belong to the *Encephalartus Altensteinii* of Lehmann and Miquel. Lehmann assigned this name and made his description of the species from the study of specimens directly imported from South Africa. But if the view here taken be correct, the species was already common in Europe under other names. A plant called "*Zamia pungens*," in the Botanic Garden at Birmingham, agrees exactly in appearance with Lehmann's plate of *E. Altensteinii*, in his 'Pugillus Sextus' (Hamburg, 1834). The history of two of these plants called "*Zamia pungens*" is remarkable. They are a male and a female, of about equal size and similar appearance, and formerly belonged to Lord Tankerville's collection at Walton-on-Thames. When they were sold, the male plant went to Kew, the female to Chatsworth. Both have flowered, and the flower of each has been represented. An engraving of the female with its cone, produced in 1832, was published by A. B. Lambert, Esq. (see Buckland's 'Bridgewater Treatise,' i. 494; ii. plate 59), and Mr. R. Horsman Solly obtained a fine drawing of the flower of the male in 1839 (Proceedings of Linn. Soc. p. 52; Annals of Nat. Hist. v. 46). This male cone is preserved in the collection of the Linnean Society, and a cone afterwards produced by the same plant is in the museum at Kew. This plant is now putting up a new crown of leaves. Its fellow, the female at Chatsworth, has been in fruit many months*.

* Of the cones of this plant and of the female hereafter mentioned of *Enc. horridus*, Mr. Robert Scott of Chatsworth has furnished the following measurements and observations taken at two different periods of their growth. The cone of *Enc. pungens* appeared on the 14th of June, and that of *Enc. horridus* on the 13th of July 1848. The measurements of October were coincident with the perfect disengagement of the cones; and although Mr. Scott has made repeated measurements since those taken in December, he does not find, up to the 9th of March (the date of his communication),

Miquel observes, that this species was formerly cultivated in European conservatories under the name of "*Zamia spinulosa*," or "*Z. spinosissima*." Both he and Lehmann assign the name of "*Encephalartus pungens*" to an entirely different species.

Encephalartus Caffer.—This species, which in Miquel's arrangement immediately follows *E. Altensteinii*, differs from it distinctly in the form of the leaves. Also in both species the form of the leaves, and more especially the obliquity with which the leaflets are set upon the midrib, and which increases regularly from the base of the leaf to its apex, may be traced to the imbricate veneration. In all *Cycadeæ* the veneration affords important aids for distinguishing both genera and species, and these characters are the more deserving of attention on account of the rare occurrence of the flowers.

The next species to *Encephalartus Caffer*, in Miquel's arrangement, is *E. longifolius*. He however represents these two species as scarcely differing except in habit. The plant in the great conservatory at Kew, named "*Zamia longifolia*," seems to me undistinguishable from *E. Caffer*. Specimens of the same may be seen at Chelsea and at Chiswick, which in those gardens are called "*Zamia*

any further increase of size. They were then full-grown, and the scales appeared likely to drop from the axis in a few weeks.

ENCEPHALARTUS PUNGENS.

	Oct. 9, 1848.	Dec. 25, 1848.
Length of cone, outside measure.....	18½ inches	21½ inches
Circumference, 9 in. from top	33 —	36 —
Circumference, 3 in. from base	33 —	37½ —
Number of spires	15	
Number of fertile scales in one spire ...	14 or 15	
Number of barren scales in one spire ...	8 or 9	
Perpend. diameter of a fertile scale.....	1¼ inch	1⅞ —
Transverse diameter of a fertile scale ...	2 —	2⅜ —
Perpend. diameter of a barren scale ...	0⅞ —	0⅞ —
Transverse diameter of a barren scale...	1¼ —	1¼ —

Each spire performs one revolution.

ENCEPHALARTUS HORRIDUS.

	Oct. 9, 1848.	Dec. 25, 1848.
Length, outside measure	10 inches	14 inches
Circumference at base	14 —	17½ —
Circumference, 3 inches from top	14 —	16 —
Number of spires	8	
Number of scales in one spire	14	
Perpend. diameter of one scale	1⅞ —	1⅞ —
Transverse diameter of one scale	1⅞ —	2 —

Each spire performs one revolution.

There are no apparently barren scales.

elegans." At Sion House there is a remarkably fine plant of this species, called there "*Encephalartus Caffrorum.*"

Probably no finer specimens of *E. Caffer* have ever been known than two, which are at Chatsworth. They were sent to the Duke of Devonshire's collection by the late Baron Ludwig, from his own garden at the Cape of Good Hope, together with all the Chatsworth specimens of this genus, excepting that already mentioned, which was brought from Walton-on-Thames. These two plants cannot be less than 100 years old.

On a close examination of the cicatrices, which are arranged in spirals on their trunks, appearances present themselves which make it probable, that not the leaflets only, but the leaves also are articulated. Many of these cicatrices are concave, smooth within, but showing the marks of bundles of vessels, which have closed after the separation of the petioles. Although, therefore, the longevity of these leaves is certainly very great, as it is in all *Cycadææ*, yet they appear to have their natural term of life, perhaps ten years or more; after which they are thrown off by an effort of the plant resembling that which in common cases takes place every year.

One of these two specimens is a female, and having recently borne fruit, requires a more detailed description.

The cone made its first appearance in the spring of 1847. In the following September it had attained so great a size, that it was thought desirable to take a cast of it in plaster, and models, made from this cast, are now in the museum at Kew, in the collections of the British Museum and of the Linnean Society, and in other collections both public and private. At the time when the cast was taken, the prevailing colour of the cone was a dark shining green, the pyramidal extremities of the rhomboids being of a lemon-yellow, streaked with brown. These colours were afterwards blended or changed, so that the surface of the cone assumed a pretty uniform bronze colour.

For a long time the cone was as compact as possible; but at the end of the year a fissure might be discerned round the base of some of the pyramids, especially of those near the top of the cone. The cone had then become twice as large as it was in September. But the rhomboids which terminated the scales, rising in the form of truncated and tuberculated pyramids, had increased much less in the upper part of the cone than in the lower. Accordingly the scales in the upper part, extending a fourth of the way down the axis, were afterwards found to be barren. Moreover, as the rhomboids in the

middle and lower part increased, they extended themselves laterally much more than vertically, and there arose thus a remarkable swelling or protuberance in the part of the cone below that, which consisted of the barren scales. In this respect the cone assumed the appearance of that of an *Encephalartus*, which is figured in Jacquin's 'Fragmenta,' plate 27.

Although the barren scales at the upper part of the cone became gradually less close and compact, they continued firmly attached to the axis until the following midsummer. Had a male plant been present, it appears probable that under these circumstances fertilization would have taken place. Although the *Cycadeæ* are classed as gymnospermous, their ovules, with the exception of the genus *Cycas*, are so covered and guarded in the earlier stages of their development, that it is difficult to imagine how the pollen can possibly obtain access to them. But, after the barren scales at the top of the cone have begun to separate, a shower of pollen, falling on it, would easily make its way through the fissures between these barren scales, and, going in the direction of the axis, would come into immediate contact with the summits of the ovules, which are all directed towards the axis and placed at a very short distance from it. In considering the mode of impregnation, it is also important to observe, that, whereas the male cone quickly comes to maturity, sheds its abundant pollen, and decays, the female cone, being of much slower growth, remains for many weeks in that state, in which the provision here described is made for the admission of the pollen.

About July 1848, all the scales separated from the axis, beginning at the top of the cone. A coloured wax model having been made of a scale with the fruit upon it in the mature state, copies of it accompany the before-mentioned models of the cone.

The scales were arranged in eight spirals, each spiral consisting of forty scales, and making two revolutions round the axis. The number of drupes, containing nuts, was probably about 400, two upon each perfect scale. The scales were weighed as they fell from the cone, and their entire amount was 46 lbs.

After all the scales had fallen, the axis was found to be supported by a very short thick peduncle, not exceeding fifteen millemetres in length, and covered with down. A section having been made across the axis in its thickest part, the centre was observed to be pith, without cells, vessels, or woody fibre. This central portion was surrounded by pith, abounding in cells and bundles of woody fibre. The cells were filled with gum, and very different from the bundles

of woody fibre. These latter, being destined to supply the scales, first pursued a course parallel to the axis, and then turned outwards to the bases of the scales.

The following are the dimensions of this magnificent plant, expressed in metres and centimetres, one metre being equal to 39·371 English inches :—

Dimensions of the trunk.

	M.	C.
Length	2	30
Girth at the narrowest part	1	2
Girth just below the leaves	1	8
Girth at the thickest parts, viz. at the ground and a little } above the middle	1	16

Dimensions of a large leaf.

Length of leaf, including foot-stalk	1	10
Length of foot-stalk		25
Length of largest leaflets		14
Greatest breadth of ditto		3½

Dimensions of the cone.

Length, including peduncle		58
From the apex to the base, measured outside		65
From the apex to the termination of the smaller rhomboids		17
Girth in the middle		92
Girth at the base		50
Greatest girth of the axis		26
Transverse diameter of a rhomboid		5
Vertical diameter of ditto		3½

In relating the history of this plant, it is to be observed, lastly, that some time before the scales began to fall from the axis, a set of young leaves made their appearance on one side of its base. They were invested with a thick, silky, olive-coloured pubescence. They at first took a horizontal direction, but on the removal of the cone their tendency was upwards.

Encephalartus horridus.—A male plant flowered in 1839 at Kinmel Park, the seat of Lord Dinorben, who presented the cone to the Linnean Society. (Proceedings, p. 9; Annals of Nat. Hist. vol. iii. p. 58.)

A female bore fruit at Chatsworth in 1846, and is now in fruit again. Another female, formerly in the garden of the Horticultural Society at Chiswick and now in Mr. Yates's possession, has twice produced a cone supported by a short peduncle. Among the distinctions, to which allusion has been made already, between the genus *Cycas* and

the other genera of the same Natural Order, it is remarkable that the female cone of *Cycas* is sessile, and that after it has arrived at maturity its scales diverge and assume a tendency to a horizontal direction, corresponding with that of the leaves; after which the next set of leaves rises from the centre of the cone. In other Cycadeæ, the cone, whether male or female, is pedunculated, and the new tuft of leaves appears by the side of the peduncle.

Genus ZAMIA.

Zamia furfuracea.—There are two fine old plants in the Botanic Gardens at Cambridge and Chelsea, which are males, and bear cones almost every year. Their stems are short and branched. In the Botanic Garden at Liverpool is a female, which produced a cone in 1848. These three plants agree quite as well with Miquel's description of "*Zamia muricata*, var. *angustifolia*," as with his description of *Zamia furfuracea*.

Zamia integrifolia.—A fine female plant in the Botanic Garden at Cambridge produces a cone every year, and one is now appearing. Five or six bulbs grow from the stem, some of them bearing leaves*.

Genus CERATZAMIA.

Ceratozamia Mexicana.—A male plant flowered at Chatsworth in 1847, and another of the same sex at Kew. The cone of the last is preserved in the museum. Two fine plants of this species are now flowering at Kew, and there are two in the garden at Chiswick, also in a flowering state. At Kew and Chiswick these plants are called "*Dipsacozamia*." In these gardens the plants differ so much in the size and form of their leaves, that they may be presumed to belong to some of the four new species preserved at Amsterdam, which Miquel describes in the 'Tijdschrift voor de Wetenschappen,' 1847, p. 38—43. The same observation applies to the *Ceratozamia*s in the conservatory of Mr. Loddiges at Hackney.

* Four *Zamia*s of other species are now flowering at Kew.

February 20.

George Newport, Esq., in the Chair.

W. S. Dallas, Esq., and Davyd Williams Nash, Esq., were elected Fellows.

Read the second part of Mr. Adam White's memoir "On the Animals known to the Ancients, with especial reference to those sculptured on the Monuments of Nineveh."

March 6.

R. Brown, Esq., V.P., in the Chair.

The necessary business of the Meeting having been disposed of, the Vice-President in the Chair proposed, that, in consequence of the recent death of Edward Forster, Esq., Treasurer and Vice-President of the Society, and in consideration of his long connexion with, and eminent services to, the Society and to Natural History, the Meeting should adjourn; which was unanimously agreed to.

March 20.

The Lord Bishop of Norwich, President, in the Chair.

James Gadesden, Esq., and H. F. Richardson, Esq., were elected Fellows, and Mr. Philip Henry Gosse an Associate.

Read a paper "On the Anatomy and Development of certain *Chalcididæ* and *Ichneumonidæ*, compared with their special economy and instincts; with descriptions of a new genus and species of Bee Parasite." Part I. By George Newport, Esq., F.R.S. & L.S.

Mr. Newport remarked that the parasitic *Hymenoptera* in their larva state are among the most imperfectly organized forms of *Articulata*, and yet, having passed through this stage of their exist-

ence, they become some of the more active and perfect of insects. They are nourished by suction, and either are attached singly to the external surface of the bodies of their victims, or reside in the same cells with them gregariously, or infest them internally, according to their species. In the whole of them, however, the general form of body and of the digestive organs, at the earlier periods of growth, is very similar, and the special development of each species is regulated by the same laws. They cast their tegument at different periods of growth like other larvæ, a fact which Mr. Newport has observed in *Paniscus*, although in the apodal larvæ of *Hymenoptera* it has heretofore escaped the observation of naturalists. Their digestive apparatus at first is extremely simple, and has the form of a capacious bag or sac, without any anal outlet. Consequently no fæces are passed until the larvæ have acquired their full growth and ceased to feed. After this period of assimilation the digestive cavity begins to assume a new condition. It becomes perforated at its base, and an intestine and anal outlet are formed, and fæces are then passed. One reason for this late completion of the alimentary canal seems to be the necessity that the fluids of the insect preyed upon should be preserved in a healthy state for the support of the parasite; and another, that the food of the victim should not be contaminated. But when the parasites are full-grown the necessity for these conditions ceases, and the intestinal portion of the digestive apparatus is developed.

The following description of a new genus of *Chalcididæ* found in the cells of *Anthophora* was then given:—

GENUS ANTHOPHORABIA, *Newp.*

Fem. Caput thorace latius; *antennæ* 6-articulatæ, pilosæ, articulis 2^{do} 3^{ti} 4^{to} 5^{to}que subæqualibus, 6^{to} clavam elongato-ovalem efformante. *Thorax abdomenque* longitudine æquales. *Alæ* venâ medianâ bifidâ. *Tarsi* 5-articulati. *Mas: Antennæ* 4-articulatæ, articulo basali arcuato, magnoperè dilatato, infernè excavato, 2^{do} cylindrico, 3^{ti} magno globoso, 4^{to} elongato-ovali. *Oculi* stemmatosi. *Alæ* abbreviatæ.

ANTHOPHORABIA RETUSA (*Fem.*). Æneo-viridis, capite magno, oculis compositis nigris, abdomine nitido ovali, alis magnis rotundatis, pedibus flavescensibus. (*Mas*) flavus vel saturatè ferrugineus, capite magno rotundato oculo utrinque unico tribusque in vertice instructo nigrescente, pedibus robustis.—Long. lin. 1.

Mr. Newport found this species in abundance in the nests of *Anthophora* at Richborough in Kent, while searching for the larvæ of *Meloë* in August 1831, 1832 and 1834. The larva is apodal, sub-

cylindrical and slightly attenuated at each extremity, and formed of fourteen segments, with a small head and short acute mandibles, and there were usually from thirty to fifty specimens in each bee-cell. In some instances they changed to nymphs and imagos at the end of summer, but in others the change did not take place until the spring, at which time the perfect insect comes forth.

The author states that he was unable to find any description of this curious parasite in the works of entomologists; the only writer who makes reference to an insect which, possibly, may have some affinity with this, being Mr. Westwood, who refers to a species, found by M. Audouin in France, under the name of *Melittobia Audouinii*, but without describing it; so that if the two insects should prove to be identical, which Mr. Newport considers doubtful, this name cannot be adopted. Reaumur and Degeer both found parasites in the cells of Mason-bees, but their species have not been clearly made out.

The author deduced conclusions with regard to the habits of *Anthophorabia* from peculiarities in the anatomy of the sexes, and expressed an opinion, from the absence of an ovipositor in the female, from both sexes being found in activity in the closed bee-cell, and more especially from the male possessing only stemmata, instead of the usual compound eyes of winged insects, that impregnation is effected before the female first quits the cell, and that she deposits her eggs in new cells while these remain open and are being provisioned. The difference of structure and function between compound eyes and ocelli was explained in support of these opinions, and the sexes of *Anthophorabia* were contrasted with those of *Stylops*, as described by the author in his "Memoir on *Meloë*," read to the Society on the 19th of January 1847. These differences of structure in similar organs were regarded as always indicative of peculiarities in economy.

A second species of *Chalcididæ* had also been found by the author, in the larva state, in the nests of *Anthophora*, on the 12th of September 1847, at Gravesend, and which he at first mistook for the larvæ of the species now named *Anthophorabia*. These larvæ afterwards proved to be of a species which he named provisionally *Monodontomerus nitidus*. The general form of the larva and the armature of its body were then described, and the question discussed as to whether it was a carnivorous feeder, subsisting on the body of the bee larva, or a pollinivorous, subsisting on its food. The armature of hairs on the surface of its body showed that it was not an internal-feeding larva, as the author has never yet found the internal-feeding parasites of insects clothed with hairs. From the presence of hairs

on its body, and from an examination of the fæces, the author was induced to regard it as pollinivorous.

The larvæ remained unchanged until the middle of May 1848, and some time before passing into the state of nymphs, fæces were passed for the first time, similar to those of the larva of *Anthophora*, which, like its parasite, Mr. Newport has constantly found passes nothing until it is full-grown and ready to undergo its transformation. The digestive apparatus of the larva of *Monodontomerus* was then described as occupying nearly the whole interior of the body in the shape of an oval sac, or Florence-flask, with exceedingly thick parietes formed of masses or packets of cells, enclosed between a delicate muscular envelope on the external and a granulated mucous layer on the internal surface. This capacious digestive stomach is connected anteriorly with a short and narrow œsophagus, and posteriorly with an imperforated column of masses of cells, which are continuous with those that form the chief portion of the walls of this organ. After the larva has ceased to feed, the cells separate, and the column becomes a tube, the separation proceeding from the centre of the base of the sac along the axis of the column to the anal outlet in the terminal segment, after which this intestinal portion of the canal is further developed and the larva undergoes its transformation.

The nymph state was assumed at the end of May, and the first perfect insects appeared on the 27th of June, or about four weeks afterwards. The author concludes that the female deposits her eggs in the cell of the bee, after it has been closed, by perforating it with her ovipositor.

Drawings of the sexes of *Anthophorabia* and its larva, and of the larva and nymph of *Monodontomerus*, with details of anatomy, were exhibited.

April 3.

Robert Brown, Esq., Vice-President, in the Chair.

Robert Bentley, Esq., was elected a Fellow.

Read a paper "On the Development of the Ovule in *Orchis Morio*, L." By Arthur Henfrey, Esq., F.L.S. &c.

The paper contains the results of a series of observations made in May 1848, which Mr. Henfrey presents to the Society, partly be-

cause he believes that in the present state of the question all evidence derived from careful observation is of some value, and partly because he has succeeded in obtaining a more complete series of figures illustrating the successive conditions of the ovule than has yet been published; Mohl, who gives the most complete account of the development in *Orchis Morio*, having given no drawings. In the first stage, examined on the 3rd of May, the ovules of flowers which were just opened and were without signs of pollen on the stigmatic surface, were just curving over towards the anatropous position; the nucleus projected beyond the cells forming the single coat of the ovule, and consisted of a large central cell (the embryo-sac) enclosed by a layer of very delicate cells of small size, constituting a proper coat of the nucleus. On the 9th, the ovules of fully-expanded flowers were not much altered except in the much clearer definition of the walls of the cells. The embryo-sac was filled with a clear colourless fluid, in which floated minute black atoms. In some flowers the stigma was smeared with pollen, which sent down numerous tubes, about $\frac{1}{4000}$ th of an inch in diameter and at most one-fourth of the size of the smallest surrounding cells. On the 13th, when the flowers were withered and the stigmas were covered with pollen, a dense bundle of tubes lay in the midst of the lax tissue of the canal leading to the cavity of the ovary. Some of the ovules were completely anatropous, while others were about three-fourths curved, the former being about $\frac{1}{100}$ th of an inch in length. The two coats of the ovule were now distinctly evident, and the nucleus was still covered by its own cellular coat, and still contained only the clear colourless fluid with black points. On the 16th, the pistillary cords extended nearly to the base of the ovary, presenting all the characters of pollen-tubes, and apparently continuous with those derived from the pollen on the stigma. Both coats of the ovules had become considerably developed, and the inner had grown up far beyond the nucleus; the embryo-sac had lost its proper cellular coat, had acquired the aspect of a large ovoid sac attached by a pedicle to the chalazal region, and contained opalescent mucilaginous matter (protoplasm), in most cases accumulated at the ends, chiefly at that next the micropyle. On the 20th, the last-mentioned appearance continued; and at the micropyle end, one, two or (usually) three minute vesicles had been formed, always seeming to originate as cavities in the mucilage, and not as if derived from the formation of a membrane on the outer surface of a nucleus or cytoblast. These vesicles soon took the appearance of distinct cells with exceedingly delicate walls, and undoubtedly existed before the pollen-tubes en-

tered the foramina of the ovules. In those ovules which had been penetrated by the pollen-tubes, these were traced by Mr. Henfrey through the wide mouth of the outer coat and the narrow canal of the inner, as far as the apex of the embryo-sac, which however they never entered, but generally appeared to be directed a little to one side and to lie in contact with its outer surface, just over the place where the minute vesicles lie within. On the 31st, the previous observations were repeated and confirmed on specimens in various stages of growth. At this period, in some of the embryo-sacs one of the vesicles had become divided into two cells by a horizontal septum, the upper cell dividing again and growing out through the endostome in a conical form to produce the confervoid filament described by Mr. Brown, and which Mr. Henfrey believes Prof. Schleiden to have mistaken for the pollen-tube. On the 3rd of June, the author again satisfied himself that the vesicle within the embryo-sac (the germinal vesicle) is the first cell of the embryonic body; it generally exhibits a slight collection of protoplasm at its base, and soon after the pollen-tube reaches the surface of the embryo-sac divides into two cells, the upper dividing again and growing out into the articulated filament, the cells of which are formed by the production of septa in the same way as in confervas, hairs of phanerogamous plants, &c.; the mucilaginous layer (or primordial utricle of Mohl) being rendered very evident by the application of iodine. At the same time the lower part of the embryonic body enlarges and soon perfectly fills the embryo-sac, the process of cell-formation by which the embryo is produced varying apparently in different cases. Generally the lowest cell enlarges very much and becomes filled with dark mucilaginous matter, and then this is soon divided into a number of cells by the formation of septa. In some cases two of the germinal vesicles undergo development and two confervoid filaments are produced.

From these observations Mr. Henfrey concludes that the embryo is really produced by the ovule itself; that the germinal vesicle exists within the embryo-sac before the pollen exerts its influence; that the pollen-tube penetrates the coats of the ovule to reach the embryo-sac; and that the passage of the pollinic fluid through the intervening membranes impregnates the germinal vesicle and determines its development into an embryo. The investigations having been made with every precaution, and the results being in perfect accordance with those of Amici, Mohl, Müller and others, he believes them to be a sufficient refutation of Schleiden's views so far as the plant in question is concerned. He regards, however, as

points requiring further investigation, the question whether the whole of the pistillary cords are composed of filaments directly produced by the pollen granules; whether there is any relation between the application of the pollen on the stigma and the development of the germinal vesicles; and whether the production of the confervoid filaments is a normal process, which is open to doubt when only observed in ovaries containing such an abundance of ovules as those of *Orchis Morio*.

Read also a notice of a species of *Monodontomerus*, parasitic in the cells of *Anthophora retusa*, contained in a letter addressed to, and communicated by, Adam White, Esq., F.L.S. &c.

Referring to the *Monodontomerus* described by Mr. Newport at the last Meeting, of which an account will be found at page 25, Mr. Smith remarks that it is identical with a species which he some months ago showed to Mr. Adam White and Mr. Francis Walker, the latter of whom then informed him that it was a new species of *Monodontomerus*. He adds, that Mr. Walker, in whose hands he placed specimens of both sexes for description, on learning a few days afterwards that Mr. Newport had reared the same insect from the nest of *Anthophora*, readily waived his right of description in deference to Mr. Newport's wish to describe the insect himself.

In the 'Zoologist' for March of the present year, Mr. Smith incidentally mentioned that he had bred two distinct species of *Monodontomerus* from the cells of *Osmia bicornis* and those of *Anthophora retusa*. Anxious, in the summer of 1848, to discover the larvæ of *Melecta punctata*, he procured from a colony of *Anthophoræ* at Charlton in Kent a number of larvæ and pupæ; but all the larvæ, though differing much in colour, produced *Anthophoræ* only. While separating the larvæ from the pupæ, he observed in a cell partially broken open, containing a pupa of the bee, a small larva by its side slightly moving; and on removing the pupa, he found twelve more minute larvæ feeding upon it, which they continued to do for ten or twelve days, by which time they were fully grown. When first observed, the pupa of the bee was about one-third consumed, and at last not a vestige of it remained; all that the cell contained besides the larvæ being a small portion of yellow dust or small granules. They remained in the larva state for several weeks, and then changed to pupæ, in which state they continued for about a fortnight, when they became perfect and active insects. The species of *Monodontomerus* bred from the cells of *Osmia* also fed upon the pupa, and underwent the same process of development.

Mr. Smith concludes by referring to a statement of Mr. Westwood in his 'Introduction to the Modern Classification of Insects,' that he had frequently observed *Monodontomerus* flying about and entering the holes made in walls by *Osmiæ*, in which they were doubtlessly about to deposit their eggs; and to his mention of a species communicated to him by M. Audouin, in which the males have rudimentary wings; and suggests that it would be exceedingly interesting to determine whether the species of *Monodontomerus*, and the *Anthophorabia* also, might be identical with the insects observed by Audouin and Fonscolombe.

April 17.

N. Wallich, M.D., in the Chair.

The Rev. David Landsborough, D.D., was elected an Associate.

Read a paper entitled "Remarks on the genus *Atriplex*." By Joseph Woods, Esq., F.L.S. &c.

After observing, that, as far as the British species are concerned, the genus *Atriplex* had remained till lately as it appeared in the 'English Flora' of Sir J. E. Smith in 1828, Mr. Woods proceeds to notice the additions made to it by Mr. Babington. The first of these is *A. nitens* (*A. Hermannii* of Moquin-Tandon), belonging to a division of the genus in which some of the flowers are perfect and produce horizontal seeds. The author thinks the division a sound one, though on one occasion he has found a few horizontal seeds, the produce probably of perfect flowers, in *A. littoralis*. The second is *A. marina*, introduced by Linnæus as a plant found in England, and distinguished from *A. littoralis* by its serrated leaves. Hudson admitted it under the name of *A. serrata*, but most of our later botanists have considered it as a variety of *A. littoralis*, and it must be placed among the doubtful species.

The next group, which has no perfect flowers, and a tendency to produce hastate or triangular leaves, is the one which presents the greatest difficulties. We find here, in the last edition of Mr. Babington's 'Manual,' three new species, besides *A. erecta* of Hudson, which, though adopted by Smith as a very rare plant, is, if Babington's view be correct, one of the most common. The surface of the seeds and the shape and tubercles of the perigonium or enlarged calyx

covering the fruit seem to be a good deal relied upon in distinguishing these species; but Mr. Woods states that several species, or at least several forms, have two sorts of seeds. Those of the smaller calyces are slightly depressed, smooth, black and shining; while those formed in the larger calyces are much larger, so much so as to have occasionally three times the diameter of the upper seeds; they are considerably more depressed, of a dark chestnut colour, and wrinkled or shagreened. The sepals are all at first smooth, and those in the lower part of the plant frequently never become tubercled. This he notes as particularly the case in *A. angustifolia*, of which otherwise the perigonium is as distinctly tubercled as in *A. erecta*. Mr. Woods is willing to admit as three common species—*A. angustifolia*, with rhomboid leaves and all the seeds black and smooth; *A. patula*, with triangular leaves, and all or nearly all of the seeds depressed and shagreened; and *A. deltoidea*, with triangular leaves, and all or nearly all the seeds thick, black and smooth. *A. erecta* he thinks to be different from *A. angustifolia*, though he is unable to point out any satisfactory character. With *A. prostrata* and *A. microsperma* he is not sufficiently acquainted to form any judgment. *A. rosea* of Babington is perhaps a good species, though nearly allied to some of the maritime varieties of *A. patula*, and perfectly distinct from the *A. rosea* of continental botanists. The latter is a self-supporting plant, and not prostrate like the *A. rosea* of Babington. Koch separates *A. laciniata* and *A. rosea* from the other species by the lobes of the perigonium, united to the middle; but this is often the case in *A. patula*, and not always so in *A. laciniata*. They are however hardened and of a pale colour. The author is disposed to rely more on the uniform buff colour of the stem, which in *A. patula* and its allies is green with resinous stripes. The *A. laciniata* of the south of Europe is not our English plant. The former has its clusters disposed in long naked spikes, the latter in short leafy ones. Ours is probably the Linnean plant. The perigone in *Atriplex* varies from ovate to rhombic, or to a square attached at the angle, and from that to campanulate; the latter form is so decided in all the specimens of the continental plant with fully formed seeds within reach of Mr. Woods, that he suggests the trivial name of *A. campanulata*.

Read also the following Letter from Linnæus to the Rev. John White, formerly Chaplain at Gibraltar, and brother of Gilbert White of Selborne and of Benjamin White, then the principal English publisher of works on natural history. Communicated by John Gould, Esq., F.L.S. &c.

Viro Reverendissimo et Venerando D^{no} I. WHITE.

s. pl. d.

Car. Linné.

Accepi literas Tuas, ad calend. januarii datas, suo tempore et ad eas regressi : accepi et datas d. 1 Martii, et 22 Aprilis. Accepi et ante duos dies merces Tuas et dona vere aurea ; pro quibus omnibus ac singulis grates imortales reddo, reddamq dum vixero.

Sturnus collaris Scop. ann. 1. p. 131. Fringilla Sordone *Manett. orn. t. 338. f. 1.* Avis kyburgensis, *Gesn. orn. app. 725.* Muscicapa gula fusco undulata, tectricibus alarum nigricantibus apiculo albo, (*collaris*) mihi dicenda. Rostrum admodum parum est emarginatum, diversa a Turdo arundinaceo.

Turdum pygargum non antea vidi ; erit equidem Turdus ; apex rostri modice incurvus.

Pratincolam antea non vidi ; ad Grallas spectat et proprii generis est. D^{no} Lever ne desinas grates meis verbis agere pro egregie et pulcherrime conservatis *aviculis*, quibus me beare voluit.

Phytolithi Filicum erant certe optimi

isti lapides qui referunt tænias non vidi ; an radicum plantarum aquaticarum rudimenta ?

ista impressio in schisto, ita refert *Sertulariam* quandam Ellisii, ut nisi magnitudo vetaret, dicerem eam *Sertulariam*.

alia foliis atris linearibus est *Zostera*.

quadrati polito, *Quartzum coloratum* γ . *Syst. nat. 3. p. 65.*

Fuci rubri et pilosi impressiones rariores :

Lepadogaster Gonum in lagenula est certe *Cyclopterus nudus* meus *Syst. nat. 414. p. 2.*

Attelabus calpensis : hunc etiam ab aliis accepi.

Tenebrio femoribus uncinatis (bispinosis) *Tenebrio calpensis* mihi dicendus.

Motacilla cauda albo nigroq maculata. a me non antea visa.

Myrmeleon formicarium nostrum habet in alis stigma album, habeo jam insectum coram.

Formicalyn. lege *Formicalynx*.

Arledi opera non prostant apud nos, sed Leidæ.

Gryllus umbraculatus ubi habitat ; quid agit cum umbraculo ?

Te Datore optimo multa animalia habeo.

Tetrao tridactylus pedibus nudis tridactylis.

Hirundo rupestris nigricans, rectricibus subæqualibus : 2, 3 macula alba.

Piscis thoracicus capite excoriato ; nondum nomen imposui.

Attelabus calpensis cærulescens thorace piloso, elytris rubris: punctis 3 nigris.

Sphex mutabilis atra pedibus hirtis, abdomine maculis luteis pleurumque quatuor.

Sphex erosa nigra, capite thorace alis pedibusque ferrugineis.

Apis calpensis labio superiore acuminato inflexo, abdominis segmentis punctis geminis nigris.

Cancer dieresis brachyurus, thorace lævi linea transversa insculpto marginibus serratis, chelis lævibus.

Cancer — brachyurus subhirsutus, manibus totis ciliatis.

Cancer ex squillarum prosapia 4 distinctæ; nondum posui differentias et numero plura, præter ultima, Te inventore, alleganda.

Literæ excrescerent in infinitum, si simul et semel omnia responso exponerem, nunc aliis negotiis implicitus reservo reliqua proximæ epistolæ.

Scripsi multa addenda *vol. 1. Syst. nat.* idq. quotidie; absolvi dimidium tomum. Si Tuus frater edat, certus sum quod hoc prodeat optimis typis, qui Anglis communis. Tam multa quæ quotidie prodire, post priorem editionem operis, et quæ allegavi multum laboris expostularunt. Si vixero absolvam opus in autumnum. Quid mihi offerat in sostrum? An poterit habere optimum correctorem typi?

Upsaliæ, 1774. d. 3 julii.

Viro Reverendo Domino Joh. White,

London.

Blackburn.

May 1.

The Lord Bishop of Norwich, President, in the Chair.

James Ramsay Atkins, Esq., and Charles Prentice, Esq., were elected Fellows.

John Hogg, Esq., F.L.S., exhibited a portion of a large and remarkable Wasp's Nest, taken by himself last autumn. The portion exhibited formed about one-third of the entire nest, which was built in the inside of the roof of one of the wings of Mr. Hogg's house at Norton in the county of Durham, a part being fixed under the roof,

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and the remainder to the side wall immediately below it. The hole under the slates by which the wasps went in and out was originally made by sparrows; and at this part, and among another portion of the wasp's nest, appeared the remains of the old bird's nest, consisting chiefly of straw with a few feathers. The entire wasp's nest bore the appearance of having been the fabric of several years, some of it being apparently older and in inferior preservation to the rest, as well as somewhat blackened. Externally the nest is beautifully parti-coloured, the layers of the various substances used in the construction presenting circular or curved lines or rings, which are brown, buff, yellow, grey, dark grey, nearly black, &c.; altogether exhibiting a very elegant shell-like structure, which Mr. Hogg has not observed in any other British wasp's nest. These layers he regards as indicative of the mode in which the wasps carried on their labours; one wasp, or set of wasps, having made use of the same substance (such as wood, lichen, the bark of a tree, &c.), collected from the same place, and of the same colour, to form one circular layer or ring; and then having been succeeded by another wasp, or set of wasps, using other substances taken from another spot, and of a different colour; and so on.

Mr. Hogg states that he has recently seen in the British Museum a very similar nest sent from China by Mr. Say; but the species of the Chinese wasp, or even its genus, is not stated. He had at first hoped that his nest might have proved the work of the new wasp taken by him in his garden at Norton some years ago, and described by Mr. Frederick Smith, in his Memoir on British Wasps, under the name of *Vespa borealis*; but on submitting to that gentleman specimens taken alive from the nest, they were determined by him to be neuters of the common wasp, *Vespa vulgaris*.

The author concludes by stating his intention to present the portion of the nest exhibited to the British Museum, where, if deemed worthy of preservation, it may be placed next to the Chinese nest, which it so closely resembles.

Read in continuation a paper "On the Anatomy and Development of certain *Chalcididæ* and *Ichneumonidæ*," &c. Part II. By George Newport, Esq., F.R.S. & L.S.

The author first read a "Postscript" to the preceding part of this paper, abstracted at p. 23, one object of which was to confirm his statement, which had been questioned by Mr. Westwood, that he discovered the insect, *Anthophorabia*, in 1831, at which time he had made known the fact to D. W. Nash, Esq., now a Fellow of the

Society, who permitted him to make known the circumstance. The author also corrected his view with regard to the nature of the food of the larva of the second species he had discovered in the nest of *Anthophora*, which he had named provisionally *Monodontomerus nitidus*, but which is now believed to be *Monodontomerus obsoletus*, which species had been suspected of infesting the genus *Osmia*, although the larva had hitherto been unknown. Having carefully examined the form of its mandibles since the first part of the paper was read, he now finds that they are acute, slender, and fitted only for piercing and not for comminuting food, and consequently he agrees with Mr. Smith that the species is carnivorous, and not pollinivorous as he had supposed. Further examination of this larva, therefore, has tended to confirm the general views which he had maintained, that structure when carefully and accurately investigated is an infallible index to function and habits.

The second part of the paper on the *Ichneumonidæ* was then read. This comprised a detailed account of the natural history of *Paniscus virgatus* from the bursting of the ovum to the assumption of the imago state. The egg, as noticed by Degeer in *Ophion luteum*, and by Hartig in other species, is affixed by a pedicle to the skin of the caterpillar on which the larva is destined to feed, and the larva continues attached to it during the whole period of growth. Mr. Newport found the eggs of *Paniscus virgatus* on the full-grown larva of the broom-moth, *Mamestra pisi*, on the 26th of September 1847. They were black, shining, and of a pear-shaped form, and each was attached by a pedicle inserted into the skin of the caterpillar. At the moment of being hatched they were burst in front, by a vertical fissure, like the eggs of the *Iulidæ*, and the head only of the larva was gradually protruded, so that at first these ova more resembled the growing seeds of leguminous plants than animal organisms. The anterior portion only of the body was afterwards slowly protruded, but the larvæ gave no evidence of sensation during the whole of their growth, and scarcely even of vitality. Yet affixed by one extremity to the shell, and by the mouth to the skin of the caterpillar, they grew rapidly until at from the 12th to the 15th day they had acquired their full size, and measured half an inch in length, and then for the first time became detached from the shell. The author then described the form and motions of the stomach as seen through the tegument on the second day of growth, and also the structure of the head, the distribution of the tracheæ, and the mode in which the larva changes its skin while still attached to the egg-shell. This change was now seen for the first time in the apodal larvæ of *Hyme-*

noptera, as noticed in the first part of this paper, in these larvæ of *Paniscus*. It occurred at least *three* times in each larva before quitting its shell. The skin is burst as in other insects along the dorsal surface of the thorax, and is gradually carried backwards chiefly by the effect of growth of the larva, but it continues to inclose the caudal segments, which are also included between the two halves of the shell. The fourth change occurs when the insect is transformed to a nymph. It assumes this state inclosed in a leather-like cocoon spun by itself after it has destroyed the caterpillar on which it has fed, and while lying in the earthen chamber which the caterpillar had formed for its own change under ground. The change to a nymph took place in April, and to the perfect Ichneumon fly, *Paniscus virgatus*, in May 1848.

The author then describes the mode in which the alimentary canal is originally developed in the embryo of insects. The first developed portions of the embryo are, first, the ventral, and then the lateral parietes of the segments. The lateral grow from below upwards, until their free margins ultimately approach along the future dorsal surface, meeting first of all in the cephalic, and then in the caudal segments. The termination of the future alimentary canal in the anal segment is the result of a fold on itself of a layer of the first portion of the yolk included by the completion of the two caudal segments, and is the commencement of the column of cells, which afterwards becoming perforated when the larva is full-grown, form the colon and intestine, and which retains the celliform structure to so late a period in the larva of *Monodontomerus*. The remains of the yolk are included within the body by the union of the segments along the dorsal surface, and form the digestive cavity, the last portion included being in the prothorax, at which point the yolk enters the body in Crustacea, as pointed out by Rathke. The mode in which the great digestive cavity, or stomach, and the different structures of the canal are formed is then described, and the general configuration of the organ is shown to be very similar, during the earlier stages of growth, in all embryos of insects. This primary form is longer retained in the imperfect apodal larvæ, especially in the parasites, than in other species, and hence the incompleteness noticed in *Monodontomerus*. The structure is completed earlier in *Microgaster* and *Ichneumon*; but although in these a true colon and intestine are formed these continue closed, and no fæces are passed until the larva is matured. The appendages of the canal follow the same laws of development. The glands which produce the silk required by the insect for the formation of its cocoon, are

formed the earliest. The *Malpighian* vessels are completed at a later period in these parasites than in the herbivorous larvæ, in which they are well formed almost from the moment of leaving the egg. In conclusion the author states, "that in proportion to the more or less early development of any structure or organ, the function or instinct associated with that organ is more or less early evolved; and that in proportion to the completeness of a tissue, such is the degree of perfection of each special function or instinct in the animal."

Drawings illustrating the anatomy were exhibited.

Read also a paper by J. O. Westwood, Esq., F.L.S. &c., entitled "Description of *Melittobia Audouinii*, a Bee Parasite." The following are the essential characters of this genus, which belongs to the family *Chalcididæ* and subfamily *Eulophides*.

MELITTOBIA.

Antennæ maris 9-articulatæ; articulo 1^{mo} maximo subtus ad apicem excavato, articulis 4^{to} 5^{to} et 6^{to} minimis; fœminæ simplices, 8-articulatæ; articulis tribus apicalibus in utroque sexu clavam ovalem formantibus. *Mas* cæcus. *Fœmina* oculis ocellisque instructa. *Alæ* maris abbreviatæ, fœminæ magnitudinis ordinariæ; alæ vena ordinaria *Eulophorum* typicorum instructæ. Tarsi 4-articulati.—*Habitatio* parasitica in nidis apum cæmentariarum.

Notices of this insect (first observed by the late M. Victor Audouin) had been published by Mr. Westwood in his 'Introduction to the Modern Classification of Insects' and in the Journal of Proceedings of the Entomological Society, and it was also considered by Mr. Westwood as identical with the insect described by Mr. Newport in the preceding paper under the name of *Anthophorabia retusa*, although different from the description published of that insect by Mr. Newport in the 'Gardener's Chronicle' in the major part of its characters, some of which, as the possession of a furcate median vein and 5-jointed tarsi, are foreign to the family and subfamily to which it belongs; whilst the asserted possession of stemmatous eyes by the male was regarded as erroneous, there being no instance of such a structure throughout the whole range of winged insects, whilst it is essentially a character of some of the wingless tribes.

Mr. Westwood also exhibited specimens of the larvæ of *Eulophus Nemati*, which are parasites on the *outside* of the body of the larvæ of *Nematus intercus*, but which are nevertheless destitute of hairs on the surface of the body, although the external parasitism of the larvæ of *Monodontomerus* was considered by Mr. Newport as indicated by the hairs on the surface of their bodies.

May 24.

The Lord Bishop of Norwich, President, in the Chair.

This day, the anniversary of the birth of Linnæus, and that appointed by the Charter for the Election of Council and Officers, the President opened the business of the day, and the Secretary read the following notices of those Members of the Society with whose decease he had become acquainted during the year.

Sir John Barrow, Bart., was the son of a small farmer, and born at Dragley Beck, in the neighbourhood of Ulverstone, Lancashire, on the 19th of June 1764. After an ordinary school education, and a short initiation into trade in an iron-foundry at Liverpool, he made a voyage in a Greenland whale ship, the captain of which was his friend. Subsequently his mathematical knowledge, which he had sedulously cultivated, qualified him to act as tutor in that department in a large academy at Greenwich; and by means of his pupils in this establishment he was introduced to a large circle of acquaintance, and among others to the late Sir George Staunton, by whom he was engaged to give instruction in mathematics to his son, the present baronet of that name. This introduction proved a most fortunate event to Mr. Barrow, for Sir George having been named Secretary to Lord Macartney's Embassy to China, obtained for him the appointment of Comptroller of the Household, in which capacity he accompanied the Embassy. To the 'Authentic Account' of the Mission published by Sir George Staunton he contributed much valuable information, which he some years afterwards completed by the publication of his own volume of 'Travels in China.' Soon after his return to England, Lord Macartney was appointed Governor of the Cape of Good Hope, then newly captured from the Dutch, and thither also Mr. Barrow accompanied him as one of his private secretaries. The two volumes of 'Travels into the Interior of Southern Africa,' which Mr. Barrow subsequently published, made the public fully acquainted with the extent, capabilities and resources of that important acquisition. They evince also, together with his 'Travels in China,' but in a higher degree, that among the varied stores of information with which his active mind was fraught, natural history had not been neglected, and contain much interesting information in a popular form on the plants and animals of a region at that time little known to English travellers. After Lord Macartney's retirement, Mr. Barrow remained at the Cape, where

FORTUNATE senex, senex beate,
Quo te carmine prædicare possim?
Est domus tibi parva, sed supellex
Munda et satis librorum
Magna copia, qui bene ac beate
Docent vivere : mensa pura, victus
Simplicissimus.

Hæc ad commoda tam beata magnum
Adjungit cumulum hortulus venustus.
Adde quod viridis tibi senectus,
Quod mens candida, candidique mores.
Abest ambitio, timorque lethi,
Et quicquid miseram facit senectam :
Nam Deo pietas amica vitæ
Et morti bona cuncta pollicetur.

TALIS ERAT,

DUM INTER VIVOS MANEBAT,

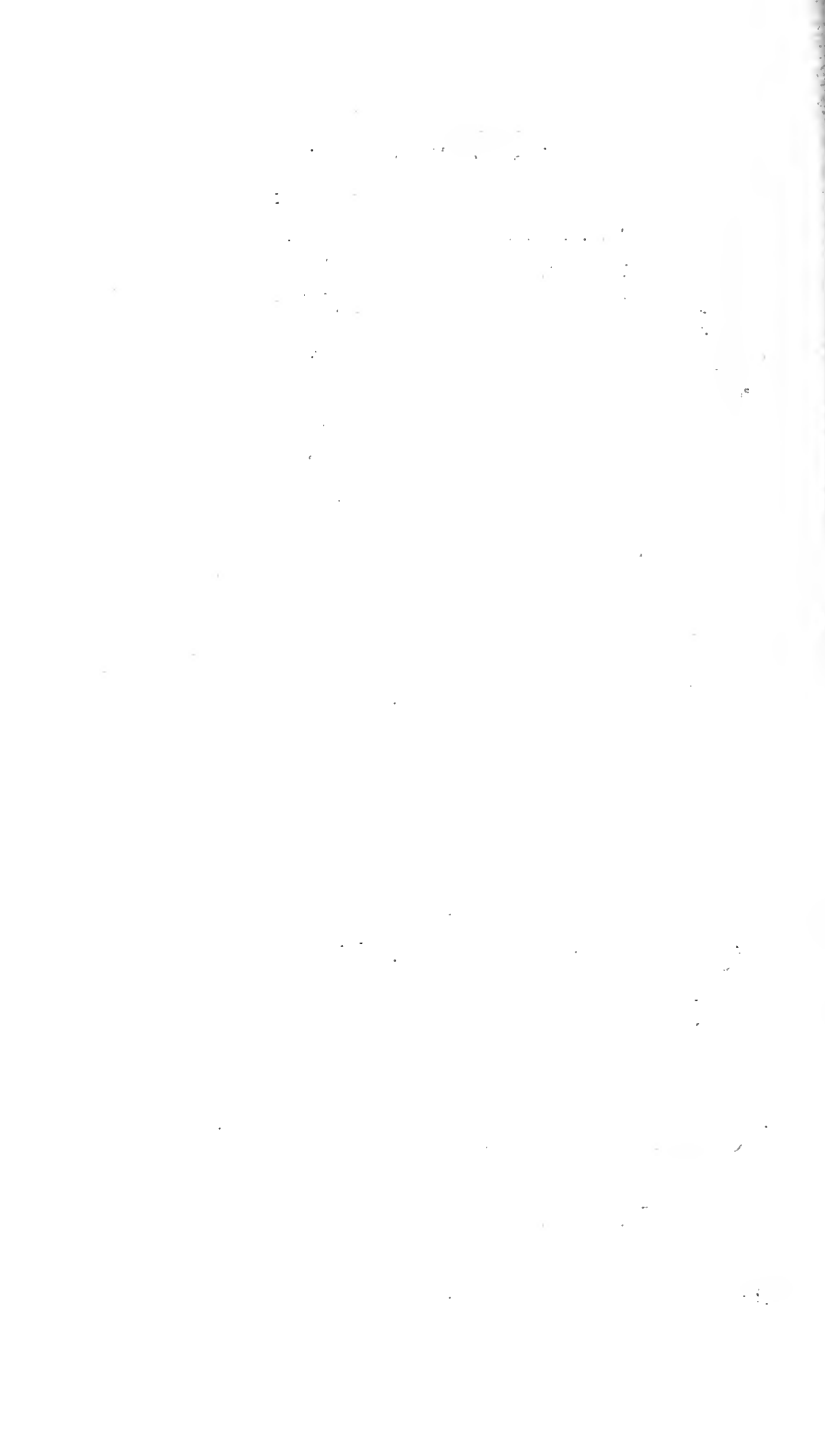
EDVARDUS FORSTER,

SOCIETATIS LINNÆANÆ VICEPRÆSES,

Quem licet in sera rapuerunt fata senecta,
Et vitæ saturum sopiit alta quies,
Nos tamen hunc, velut immaturo funere raptum,
Flemus, et effusis diffluimus lacrymis.

OBIIIT IX. CAL. MAR. A.D. MDCCCXLIX. ÆTATIS LXXXIV.

Vixisti bene ac beate !
. valente
Semper corpore, mente sana, amicis
Jucundus, pietate singulari.



he rendered important services to the new governor, General Dundas, by whom on his return to England he was strongly recommended to his uncle, Lord Melville; and when that nobleman became First Lord of the Admiralty in 1804, Mr. Barrow was appointed to be the Second Secretary of the Board, an office which he continued to fill, with the exception of a few months in 1806, for a period of forty years. In this capacity he was mainly instrumental in the promotion of the various Polar Expeditions, in which he felt the deepest interest; and took an active share, under the direction of Sir James Graham, in the carrying out of those important changes which have so much improved and simplified the civil administration of the Navy. His connexion with the 'Quarterly Review,' to which he contributed no fewer than 195 articles, commenced with the fourth number and was continued to the close of his life; and many other literary labours, which it is unnecessary to enumerate here, attest both his extensive information and his laborious habits. He became a Fellow of the Royal Society in 1805, and of the Linnean Society in 1810. In 1835, during the short administration of Sir Robert Peel, he was created a Baronet with the special approbation of the King; in 1845 he retired from public life; and he died on the 23rd November 1848, suddenly, after walking out and transacting business as usual, in the 85th year of his age.

George Bennett, Esq., formerly a Surgeon at Staines in Middlesex, was elected into the Society on the 20th of June 1826, and died on the 30th of July 1848.

Edwin Charles Charlton, Esq., was elected a Fellow of the Society in 1845.

Edward Forster, Esq., the late lamented Treasurer of the Society, was the third son of Edward Forster, Esq., for fifty-two years Governor of the Russia Company of London, and was born at Walthamstow in the county of Essex on the 12th of October 1765. He passed the greater part of his childhood in the neighbourhood of Epping Forest, and from the age of fifteen became particularly attached to the study of English botany, which he ardently cultivated through a long and active life. He was a partner in the eminent banking-house of Lubbock, Forster and Company, and to within a few hours of his death took a leading part in the business of the bank. In 1800 he was elected a Fellow of the Linnean Society, of which he became Treasurer in 1816, and one of the Vice-Presidents in 1828; and his kindliness of disposition, unremitting attention to his duties, and zeal for the interests of the Society, will long endear his memory to all its members. He was a

man of very active habits ; rising daily at 6 o'clock, usually spending an hour before breakfast in his garden, in which he cultivated many of the rarer and more obscure British species, and taking a great deal of bodily exercise, which, together with his extreme temperance, probably contributed greatly to the prolongation of his life. His death, which took place in the 84th year of his age, at his residence, Ivy House, Woodford, on Wednesday the 21st of February in the present year, was occasioned by an attack of cholera, contracted, as was supposed, a few days previously at the Refuge for the Destitute, of which valuable charity he had long been a most zealous and liberal supporter. He was buried on the 1st of March in the family-vault at Walthamstow, in the immediate neighbourhood of which his whole life had been spent.

Mr. Forster possessed a very complete and well-arranged herbarium of British plants, and particularly devoted himself to those of his native county of Essex ; and he had long entertained the intention of publishing its "Flora," the manuscript of which he has left in an imperfect state. His contributions to our 'Transactions' are limited to two papers ; the one "On *Vicia angustifolia*, Smith," in vol. xvi. ; and the other "On *Esula major Germanica* of Lobel," in vol. xvii. ; but he also published several papers on subjects connected with English botany in the 'Phytologist,' the titles of which are as follows :

1. Note on *Centranthus Calcitrapa*, vol. i. p. 648.
2. Note on *Aspidium spinulosum*, vol. i. p. 814.
3. Notes on Botanical Classification, vol. i. p. 913.
4. Note on *Primula elatior*, vol. i. p. 974.
5. On *Arenaria uliginosa*, *Leersia oryzoides*, and *Galium Vaillantii*, vol. ii. p. 1.
6. On *Cœnanthe pimpinelloides* and *Cœn. Lachenalii*, vol. ii. p. 403.
7. Corrections of erroneous habitats given to British Plants, vol. ii. p. 609.
8. On the occurrence of *Juncus diffusus* in Epping Forest, vol. ii. p. 941.
9. Note on the *Viola flavicornis* of Smith, vol. ii. p. 963.
10. Further Remarks on *Viola flavicornis*, vol. iii. p. 31.

Mr. Forster married early in life, but has left no children ; his property being bequeathed to the descendants of his elder brother Thomas Furlly Forster, also formerly a Fellow of the Linnean Society, and a distinguished cultivator of English botany.

George Gardner, Esq., was born in Glasgow in May 1812, and was educated for the medical profession in the University of that city. He displayed at an early period a taste for the study of natural

history, but botany in particular was his favourite pursuit. At that time Sir William Hooker filled the Chair of Botany in that University, and Mr. Gardner so far attracted his notice as to lead him to open to him the range of his fine herbarium, and allow him the free use of his extensive botanical library. The ardent zeal of the young student urged him to make the best use of these rare advantages, and his progress was great and rapid. His numerous attainments and many excellent qualities soon obtained him the steady friendship of his generous teacher, and he continued the pursuit of his studies till the end of 1835, when having expressed his eager desire to explore the botanical treasures of tropical climates, Sir William Hooker obtained the cooperation of twenty-four subscribers who contributed towards the expenses of his journey and agreed to purchase sets of the dried plants he proposed to collect, while a number of others engaged to receive from him such living plants as he might select on account of their beauty or rarity. Among the latter was the late Duke of Bedford, who was one of the young botanist's most liberal patrons, and Brazil was selected as the most appropriate field for his exertions.

Previous to his departure, he published a pocket herbarium entitled 'Musci Britannici,' on the plan of Funke's 'Deutschlands Moose,' where dried specimens illustrative of each species were neatly fixed according to the arrangement in Hooker's 'British Flora.' Mr. Gardner embarked at Liverpool on his projected expedition in May 1836, and arrived in July following at Rio de Janeiro. The receipt of his first set of 400 species, collected on the Corcovado and mountain ranges immediately surrounding that city, showed how faithfully and successfully he discharged the duties of his mission, and proved the harbingers of the extremely fine collection he subsequently made in the interior of Brazil. The next field of his exertions was the lofty range of the Organ Mountains covered with primæval forests, which he explored with great success, being the first to scale the loftiest peak of that range, where he obtained much to reward his exertions. His activity was unceasing, and his time entirely devoted with the greatest ardour to a pursuit which presented him with so many novelties and opened to him so attractive a career. During his researches among the riches of this fertile region he acquired such a knowledge of the Portuguese language, and studied so to adapt himself to the habits of the people, as to enable him to carry into effect his original design of traversing the interior provinces of Northern Brazil, in quest of their botanical productions, which until that period had only been investigated by Pohl, Von Martius,

A. St. Hilaire, and our countryman Dr. Burchell, and were comparatively little known to botanists in general. With this view he embarked at Rio de Janeiro, and reached Pernambuco in July 1837 : he spent three months in exploring that province, visiting the Rio San Francisco, which he ascended as high as the falls of Pedro Affonço ; hence he returned to Pernambuco, and proceeded by sea to Aracaty, from which point he penetrated inland, making very large collections in the provinces of Ceara and Piauhy. His intention was to cross to the westward and explore the banks of the Tocantins, and ascending along the course of that river to penetrate by this route as far as the city of Goyaz, and if possible to reach the cities of Cuyaba and Matto Grosso ; but the political disturbances then raging in Piauhy obliged him to alter his course in a more southerly direction : this had the advantage of offering a long tract yet untrodden by any botanist, and he accordingly traversed the westernmost portion of the province of Pernambuco and crossed the more eastern parts of that of Goyaz, examining in his way the high table-lands in these districts, which afforded him a rich harvest. Crossing then the Serra Geral, near Arrayas, he entered the province of Minas Geraës, where he added greatly to his collections, especially among the rarities of the Diamond district, and after traversing this entire province he again reached Rio de Janeiro at the end of 1840. Hence he paid a second visit to the Organ Mountains and the rich mountain country in the neighbourhood of the Parahyba River, and finally embarked with his collections for Liverpool, where he arrived in July 1841, having been absent five years and two months, during which period his collections amounted to upwards of 6000 species of Phanerogamous plants, consisting of fine and well selected specimens, in excellent preservation.

His many interesting letters to Sir William Hooker, written at various stages during his travels, were published from time to time in the ' Companion to the Botanical Magazine,' the ' Annals of Natural History,' and the ' Journal of Botany ;' but in 1846 he prepared a more popular Account of his Journey, which was published in an 8vo volume under the title of ' Travels in the Interior of Brazil.' He likewise contributed, after his return to England, several botanical memoirs to the ' London Journal of Botany' on *Chresta*, *Pycnocephala*, *Trochopteris*, *Bowmannia*, *Hockinia*, and several other new genera ; and in 1842 he commenced an Enumeration and description of the plants he had collected during his travels, which he continued to publish from time to time in the same journal. In 1843, in conjunction with Mr. Fielding, he published a ' Sertum Plantarum,' containing

figures and descriptions of many of the novelties of that gentleman's collection, and he also contributed several other descriptions of his plants for Hooker's 'Icones Plantarum.' He became a Fellow of the Linnean Society in 1842; and published in the 19th volume of our 'Transactions' a paper "on *Peltophyllum*, a genus allied to *Triuris*."

In September 1843, at the recommendation of his friend Sir Wm. Hooker, he received from Government the appointment of Superintendent of the Botanic Garden of Ceylon. The first object of his ambition in entering upon the duties of this appointment was the formation of a complete Flora of Ceylon, to which he constantly devoted his time and energies. In order to compare the relations of the botany of Ceylon with that of the Southern Peninsula of India, he made an excursion to Madras in the beginning of 1845, where he had the opportunity of consulting the rich herbarium of Dr. Wight, in company with whom he herborized extensively in the Neilgherry Mountains, where he formed a very interesting collection. After his return to Ceylon he made several journeys into the interior, and to many distant parts of the island, adding thus constantly and extensively to his collections. During five years he made great progress in the accumulation of materials towards his projected Flora, which he expected to complete for publication in 1851. In allusion to this great object of his ambition he wrote in 1844: "I trust to be able to publish, in the course of a few years, a Flora of the island worthy of the richness and beauty of its vegetation and of the encouragement afforded me by the home and local Governments. This, however, as you are well able to judge, will be a work of no little labour, as it must contain descriptions of from 4000 to 5000 species, being considerably more than half of the plants defined by Linnæus in the last edition of his 'Species Plantarum.'"

He returned about the middle of last year from one of his long excursions made in company with Sir Emerson Tennent to Jaffna, Trincomalee, and the eastern districts of the island: subsequently he was constantly occupied in examining and registering the characters of the plants of the large collection made during that journey, and frequently complained of pain in the head, which he attributed to too close application to these sedentary pursuits. He therefore gladly availed himself of an invitation from Lord Torrington, Governor of the island, to join him at Newera Ellia, the famed Sanitarium of Ceylon, to which place he repaired on the 10th of March last. He arrived there in excellent spirits, at three in the afternoon, and after lunching with the Governor and his family re-

tired to rest after his long ride, when he was suddenly attacked by a fit of apoplexy, which rendered him quite insensible, and of which he died in a few hours. In communicating this sad news by the last overland mail, Lord Torrington, Sir Emerson Tennent, and many other persons of consideration in the island, spoke of it not only as an irreparable public loss, but expressed extreme regret upon being thus suddenly deprived of an invaluable friend, for whom they felt the most sincere affection; for Mr. Gardner possessed in a rare degree the faculty of making friends in every direction. The cheerfulness of his disposition, his never-tiring energy, the variety and extent of his acquirements, his desire to impart information wherever required, his vivacity and pleasing conversational powers, secured him wherever he went the esteem and friendship of all well-informed persons.

Thus has been suddenly cut off in the prime of his life one of the most active of the practical botanists of the day. It is much to be desired that the work which he has advanced so far towards completion may not be lost to science, and that a successor may be found fully competent to arrange the large mass of materials already accumulated; and in carrying out this object, it is to be hoped, the merit which belongs to this deserving botanist will be recorded to the full extent of his due. Independently of the labours already noticed, Mr. Gardner had just completed for publication a 'Manual of Indian Botany;' an elementary work of that nature having been long a great desideratum to the numerous students of botanical science in India. In addition to his contributions before mentioned, he published in the 'Calcutta Journal of Natural History,' several interesting memoirs, viz. on the *Cyrtandraceæ* of Ceylon, on *Anstrutheria*, *Sarcandra*, &c., *Carria*, *Dysodidendron*, *Leucocodon*, and on *Christisonia*, &c., together with a valuable paper on the *Podostemaceæ* of the island and of Southern India, to which he added descriptions of the plants of this order met with during his travels in Brazil.

William Gordon, Esq., M.D., was born on the 2nd of August 1800, at Fountain's Hall near Ripon in the county of York. He received the rudiments of his education at the Grammar School of that city, and subsequently pursued his medical studies in London and at the University of Edinburgh. He resided for twelve years as a general practitioner at Welton in the neighbourhood of Hull, and there married a sister of Sir William Lowthrop. In 1841 he took his degree of M.D. and settled as a physician at Hull, where, in addition to the duties of his profession, he devoted himself to the placing the means of acquirement and improvement within the reach of the working classes,

and greatly exerted himself, by lectures and otherwise, in promoting the objects of the Mechanics' Institute and of the Literary and Philosophical Society. In 1828 he published 'Academical Examinations on the Practice of Surgery,' and in 1832 'A critical Enquiry concerning a new Membrane of the Eye.' He also contributed various papers to the medical journals. His election into the Linnean Society dates from 1832; and he died in the beginning of February of the present year. His funeral, which took place on the 10th of that month, proved the high respect in which he was held, and the deep impression which his unwearied efforts for the improvement of his species had made on the minds of all classes of his fellow-townsmen; a vast concourse following him to the grave, and the humbler classes having set on foot a collection among themselves to raise a monument to record at once his merit and their gratitude for his exertions in their behalf.

William Horton Lloyd, Esq., well known to us all as one of the most constant attendants on our Meetings, and for his liberal feelings and kindness of disposition, was born at Chapel-Allerton in the neighbourhood of Leeds in the year 1784. His family, although not boasting any great descent, were very respectable manufacturers in Manchester. He was himself destined for the bar, and studied the law for a considerable time; but conscientious scruples with regard to the oath induced him to relinquish his idea of adopting the legal profession, and he devoted himself to the cultivation of his taste for natural science and antiquities, for which he had a strong predilection. He became a Fellow of the Linnean Society in 1807, and was also a Fellow of the Society of Antiquaries, and one of the earliest Members of the Zoological Society, of the Horticultural Society, of the British Association, and of several other scientific and literary institutions. For the Linnean Society in particular he always entertained the warmest regard; and although he never published anything, he constantly took a deep interest in the progress of science. He died at his house in Park Square on the 18th of February in the present year, having suffered for a year or two previously several slight paralytic attacks, but retaining his faculties little impaired almost to the last.

Alexander MacLeay, Esq., for more than a quarter of a century Secretary to this Society, was born in the county of Ross on the 24th of June 1767. His father, who was Provost of the town of Wick, was also a Deputy-Lieutenant of the county of Caithness, and the representative of one of the most ancient families in the north of Scotland. Mr. MacLeay was educated for commercial

pursuits, which he relinquished early in life, and became in 1795 Chief Clerk in the Prisoners of War Office, in 1797 head of the department of Correspondence of the Transport Board, and in 1806 Secretary of that Board, which office he filled until the abolition of the Board in 1818, when he retired upon a pension. In the year 1825 he was solicited by the late Earl Bathurst to undertake the important office of Colonial Secretary to the government of New South Wales, which he held until the close of 1836. Having fixed his residence in the colony, with which he had now become completely identified, he was chosen in 1843 to be the first Speaker of the Legislative Council then established; and in that capacity conducted himself with so much ability, judgment and impartiality, as to receive on his retirement from its duties in May 1846 the marked approbation of both sides of the House.

In 1794 Mr. MacLeay became a Fellow of the Linnean Society, and in 1798 he succeeded Mr. Marsham in the office of Secretary, which he held until his Colonial employment compelled him to relinquish it in 1825. The following Minute of Council on that occasion, which was subsequently adopted by a General Meeting of the Society, expresses the high sense universally entertained by the Members of his long and useful services:—

“The Linnean Society of London take the earliest opportunity after the retirement of Alexander MacLeay, Esq. from the Secretaryship of the Society, to record upon their Minutes the high estimation in which he is held by them on account of twenty-seven years of unremitting and unrequited labour devoted to the interests of science; and that in quitting for a time this sphere of usefulness to fill an honourable station in a distant country, he carries with him the cordial esteem and sincere regret of this Society.”

As a naturalist, Mr. MacLeay devoted himself almost exclusively to the study of insects, of which he had formed, previous to his quitting England, the finest and most extensive collection then existing in the possession of a private individual. Of this great class of animals he possessed an intimate knowledge, without, however, having published anything on the subject, although he had made preparations for a monograph of the singular genus *Paussus*, in which his cabinet was peculiarly rich. He became a Fellow of the Royal Society in 1809, and was also a Foreign Member of the Academy of Sciences of Stockholm, and a Corresponding Member of the Academy of Turin.

Mr. MacLeay married early in life a relation of the house of Barclay of Urie, by whom he had a numerous family. He died at Syd-

ney, New South Wales, on the 18th of July 1848, in the 82nd year of his age.

William Pilkington, Esq., was born at Hatfield in the West Riding of the county of York on the 7th September 1758. He died at the same place in the 90th year of his age, on the 13th of August 1848, leaving two sons, of whom the eldest was formerly one of the Assistant Poor Law Commissioners, and subsequently an Assistant Commissioner of Tithes. He was lineally descended from one of the oldest Saxon families in the kingdom; a full account of which is given in Burke's 'History of the Landed Gentry,' under the name of Pilkington of Hatfield; and he possessed a considerable estate in the parish in which he was born and died.

He was educated at the Charter-House School on Sutton's foundation, and was at first intended for the church; but having from his earliest years evinced considerable talent for drawing, he was persuaded to change his intended profession for one for which nature seemed more particularly to have fitted him, viz. that of an architect; and he was accordingly placed as a pupil under the most eminent architect of the day, the celebrated Sir Robert Taylor. Under his tuition he advanced rapidly in his profession, was appointed by the Government Surveyor to the Customs and Transport Boards, and during his professional career designed and superintended the erection of many public and private buildings, which evince his taste and skill in architecture to have been not inconsiderable. He was indefatigable in business, and although his professional studies absorbed the greatest part of the day, yet he generally found some leisure time in each to devote to his favourite pursuits, botany, conchology and mineralogy, the branches of natural history in which he took the most interest. He possessed a well-preserved Hortus Siccus of his own collection; and a fine collection of shells and minerals, with many very rare and valuable works on all these subjects. During his professional life he resided in Whitehall Yard, Westminster; and there, many men, eminent for their love and knowledge of and services to natural history, frequently found themselves congregated under his hospitable roof. Among his most intimate friends were Dr. Shaw, Dr. Maton, Sir James Smith, Sir Alexander Crichton, Mr. Aylmer Bourke Lambert, The Rev. Thomas Rackett, Mr. Charles Hatchett, and Mr. William Swainson, all well-known Fellows of the Linnean Society.

He was elected a Fellow of the Linnean Society on the 17th of March 1795, and was also a Fellow of the Society of Antiquaries, into which he was elected on the 16th June 1800.

Mr. Pilkington contributed to the 7th volume of the Society's Transactions a "Description of some Fossil Shells found in Hants," and has left behind him numerous MSS. on subjects of natural history. Towards the latter part of his life he left his profession and London altogether, and resided on his estate at Hatfield, passing his time in doing good to his poorer neighbours, and in the enjoyment of his favourite pursuits and studies.

Robert James Nicholl Streeten, M.D., was born in London on the 28th of June 1800, matriculated at the University of Edinburgh in 1820, studied in Paris during the year 1823, and took his degree at Edinburgh in 1824, his thesis "De Delirio tremente" being dated on the 2nd of August in that year. Here, under the instructions of the late Prof. Graham, whom he accompanied on one of his Highland excursions, he acquired a taste for botany and other branches of natural history, which he never ceased to cultivate. A few months after taking his degree he settled in Worcester, and became one of the Physicians of the Dispensary, which office he continued to fill up to the time of his death. He took an active part in the formation of the Provincial Medical and Surgical Association, and contributed numerous papers to the 'Midland Medical and Surgical Reporter,' and to its successor the 'Provincial Medical and Surgical Journal,' published under the auspices of the Association, of which in 1843 he became Secretary, and soon after took upon himself the duties of responsible editor of the Journal. He was author also of some papers in the 'Transactions' of the Association, and in the 'British and Foreign Medical Review.' On the establishment of the Worcestershire Natural History Society he became an active Member, contributed greatly to the success of its Museum, and was the author of "The Address of the Council," delivered at its first Anniversary Meeting in 1834, and of a "Note on the second British species of *Monotropa* (*Hypopitys hypophegea*, G. Don)," published in the 1st volume of the 'Phytologist.' He became a Fellow of the Linnean Society in 1846, and died at Worcester on the 10th of May in the present year.

John Frederick Walter, Esq., M.D., became a Fellow of this Society on the 1st of March 1836. He left England between three and four years since for the Mauritius, where, on his arrival, he was elected a Resident Member of the Royal Society of Arts and Sciences of the island, and his death is announced in the Report of that Society, read at the Annual Meeting held on the 24th of August 1847.

Among our *Foreign Members*, the Society and the scientific world have sustained a severe loss by the death of

Stephan Ladislaus Endlicher, Professor of Botany in the University of Vienna, and Director of the Botanic Garden of that city. He was born at Presburg on the 24th of June 1804, and there acquired his school education. His higher studies were pursued partly at Pesth and partly at Vienna, where in 1823 he became a pupil of the Archiepiscopal Seminary, being then destined for the church. But after the completion of his theological education, and when he had already taken the minor orders, family circumstances determined him to re-enter the secular state in 1826. Two years afterwards he was attached to the Imperial Library at Vienna, and the circumstances of his parents placed him in a state of easy independence. From the time of his quitting the ecclesiastical profession he devoted himself enthusiastically to the study of natural history, and more especially of botany, and to that of the languages of Eastern Asia, particularly Chinese. In botany he soon acquired so distinguished a reputation as to mark him out for the Keepership of the Herbarium in the Imperial Cabinet of Natural History; and in 1840, on the death of Baron Jacquin, he became Professor of Botany and Director of the Botanic Garden, which establishment he exerted himself greatly to reorganize and improve. The following is a Catalogue of his botanical writings :—

Flora Pisoniensis, Pesth, 1830.

Ceratotheca, eine Neue Pflanzengattung (from the *Linnæa*), Berl. 1832.

Meletemata Botanica, Vienna, 1832, published in conjunction with Schott, and limited to sixty copies.

Atakta Botanica, Pars I., Vienna, 1833.

Prodromus Floræ Norfolkicæ, Vienna, 1833.

Sertum Cabulicum, Vienna, 1836, in conjunction with Fenzl.

Grundzüge einer neuen Theorie der Pflanzenzeugung, Vienna, 1838.

Genera Plantarum secundum Ordines Naturales disposita, Vienna, 1836–40; with two *Mantissæ*, 1842, 1843, and a *Supplement*, 1847.

Iconographia Generum Plantarum, Vienna, 1838.

Stirpium Novarum Decades 1–10, Vienna, 1839, in conjunction with A. Gray, Putterlick and Reisseck.

Caroli Linnæi Epistolæ ad Nic. Jos. Jacquin, Vienna, 1841, published in connexion with Schreibers.

Enchiridion Botanicum, Leipz. 1841.

Catalogus Horti Academici Vindobonensis, Vienna, 1842.

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Medicinalpflanzen des Östreischen Pharmacopöe, Vienna, 1842.

Grundzüge der Botanik, Vienna, 1843, in conjunction with Unger.

He also continued, after Spenner's death, in conjunction with Putterlick, T. F. Nees von Esenbeck's 'Genera Plantarum Floræ Germanicæ;' and contributed largely to C. G. Nees von Esenbeck's edition of Mr. Brown's 'Vermischte Schriften;' to Pöppig's 'Nova Genera et Species Plantarum;' to the 'Annalen des Wiener Museums der Naturgeschichte;' to the 'Enumeratio Plantarum quas in Novâ Hollandiâ collegit Car. L. B. de Hügel;' and to the 'Flora Brasiliensis,' which he edited in common with Von Martius.

Of these numerous and important works the 'Genera Plantarum' is that on which his fame will chiefly rest, as a work of immense labour, great research and profound botanical science. It will long continue to be a book of standard reference to the systematic botanist, of whose labours it is a constant and indispensable companion.

In private life Professor Endlicher was a most excellent and amiable man. He died at Vienna on the 28th of March of an apoplectic attack, caused as some physicians presumed by an effusion of pus from the *pars petrosa* of the left side into the brain, as he had suffered for many years from a polypus in the ear. On the previous Monday he had received his friends with his usual calmness and serenity, complaining only of a slight headache; but at midday on Wednesday he lost his speech and became insensible, and about seven o'clock in the evening he ceased to exist, leaving a large circle of warmly attached friends to deplore his premature loss.

Two of our *Associates* are also to be added to the list of deaths.

Mr. David Cameron was elected an Associate of the Society on the 20th November 1827. He was then resident as head gardener at Bury Hill near Dorking, Surrey, the seat of the late Robert Barclay, Esq., F.L.S. &c., in whose service he remained until the early part of 1831, when he was appointed Curator of the recently founded Botanic Garden at Birmingham. During his stay at Bury Hill he communicated to the 'Gardener's Magazine' (to which Journal he was for many years an active contributor), two articles upon the Flowering Plants and Ferns introduced into this country by Mr. Barclay, or then growing at Bury Hill, with remarks on their culture, and woodcuts of many of them; also a paper on the mode of destroying the Red Spider in hothouses.

Among the numerous communications made by Mr. Cameron to the editor of the 'Gardener's Magazine' while he continued in charge of the Birmingham Garden, the principal are—

1. On protecting the Blossoms of Fruit-trees on Walls from Frost, vol. viii.
2. Account of the effects of the last winter (1837-38) on the Trees and Shrubs of the Botanic Garden, Birmingham, vol. xiv.
3. Account of the preparatory operations made in the Birmingham Botanic Garden previously to planting the Arboretum there; with the dimensions which some of the trees have attained in seven years, vol. xv.

Besides the above, he continued to forward from time to time for insertion in the same Magazine, notices of the new, rare, or otherwise interesting additions which were continually being made to the valuable collection under his care; and of the effects produced by hail-storms, unusually severe frosts, &c. &c. After the death of Mr. Loudon and consequent termination of the 'Gardener's Magazine,' Mr. Cameron became an occasional correspondent of the 'Phytologist,' to which he was one of the earliest contributors.

His communications to the 1st vol. are—

1. Note on (the culture of) British Orchideæ, p. 62.
2. Notes on the cultivation of *Lycopodium clavatum* and *L. Selago*, p. 63.
3. Note on *Dianthus plumarius* and *D. Caryophyllus*, p. 63.
4. Note on *Cibotium Barometz*, p. 427.
5. Note on *Anagallis arvensis* and *A. cærulea*.
6. Note on the Irish Furze (*Ulex strictus*).
7. Warwickshire locality for *Equisetum fluviatile*, p. 555.

The 3rd vol. of the Journal of the Horticultural Society (of which he was a Corresponding Member) also contains two papers by him:

1. On the cultivation of British Orchids, and
2. On the cultivation of Hardy Heaths.

Mr. Cameron appears to have been unusually successful in cultivating at Birmingham our terrestrial *Orchideæ*; owing, probably, to the excellent opportunities which he must have possessed of becoming acquainted with their habits, during the time of his residence among the chalk hills of Surrey. He never communicated any paper to the Linnean Society; but he frequently contributed to give additional interest to our Meetings by forwarding for exhibition fresh specimens of plants likely to attract attention, either from their rarity or beauty; many of which, proving new to our herbarium, have been dried and preserved. He continued to hold the office of Curator to the Birmingham Botanic Garden until the end of 1847 or beginning of 1848, when he removed to Shrawley in Worcestershire, where he

resided till the date of his death, which took place after an illness of a few hours' duration, on the 25th June last, at the age of 61.

Mr. William M'Nab, for many years Superintendent of the Royal Botanic Garden at Edinburgh, and a most skilful and successful horticulturist, was born in the year 1780, in the parish of Dailly in Ayrshire, where his father was a small farmer. When quite a lad he had a strong predilection for the occupation of a gardener, and was accordingly apprenticed at the age of sixteen to the gardener of Mr. Kennedy of Dunure, who after three years' service recommended him to Mr. Walter Dickson, a well-known nurseryman at Edinburgh. From thence he passed into the garden of the Earl of Haddington at Tynningham in East Lothian; and was subsequently admitted into the Royal Garden at Kew, where his diligence and intelligence recommended him to the special notice of Mr. Aiton, by whom he was appointed Foreman. Here he also attracted the attention of Sir Joseph Banks, who in 1810 recommended him to Dr. Rutherford, the Professor of Botany in Edinburgh, and he became Superintendent of the Edinburgh Botanic Garden, an office which he filled for nearly forty years. Some years after his appointment, the removal of the Botanic Garden to its present site was effected; and the laying out and planting of the new Garden, as well as the successful removal of large and valuable specimens from the old to the new establishment, afford striking testimonials of his industry and skill. He was the author of 'Hints on the Planting and General Treatment of Hardy Evergreens in the Climate of Scotland,' Edinb. 8vo, 1831; and of 'A Treatise on the Propagation, Cultivation and General Treatment of Cape Heaths, in a Climate where they require Protection during the Winter Months,' Edinb. 8vo, 1832. In the latter branch of cultivation he was indeed peculiarly successful, and his directions for the management of that beautiful tribe of plants are regarded as the most valuable practical suggestions that have yet been offered. As an assistant to the Professors of Botany, both in the garden and in the botanical excursions of the pupils, Mr. M'Nab acquired universal respect and esteem. He died on the 1st of December last, and was succeeded in the Curatorship of the garden by his son James, who inherits his father's skill as a gardener and devotion to botanical pursuits.

The Secretary also announced that twelve Fellows and three Associates had been elected since the last Anniversary.

At the election which subsequently took place, the Lord Bishop of Norwich was re-elected President; William Yarrell, Esq., was

elected Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the Council in the room of others going out, viz.: Thomas Bell, Esq., Francis Boott, M.D., John Gould, Esq., John Hogg, Esq., and Richard Horsman Solly, Esq.

Among the presents announced by the Secretary were the following:—

The herbarium of the late Thomas Walter, Esq., author of the 'Flora Caroliniana;' presented by John Fraser, Esq., A.L.S.

A Portrait of the late Sir Joseph Banks, Baronet, K.B., painted by the late Thomas Phillips, Esq., R.A.; presented by Captain Sir E. Home, Bart., R.N.

A Lithographed Portrait of the Right Rev. the Lord Bishop of Norwich, Pres. L.S., by T. H. Maguire; presented by G. Ransome, Esq., F.L.S.

There were also presented by W. A. Bromfield, M.D., F.L.S., specimens of a *Luzula* growing abundantly at Apse Castle, near Shanklin, Isle of Wight, and described by Dr. Bromfield as having the divaricate and reflexed panicle of *L. pilosa*, with the fruit of *L. Forsteri*, excepting that the seeds are scarcely above one-third or one-fourth the size of those of the latter species. The capsules (not yet ripe) seem to be naturally smaller than in *L. Forsteri*, and much shorter than the sepals, which thus appear to conceal them. Besides their much smaller size, the seeds of the plant exhibited appear to be rounder than in *L. Forsteri*, with a still shorter and very obtuse appendage, and to come later to maturity than in that or *L. pilosa*, as was shown by the accompanying specimens of both, in which the capsules had attained to nearly their full dimensions, whilst those of the new plant were much less advanced. This new form is the prevailing one at Apse Castle, greatly exceeding either of the two others or *L. sylvatica* (which also grows there) in quantity, and is extremely plentiful on dry sloping banks amongst bushes, and either growing alone or intermixed with the other three. The form of the seeds proves, in Dr. Bromfield's opinion, that it cannot be a variety of *L. pilosa*, whilst their very small size and the form of the capsule militate against its connection with *L. Forsteri*. So far as yet observed, the plant is taller than either of these, with longer roots and lower stem leaves; the leaves as broad as in *L. pilosa*, and from their greater length more lax or drooping at their extremities. The panicle, though much like that of *L. pilosa*, would seem to be less compounded, and narrower or more oblong in contour, and this last character coupled with the small size of

the capsules first drew Dr. Bromfield's attention to what he would otherwise have regarded as merely *L. pilosa*. It seems improbable that it should be a hybrid between *L. pilosa* and *L. Forsteri*, being so much more plentiful than the assumed parents, to say nothing of the very minute seeds, so different in this respect from those of either. Dr. Bromfield has not met with it as yet in any other locality but that above mentioned.

June 5.

Thomas Horsfield, M.D., V.P., in the Chair.

Mr. James Yates, F.L.S., exhibited flowering specimens from his garden at Highgate of *Ceanothus thyrsiflorus*, Eschsch., a species first discovered in California by the late Mr. A. Menzies, F.L.S.

Mr. Cornelius Varley, at the request of the Vice-President in the Chair, exhibited numerous drawings illustrative of the structure and circulation in different species of *Chara*, and entered into an explanation of the more remarkable circumstances connected therewith.

Read a paper "On *Ichneumon Atropos*, Curt." By George Newport, Esq., F.R.S. & L.S.

Several years ago the author obtained many specimens of this insect both in the larva and perfect states at Canterbury, chiefly in the year 1829, but he has not met with them since 1834. He has taken the perfect insect in the month of July, and has many times reared it from the larva state in which it is a parasite within the body of the larva of *Sphinx ligustri*, on which he considers it to be more common than on that of *Acherontia Atropos*. Mr. Newport gives some account of the habits and circumstances of its growth. It occurs in the body of the *Sphinx* larva and in the pupa from August to the following April, at which time it changes to a nymph, and remains in this state for a month to six weeks and comes forth in June. The anatomy of the larva was then described and shown to be in every particular in strict accordance with the condition of life under which this parasite exists, and confirmatory of the view of the author that the habits of different species are invariably in accord-

ance with peculiarities of function, and that these are dependent mainly on differences of detail of structure.

June 19.

The Lord Bishop of Norwich, President, in the Chair.

Frederick Gould, Esq., was elected a Fellow.

Read "Descriptions of seventeen new species of the Coleopterous family *Paussidæ*." By J. O. Westwood, Esq., F.L.S. &c.

Genus CERAPTERUS, Swed.

Subgenus ORTHOPTERUS.

Cerapterus (Orthopterus) La Fertei, Westw.

C. piceo-castaneus nitidus lævis, pronoto magis fulvescenti-castaneo, elytris nigro-castaneis tenuissime punctatis: singulo plaga longitudinali per dimidium posticum suturæ extensa ad apicem recurva et cum margine externo parallela fulva; pronoto linea impressa media; disco haud setoso, pedibus rufo-castaneis.—Long. corp. lin. 6.

Hab. in Africa occidentali tropica apud "Rio Grande," inter Gambiam et Sierram Leonam.

In Mus. D. La Fertei.

Obs. The club of the antennæ is $2\frac{1}{3}$ rd longer than broad; the terminal joint is equal in length to the ninth, eighth, seventh, and $\frac{1}{3}$ rd of the sixth joints.

Cerapterus (Orthopterus) concolor, Westw.

C. totus obscure castaneus nitidissimus, elytris magis nigricantibus; pronoto linea media longitudinali vix distincta; elytris basi et lateribus punctis setiferis instructis; disco magis evidenter punctato, tibiis rufo-castaneis.—Long. corp. lin. 6.

Hab. apud Portum Natalensem Africæ meridionalis.

In Mus. Brit. et Fortnum.

Obs. The club of the antennæ is $2\frac{1}{3}$ rd times longer than broad; the seven intermediate joints are of equal breadth, the last joint is rather convex, and as long as the ninth, eighth, seventh, and half of the sixth united.

It is impossible, without a comparison with Mr. W. S. MacLeay's original specimen of *C. Smithii*, to determine whether this

species may not prove a concolorous variety of that insect. Judging from the description and figure of the antennæ however, this supposition appears very doubtful.

Subgenus ARTHROPTERUS.

Cerapterus (Arthropterus) denudatus, Westw.

C. piceo-castaneus subnitidus tenuissime punctatus, elytris magis nitidis, antennis angustis planis; articulo ultimo duobus præcedentibus longitudine æquali, capitis angulis posticis porrectis, prothorace capite paullo angustiori supra subdepresso truncato-cordato linea media impressa, pedibus subangustis; tibiis omnibus angulo externo apicali acuto.—Long. corp. lin. 6.

Hab. in Nova Hollandia, ad ripas fluvii "Mundarra" dicti.

In Mus. F. Bond.

Cerapterus (Arthropterus) Wilsoni, Westw.

C. totus castaneus nitidus, capite parvo punctato et inter oculos bi-impresso: angulis posticis vix ultra oculos lateraliter porrectis, antennarum clava subangusta sub lente tenuissime granulata; articulo 3tio clavæ latiori: ultimo angustiori longitudine vix tribus præcedentibus æquali, pronoto subquadrato punctato: angulis anticis rotundatis: disco haud longitudinaliter sulcato; elytris elongatis tenuissime punctatis: punctis ad basin majoribus castaneis: sutura magis fulvescenti, pedibus angustis; tibiis vix tarsis duplo latioribus.—Long. corp. lin. 7.

Hab. in Novæ Hollandiæ Adelaide, D. Wilson. In Mus. Westw.

Cerapterus (Arthropterus) subsulcatus, Westw.

C. totus castaneus, capite punctato inter oculos haud impresso: angulis posticis pone oculos valde porrectis, antennis tenuissime punctatis clava sensim a basi ad articulum ultimum latiori; articulo ultimo sexta parte latiori quam longo tribusque articulis præcedentibus longitudine sub-æquali, pronoto punctato cordato-truncato: sulco longitudinali medio fere omnino oblitterato, elytris longitudinaliter subsulcatis vix punctatis: disco setis brevissimis pauciter instructo basi longius setosis, tibiis tarsis plus duplo latioribus basi angustioribus apice externo præsertim in pedibus anticis actis.—Long. corp. lin. 5½.

Hab. in Nova Hollandia, King George's Sound. In Mus. D. Parry.

Subgenus PLEUROPTERUS.

Cerapterus (Pleuropterus) alternans.

C. rufus, elytris magis fulvis: singulo plagis duabus latis nigris postice conjunctis, opacus fere lævis, capite brevi; vertice antice longitudinaliter impresso punctisque duobus impressis intra partem oculorum posticam, antennis fere planis; clava e basi ad apicem sensim angustata: articulo basali postice in lobum rotundatum producto, pronoto transverso: angulis anticis rotundatis: posticis valde incisissimis: inter angulos posticos

tuberculis duobus rotundatis instructo; disco valde irregulari sulco profundo longitudinali; elytrorum humeris elevatis: disco singuli 4-costato, pedibus longis gracilibus.—Long. corp. lin. 4.

Hab. in Mozambique et apud Portum Natalensem.

In Mus. Melly (e Mus. Berol. cum nomine supra indicato transmissus) et Mus. D. Fortnum.

Ceraapterus (Pleuropterus) hastatus.

C. piceus tenuissime punctatus pubescens, elytris subopacis, capite antice sulcato, antennis magis quam in specie præcedenti regularibus et supra nonnihil concavis; articulo basali clavæ extus in tuberculum obtusum intus sinuatum producto: articulis reliquis longitudine fere æqualibus: ultimo rotundato, pronoto breviter cordato-truncato: angulis anticis valde obtusis posticis valde incisus utrinque inter angulos posticos tuberculo elevato instructo; elytris obscure piceis basi costatis: singulo macula prope basin altera pone medium cum macula suturali connexa margineque postico fulvis, pedibus gracilibus.—Long. corp. lin. 5.

C. (P.) Westermanni affinis, at latior, magis pubescens, antennis et prothorace aliter formatis.

Hab. in Mozambique. In Mus. D. Melly (e Mus. reg. Berol. cum nomine supra indicato transmissus).

Genus PENTAPLATARTHUS.

Pentaplatarthrus natalensis.

P. castaneo-nigricans, elytris interdum cruce nigra notatis, antennis planis articulis clavæ subcontinuis (nec basi et apice constructis ut in *P. Paussoide*), prothoracis lateribus in medio angulatis.—Long. corp. lin. $4\frac{1}{2}$.

Hab. apud Portum Natalensem Africæ meridionalis. In Mus. Westw. &c.

Obs. On a careful comparison I can detect no other characters to separate the somewhat larger Port Natal specimens recently arrived in this country from the typical specimen of *P. Paussoides* now in my collection. I have employed above the name given to these insects in the Royal Berlin collection, but scarcely consider them specifically distinct.

Genus PAUSSUS.

Sect. A. Prothorax quasi bipartitus.

Subsect. *a.* Antennarum clava postice haud excavata.

Paussus sinicus, Westw.

P. subcylindricus niger subopacus setis minutissimis griseis undique sparsis obsitus, elytrorum apice et angulo postico externo piceis, capite tuberculo obtuso inter oculos serieque quatuor minorum prope collum, antennarum clava angusta in medio angustiore apice clavato et supra seriebus duabus tuberculorum parvorum (in singula serie tribus) in

apicem insidentibus, prothorace bipartito: parte antica haud postica latiore: lateribus angulatis, palpis maxillaribus articulo 2^{do} intus ad apicem acuminato-producto, labialibus articulo ultimo ovato-acuminato.—Long. corp. lin. 4.

Hab. prope Hong Kong. D. Bowring.

In Mus. Britann.

Obs. I have adopted the specific names proposed by Capt. Champion, for this and the two other species brought from Hong Kong by Mr. Bowring, and presented by him to the British Museum.

Paussus granulatus, Westw.

P. luteo-fulvus disco elytrorum magis rufescenti, podice piceo, capite inter oculos bi-impresso tuberculisque duobus excavatis instructo: angulis anticis supra basin antennarum productis, antennarum clava falcata apice acutissimo setaque unica apicali instructo, palpis maxillaribus articulo 2^{do} fere rotundato, capite subnitido gracillime cicatricoso, pronoto glabro; elytris opacis granulatis: singulo plaga longitudinali submembranacea grisea impresso, pedibus gracilibus; tibiis 2 posticis magis dilatatis.—Long. corp. lin. 3 $\frac{3}{4}$.

Hab. in Africa meridionali, prope Portum Natalensem.

In Mus. D. Fortnum.

Subsect. *b.* Antennarum clava postice excavata.

* Species Indicæ.

Paussus politus, Westw.

P. fulvo-rufus, pronoti lateribus posticis discoque elytrorum nigris, capite tuberculo conico parum elevato inter oculos, antennarum clava naviculari: margine antico fere recto: apice rotundato: margine postico excavato excavatione acuminato-ovali margine supero simplici infero 5-denticulato et 5-setoso, prothorace bipartito: parte postica antica haud latiori, elytris nitidis lævibus breviter setosis lateribus longius setosis, podice rufo setarum serie marginato, pedibus subgracilibus; basi femorum obscuriori.—Long. corp. lin. 3 $\frac{1}{2}$.

Hab. in India orientali, D. Bacon. In Mus. Westw., &c.

Obs. Nearly allied to *P. ploiophorus* and *denticulatus*, but differs in the narrowed hind-part of the prothorax; also to *P. nauceras*, but differs in the glossy elytra and different shape of the antennæ.

Paussus Bowringii, Westw.

P. niger nitidus, clava antennarum parte pronoti antica elytrorumque basi lateribus apiceque ferrugineis, capite inter oculos tuberculo elevato quasi e tuberculis duobus minutis composito, antennarum clava lata margine antico acuto postico profunde fossulato: fossulæ margine supero recto infero 6-denticulato, pronoti partis anticæ lateribus acute angulatis: parte postica angustiori lateribus sinuatis, palporum

maxillarium articulo 2^{do} lato subquadrato, elytris brevissime setosis lateribus setis longioribus densius obsitis.—Long. corp. lin. $3\frac{1}{2}$.

Hab. ad Hong Kong. D. Bowring.

In Mus. Britann.

Paussus hystrix, Westw.

P. obscure ferrugineus opacus, capite antice emarginato; vertice tuberculis duobus ovalibus elevatis, antennarum clava oblonga subovata postice excavatione oblonga instructa: hujus marginibus supero et infero sinuatis seu tuberculis rotundatis quinque instructis, prothorace capite paullo angustiori: parte postica antica parum angustiori: lateribus fere rectis, elytris lateribus rufo setosis: singulo ante medium disci impressione ovali alteraque elongata subcurvata laterali instructis, podice serie setarum marginato, pedibus angustis, palporum maxillarium articulo 2^{do} fere rotundato.—Long. corp. lin. $3\frac{1}{2}$.

Hab. ad Hong Kong. D. Bowring.

In Mus. Britann.

** Species Africanæ.

Paussus cucullatus.

P. totus castaneus subnitidus tenuissime punctatus, pronoto magis nitido lævi, capitis vertice impressione ovali marginibus elevatis in qua tubercula 2 parva ovalia exstant, antennarum clava glaberrima late ovali basi truncata postice profunde excavata intus prope marginem anticum necnon margines excavationis transverse impressa, prothoracis parte antica brevi lateribus acute angulatis: postica multo angustiori in medio profunde impressa, pedibus dilatatis, podice setarum serie marginato, palporum maxillarium articulo 2^{do} lato rotundato.—Long. corp. lin. 2.

Hab. in Africa meridionali apud Portum Natalensem. In Mus. D. Melly cum nomine supra indicato e Mus. Reg. Berol. communicatus.

Sect. B. Prothorax subcontinuus.

Paussus spinicoxis, Westw.

P. angustus castaneo-testaceus, capite elytrisque tenuissime punctatis, capite tuberculo conico dorsali inter oculos armato, oculis magnis, antennarum clava subovali undique acute marginata punctata basi externe in dentem producto, disco utrinque versus marginem posticum 4-impresso, prothorace glabro subcontinuo angulis anticis rotundatis: parte antica a postica fossula profunda transversa utrinque setosa separata, elytris glabris, podice marginato punctato, palpis maxillaribus subfiliformibus articulo 2^{do} parum crassiori, pedibus gracilibus; coxis 2 posticis in spinam productis.—Long. corp. lin. 4.

Hab. in Africa meridionali apud Portum Natalensem.

In Mus. Britann.

Paussus cultratus.

P. totus testaceo-fulvus punctatus et breviter setosus, capite supra convexo integro angulis posticis pone oculos porrectis, clypeo emarginato,

antennis depressis late-falcatis apice acutissimis margine omni acuto glabris tenuiter punctatis, palpis maxillaribus filiformibus, prothorace ovali antice posticeque truncato in medio parum depresso glabro excavationibus duabus profundis subrotundatis in medio notato, pedibus subgracilibus; tibiis compressis et ante apicem sensim angustioribus, podice punctato setoso margine acuto elevato.—Long. corp. lin. 3.

Hab. in Africa meridionali apud Portum Natalensem. In Mus. D. Melly cum nomine supra indicato e Mus. Reg. Berol. communicatus.

Paussus setosus, Westw.

P. luteo-castaneus setis aureis obsitus, capite antennis pedibusque magis castaneis, capite inter oculos tuberculo elevato setigero instructo, clypeo vix emarginato, antennarum clava elongata lateribus parallelis margine omni acuto basi externe in dentem conicum apice setosum producto margine postico setarum curvatarum serie instructo, prothorace oblongo: parte antica parum latiori lateribus rotundatis: partis posticæ lateribus fere parallelis: in medio disci impressione profunda subquadrata, elytris profundius punctatis, podice setarum serie marginato, pedibus gracilibus longioribus.—Long. corp. lin. $3\frac{3}{4}$.

Hab. in Guinea.

In Mus. D. La Fertei.

Read also a continuation of Mr. Huxley's paper "On the Anatomy of the *Diphydæ*," &c.

November 6.

William Yarrell, Esq., V.P., in the Chair.

The necessary business of the Meeting having been disposed of, it was proposed by the Vice-President in the Chair and unanimously resolved,

"That in consideration of the death of the late excellent and venerable President of the Society, the Lord Bishop of Norwich, and as a mark of respect to his Memory, this Meeting do now adjourn."

November 20.

William Yarrell, Esq., V.P., in the Chair.

George Frederick Samuel Robinson, Lord Viscount Goderich, and Alfred Tyler, Esq., F.G.S., were elected Fellows.

Mr. Hogg, F.L.S., presented two spikes of a variety of *Hordeum hexastichon*, L., grown from seeds sown in March of the present year at Norton in the county of Durham. The seed was derived from some found in the pocket of a sailor, who died during a voyage in the Mediterranean. Mr. Hogg designates this variety as *H. hexastichon* var. *seminibus nigris seu cæruleo-nigris*, "black, or rather blue-black Bigg." He states that he cannot find in authors any description at all answering to it, although Persoon and Séringe mention a similar variety of the common barley, *Hordeum vulgare*, L. The variety presented by Mr. Hogg ripens early, is exceedingly prolific, and has large grains; and he therefore considers it worthy of cultivation, and though perhaps not so well adapted to malting as the common barley, yet likely to be valuable for other purposes, and particularly for the fattening of cattle.

Read a Paper "On the Development of the Spores and Elaters of *Marchantia polymorpha*." By Arthur Henfrey, Esq., F.L.S. &c.

Mr. Henfrey commences by referring to the memoirs of M. Mirbel on *Marchantia*, &c., and the accompanying note of Mr. Griffith; to M. Lindenberg's Monograph of *Ricciæ*; and to the several publications of Bischoff, Von Mohl, Gottsche and Fitt on the development of the spores of various cryptogamic plants. He briefly describes the development of the little green cellular body found within the pistillidium which becomes the capsule of *Marchantia polymorpha*, and states that from the facts observed and from analogy he is inclined to believe that the young capsule is at first formed of a continuous cellular substance, and that the cells of this tissue become parent-cells, producing new cells within them, which they set free by becoming dissolved, exactly as occurs in the production of the parent-cells of the pollen-grains in the continuous cellular tissue of anthers. M. Mirbel does not appear to have examined the contents of the capsules until this complete separation of the cells had taken place, when he describes them as consisting of minute elongated cells (the young elaters) mingled with small squarish cells (the

spores). But Mr. Henfrey found the younger capsules to contain elongated cells alone, and those of two sizes. The whole cavity was filled by such cells apparently radiating from the centre; the narrower cells being interposed between much longer and broader cells of the same form. The former were the young elaters, the latter the parent-cells of the spores.

The young elaters Mr. Henfrey describes as elongated slender tubes attenuated towards each extremity, and filled at first with an almost colourless coagulable protoplasm. After a short time starch globules are seen within them, which might readily be mistaken for the rudiments of the spiral fibre; but the author believes that the accounts given by some writers of the formation of spiral fibre in spiral vessels from rows of minute granules are incorrect, and have arisen from observation of starch granules lying in rows often running obliquely across the tubes. After a greater enlargement in the length than in the diameter of these cells the starch granules and finally the protoplasm disappear, and faint streaks denoting the nascent fibres are at length visible upon the walls. These gradually become more and more distinct, until in the mature elaters they present themselves in the form of strong flattened bands. In *Marchantia* there are two fibres, the ends of which are confluent at the extremities of the tubes in which they are contained; so that more properly speaking there is but one endless fibre twisted upon itself, which may be represented by a piece of string doubled with its ends united, and twisted spirally upon itself. This is evidently the best possible condition of structure for its purpose of acting as a spring. In unrolling, the fibre tears up the membrane of the walls of the tube, which after the elaters have been discharged is often no longer to be detected.

While the elaters are passing through these stages the larger elongated cells exhibit a very remarkable series of changes, which Mr. Henfrey regards as differing from anything that has yet been observed in analogous structures. They are at first filled, like the elaters, with a delicate colourless protoplasm, in which float exceedingly minute granules, and which is apparently the same substance that occurs in all young cells which increase by self-division. These larger cells soon exhibit transverse streaks of a lighter colour, in consequence of the separation of the protoplasm into a number of distinct portions, and the formation of cross membranes at these places, dividing the tubular cell into a row of cells, all of a square form except the two terminal ones which are attenuated towards the free point. The author could not determine whether the septa were

formed by gradual growing in of the membrane, nor could he detect at this period a double membrane, which must, however, exist, to admit of the subsequent separation of the contained cells. Vertical septa are often formed in addition, producing a double row of cells within the tube. About the time when the cells separate from each other, their contents undergo a change, which exactly resembles that which occurs in the contents of the parent-cells and special-parent-cells of pollen when the formation of free cells is about to take place in their interior. The mucilaginous matter, or protoplasm, acquires a deep yellow colour, becomes much thicker, and exhibits a quantity of globular bodies which look like drops of oil. Mr. Henfrey gives his reasons for regarding these appearances neither as drops of oil nor as vesicular cavities, but as globular drops of the yellow protoplasm. Such globules are of various sizes and sometimes occupy half the cavity of the cell, but neither before nor after their formation was the author enabled to detect the presence of nuclei.

Soon after the separation of these cells their yellow contents exhibit lighter streaks running across, which denote that they are each about to separate into four portions. When these portions are completely isolated and become coated by their proper membranes, they constitute the spores, and are subsequently set free by the solution of the membrane of the parent-cells. Their contents then again become clear and almost colourless, their membrane becomes thickened and of a bright yellow colour, and finally their cavity becomes filled with globules of pretty regular size. No trace of septa dividing the parent-cells into chambers, such as are met with in the special-parent-cells of the pollen, were observed, even when treated with iodine; and when the parent-cells in which the contents had parted into four portions were ruptured at one place, all the contents passed out and the membrane remained as a simple sac. In the ripe spore the author could distinguish only a single coat, which grows out into a tube at one point in germination. During this process the entire spore with its contents becomes colourless, the yellow colour and the globules disappearing; and after a short time chlorophyll vesicles appear, which, on the application of iodine, are seen to be imbedded in a coagulable, colourless protoplasm.

In conclusion, the author again directs attention to the striking circumstance, that throughout the whole course of development he met with no nuclei; neither did he observe nuclei during the development of the spores of *Sphaerocarpus terrestris*, which he had also partially traced. Sometimes the globular bodies before alluded to

as formed in the yellow protoplasm presented appearances which might be mistaken for nuclei; but careful investigation always led him to believe that these appearances were deceptive; and as he obtained clear and well-defined views of all the various stages with fully sufficient magnifying powers to see nuclei if present, he states that he is compelled to deny their existence here.

A series of illustrative figures accompanied the paper.

December 4.

T. Horsfield, M.D., V.P., in the Chair.

The Meeting having been specially summoned to supply the vacancy in the Council caused by the death of the Bishop of Norwich, and to elect a President in his stead; the Vice-President in the Chair opened the business of the day, and the votes having been taken for a Member of Council, Charles Morgan Lemann, M.D., was declared to be elected into the Council.

The ballot for President having also closed, Robert Brown, Esq. was declared to be elected President.

December 18.

Robert Brown, Esq., President, in the Chair.

The President nominated Thomas Horsfield, M.D., Sir William Jackson Hooker, William Yarrell, Esq., and Nathaniel Wallich, M.D., to be Vice-Presidents for the remainder of the year.

A letter was read, addressed to the Secretary by John Hogg, Esq., F.L.S., giving an account of a double variety of the Field Scabious, *Scabiosa arvensis*, L. (*Knautia arvensis*, Coult.), a specimen of which he presented to the Society. The specimen was gathered in a stubble-field at Norton in the county of Durham on the 29th of September, and was the only one seen with a double flower, all the other plants in the field presenting the ordinary flower of the species.

The doubling consists in the enlargement of the inner florets to the same size as the outer ones in the ordinary flowers; but the anthers and stamina of the former do not appear to have become abortive as in the outer enlarged florets, and as might have been expected from the similar change in the corolla. In Hooker's 'British Flora,' the species is characterized by the corolla of its outer florets having unequal and of its inner florets equal segments: in this double variety the segments of the inner florets are unequal like those of the outer.

Mr. Westwood, F.L.S., exhibited a small branch of a *Nelis d'hiver* pear grown against a wall in the garden of Mr. Wilmot, Isleworth, covered with a great number of large, solid, woody, gall-like protuberances caused by the punctures of a species of *Aphis* closely allied to the American blight, the twigs in this branch having been completely stunted in their growth, and not exceeding an inch in length, the energy of the tree having been concentrated in the growth of the protuberances. Mr. Westwood pointed out the difference between the real galls (sometimes quite hard and woody in their texture) caused by the punctures of insects and the deposition of eggs, and these pseudo-galls which did not enclose eggs, but were the result of the punctures of the proboscis of insects for obtaining an immediate supply of food. The latter are of great rarity, and Mr. Westwood had never seen any which could be compared in extent to the specimen exhibited, which was moreover covered with a whitish powder discharged from the bodies of the *Aphides*, and with a great number of the skins shed by them during their transformations.

Read a further continuation of Mr. Huxley's Memoir "On the Anatomy of the *Diphyidæ*," &c.

January 15, 1850.

R. Brown, Esq., President, in the Chair.

Ronald Campbell Gunn, Esq., Joseph Milligan, Esq., Ralph Barnes Grindrod, M.D., John Dalston Jones, Esq., and Christopher Rice Mansell Talbot, Esq., M.P., were elected Fellows.

No. XLII.—PROCEEDINGS OF THE LINNEAN SOCIETY.

Read a Paper "On the Economy of a new species of Saw-fly." By John Curtis, Esq., F.L.S. &c. &c.

This species, which belongs to the genus *Selandria*, was taken by Lord Goderich in his father's garden at Putney, where its larvæ were first observed in July 1846, on the Solomon's Seal (*Convallaria multiflora*, L.?). When first noticed, Lord Goderich states, they had almost consumed the entire membrane of the leaves, and many of them were feeding on the stalks; and in a short time after they had eaten the plant nearly to the ground, leaving only the stronger branches, but not destroying the plant itself. The number on one small plant was full a hundred; and the next year, and again in 1848, they reappeared in equal numbers. In 1849 their numbers were fewer. Mr. Curtis gives a detailed description of the caterpillar, which on the 28th of June (when many of them had cast their last skins, which remained sticking to the leaves) were nearly $\frac{3}{4}$ of an inch in length. They disappeared in succession, burying themselves from 2 to 4 inches deep in the earth, where they formed small oval cocoons like a coating of glue, but often perforated in different places. On the 30th of April in the last year, Mr. Curtis succeeded in breeding a male fly; another male and two females were hatched on the 3rd of May; and these were succeeded by several more of the latter sex. They were as black as ink, and appear to be allied to *Selandria fuliginosa*, Schrank, but the male antennæ approach those of *Cladius*. A full description of both sexes is given, and the species is named by Mr. Curtis after its discoverer, *Selandria Robinsoni*.

The paper was accompanied by drawings, illustrating the structure of the insect; and was concluded by some remarks on the characters and affinities of the genus *Selandria*. Although the elongated antennæ of the species described resemble those of *Nematus*, and still more those of *Cladius*, it is not only distinguished from those genera by its divided marginal cell, but the heavy habit of the females especially and the characters of its trophi, which are intermediate between *Athelia* and *Tenthredo*, indicate the groups to which it is naturally allied. The author regards the number of discoidal cells in the inferior wings as furnishing good characters for the distinction of the genus *Selandria* into sections as follows:—

1. With two discoidal cells, the marginal cell receiving one transverse nervure.—Example *S. serva*, Fabr.
2. With both transverse nervures united with the marginal one.—Example *S. stramineipes*, Klug.
3. With one discoidal cell.—Example *S. Robinsoni*.
4. With no discoidal cell.—Example *S. fuliginosa*, Schrank.

And he further observes that the variations in the position of the nervures, and in the magnitude of the cells, will also be found very useful in identifying the species.

February 5.

William Yarrell, Esq., V.P., in the Chair.

The Rev. George Capel, James Buckman, Esq., and Walter Tebbett, Esq., were elected Fellows.

Mr. Gould, F.L.S., exhibited specimens of the male and female of a new species of *Menura* from the Richmond River, New South Wales, and pointed out the distinctions between it and the original species. He named the new species *M. Alberti*, in grateful acknowledgement of the patronage which he had received from H.R.H. Prince Albert. He also exhibited a specimen of a new and remarkable Crustaceous animal from the same locality.

Dr. Wallich, V.P.L.S., communicated, by desire of Prof. von Martius, President of the Royal Bavarian Botanical Society of Regensburg, an official copy of an Address presented by that Society to Robert Brown, Esq., on his election to the Presidency of the Linnean Society.

Read the conclusion of Mr. Huxley's paper "On the Anatomy of *Diphyes*, and on the Unity of Composition of the *Diphyidæ* and *Phy-sophoridæ*," &c.

Mr. Huxley, whose communication was written at sea, commences his memoir by a brief abstract of previous investigations of the family of *Diphyidæ*, chiefly derived from the works of Lesson and Will, in the absence of other books of reference. Of all the authors referred to, he observes, there is not one except Will, who has given any but a very superficial account of the family. So far even as the natorial organs are concerned, it is but rarely that a description is sufficiently detailed and accurate not to fit two or three species with equal ease, while the minute internal organs have fared still worse. By all, the important fact of the gemmiparous generation of these

animals is overlooked ; by all, except Will, the demonstration of the generative organs is omitted, and even he mentions with some doubt the male sac only ; and lastly there is no attempt made by any of them to trace the various organs through their development, or to establish on the ground of anatomy the natural affinities of the group. To these latter points, Mr. Huxley states, that his attention has been chiefly directed during a voyage of some months through the South Atlantic and Indian Oceans, in the course of which he has examined several genera both of *Diphyidæ* and *Physophoridæ*, with as much care and attention as the inconveniences of ship-board would permit. The results are given under the following sectional divisions, viz. : 1. a description of the different species examined ; 2. their anatomy ; and 3. a comparison of *Diphyidæ* and *Physophoridæ*. Under the first head Mr. Huxley describes four species of *Diphyes*, one of *Calpe*, one of *Eudoxia*, one of *Aglaisma*?, and one of *Rosacea*. He then enters at length into the anatomy of the different parts of the body, under the several heads of the common tube ; the natatorial organs and the duct connecting their cavities with the common tube ; the nuclear piece or bract and its sacculus ; and the polypoids, each consisting of a stomachal sac, a prehensile organ and a generative organ. Although generative sacs were found by the author in all the genera examined by him, it was only in *Eudoxia* and *Aglaisma* (?) that he procured unequivocal evidence, by the presence of ova, of their real nature. No unequivocal male organs were observed, although the so-called "entozoa" of Will were frequently seen swimming about in the cavity of the young generative organs. But they were not more abundant in these situations than in the stomachal sacs, common tube, &c., and their dissimilarity to true spermatozoa is too great for any conclusions to be founded on their presence. The total absence of male sacs, and the rarity of ova in the females, may, Mr. Huxley thinks, be accounted for by the season during which his investigations were carried on, the months of March, April, May and June being the winter of the Southern Hemisphere. Lastly, the author enters on the comparative anatomy of various species of *Physophoridæ*, by means of which he believes it to be satisfactorily demonstrated that there exists a unity of organization between the two families of *Diphyidæ* and *Physophoridæ* ; and concludes by stating his opinion that *at least* two other families, the Hydriform and Sertularian Polypes, should be arranged with them in one natural group. The structural coincidences in these families he enumerates as follows : 1. body composed of two membranes, out of which the organs are modeled ; 2. thread-cells universally (?) pre-

sent; 3. gemmiparous generation; 4. sexual generation, spermatozoa and ova being formed in vase-like external sacs.

The paper was accompanied with a series of illustrative drawings.

February 19.

William Yarrell, Esq., V.P., in the Chair.

The Rev. James Bedingfeld was elected a Fellow.

Read some Notices and Anecdotes of John Christian Daniel von Schreber, chiefly derived from the 'Erinnerungen aus meinen neunzig-jährigen Leben.' By Dr. Ernst Wilhelm Martius. Communicated by Dr. Wallich, V.P.L.S. &c. &c.

Read also extracts from two Letters of the First President of the Society, Sir James Edward Smith, to J. Dryander, Esq., V.P.L.S., dated in 1792 and 1802. Communicated by the President.

March 5.

William Yarrell, Esq., V.P., in the Chair.

Dr. Wallich, V.P.L.S., read the following extract of a letter from Prof. Lehmann, dated Hamburg, 14th December, 1849:—"I write to inform you that a work has just appeared, namely Proceedings of the Fifth Meeting of Scandinavian Naturalists held at Copenhagen 1847. Copenhagen, 1849. 8vo. There is in it a very remarkable paper by Liebmann, entitled 'A few words concerning the Impregnation of *Cycadæa*,' p. 501 *seq.* It appears, according to this paper, that in that family ripe and vegetative fruits may be produced, without the process of impregnation. A female plant in the Botanic Garden at Copenhagen (males do not exist in Europe) produced seeds which have germinated! Liebmann made the same observation in Mexico."

Read also a paper entitled, "Further observations on the habits of *Monodontomerus*, with some account of a new *Acarus*, *Heteropus ventricosus*, a parasite in the nests of *Anthophora retusa*." By George Newport, Esq., F.R.S., F.L.S. &c. &c.

Mr. Newport remarked that as some of the details of a paper on "certain *Chalcididæ* and *Ichneumonidæ*" read to the Linnean Society in March 1849 had drawn forth at that time the dissent of some entomologists, he had repeated his observations during the past summer, and on one occasion had obtained as many as *two hundred and forty-seven* larvæ of *Monodontomeri* from the nests of *Anthophora*. In every instance these parasites had fed on the bee larva *from without*, and had drained it of its contents in the same way that the larva of *Paniscus* drains that of the body of a caterpillar, thus proving the correctness of his original statement, that the *Monodontomeri* are *external* and not *internal* feeding parasites. He had originally been led to this view, *not*, as erroneously stated by Mr. Westwood in the printed Proceedings of the Linnean Society for May 1849, p. 37 (Annals and Mag. Nat. History, Oct. 1849, p. 288), from the simple fact that the author had found the bodies of these parasites covered with an armature of hairs, but as he had explicitly stated in his former paper, from the circumstance that he had never found hairs on the bodies of *internal* feeding parasites. Mr. Newport also found, as he formerly mentioned, some remains of the destroyed bee larva in each cell, but no "yellow dust or granules," as stated by another observer. Thus his more recent observations have confirmed those which he formerly communicated to the Society on the *Monodontomeri*.

Having however collected a quantity of these larvæ for further observation, he was surprised to find at the end of a few days that their bodies were covered with multitudes of what at first appeared like microscopic drops of fluid, which each day increased in size, until at length he found, on careful examination, that those supposed drops were the bodies of multitudes of gravid parasites, which infested and ultimately destroyed the larvæ of *Monodontomerus*, as these had done that of the bee. The œconomy of this microscopic parasite was then traced to some extent, and the fact of their having attained a mature state proved in the circumstance that at the end of about three weeks many of them produced multitudes of extremely minute young, which differed from their parents only in the smaller size, and in having no enlargement of the abdominal portion of the body. These young were smaller even than the young of *Stylops*, as each measured only *sixteen thousandths* of an inch in length. The

author stated other facts connected with the œconomy of this singular parasite, and mentioned that he is still engaged in its investigation. The following are the characters and description of this new *Acarus*.

Class ACARI.

Family SARCOPTIDES, Koch.

Genus *Heteropus*, Newp.

Corpus elongatum, subarticulatum. *Caput* mobile. *Thorax* a trunco distinctus, ad latera corpusculis clavatis munitus. *Pedes anteriores* palpiformes; *reliqui* (parium trium posteriorum) æquales, arcuati, attenuati, tarsis gracilibus 4-articulatis, articulo terminali lato vesiculari.

H. VENTRICOSUS, pallidè ferrugineus, capite saturatiore, prothorace paribus 2 pilorum longorum, pedibus subrobustis; articulis omnibus longè pilosis: tibiæ articulo apicali corporis dimidium æquante.—Long. $\frac{1}{8}$ — $\frac{1}{6}$ lin. ♀ gravidæ abdomine magnoperè inflato vesiculari.

Hab. In postibus intra nidos *Anthophoræ retusæ*, apud Gravesend, in Comitatu Kent.

March 19.

Robert Brown, Esq., President, in the Chair.

Grantham Robert Dodd, Esq., jun., was elected a Fellow.

Read some Notes written by Mr. Seemann, the Botanical Collector for Kew Garden, in the Voyage of H.M.S. Herald. Communicated by Sir W. J. Hooker, F.R.S., V.P.L.S. &c.

April 2.

Robert Brown, Esq., President, in the Chair.

Read the commencement of a memoir "On the family of *Triur-riaceæ*." By John Miers, Esq., F.R.S., F.L.S. &c.

April 16.

Robert Brown, Esq., President, in the Chair.

Read the conclusion of Mr. Miers's memoir "On the family of *Triuriaceæ*."

Mr. Miers commences his paper by a reference to his establishment of the genus *Triuris* in the 19th volume of the Society's 'Transactions,' and to the subsequent publication in the same volume by the late Dr. Gardner of another nearly related genus under the name of *Peltophyllum*; but the name of the latter having been derived from a leaf accompanying the specimen which Mr. Miers shows not to have belonged to it, but to be in all probability that of a seedling *Cissampelos*, he has found it necessary to substitute another generic name, and has redescribed it in the following terms:—

HEXURIS, Miers.—*Peltophyllum*, Gardn.

CHAR. GEN. Flores dioici. Masc. ignoti. Fem. Perianthium profundè 6-partitum, hyalinum, persistens; laciniis obovatis, præfloratione valvatis, singulâ infra apicem cornu subulato duplò longiore gyrato incluso, demùm patentibus, marginibus reflexis. Ovaria indefinitè numerosa, minima, densissimè in gynæcium aggregata, sessilia, gibboso-ovata, 1-locularia, 1-ovulata. Stylus subulatus, ad faciem internam sublateralis, apice paulùm incrassatus, obliquè truncatus et stigmatosus. Fructus ignotus.—Planta pusilla, Brasiliensis, diaphana, albida; rhizomate fibroso; caule recto, simplici, v. subramoso; foliis bracteiformibus, paucis, basilaribus, ovatis, acutis, adpressis, hyalinis; floribus solitariis v. sabracemosis; pedunculis unifloris, basi bracteatis.

Hexuris Gardneri, Miers.

Peltophyllum luteum, Gardn. in Linn. Trans. xix. p. 157. t. 15.

Hab. in arenosis humidis Prov. Goyaz Brasilæ, Gardner, no. 3570.

The author next refers to two Ceylonese plants described by Capt. Champion in the Calcutta Journal of Natural History for April 1846, with a note by Dr. Gardner, who was at the time much struck by their resemblance to *Triuris* and his own *Peltophyllum*; but both gentlemen recognizing the manifest affinity of the Ceylonese plant to *Sciaphila* of Blume, and misled by the position in *Urticeæ* assigned to that genus by Dr. Blume, concurred in placing them in one or other of the divisions of that great natural group. Of these two genera Mr. Miers adopts the one, *Hyalisma*, as sufficiently distinct; but the second, *Aphyllia*, he refers without hesitation to *Sciaphila*, together with two undescribed plants from Sir W. J. Hooker's her-

barium, found respectively by Cuming in the Philippine Islands, and by Purdie in Venezuela. He also corrects with much detail the descriptions of the embryo of the latter given by Mr. Champion and by Dr. Gardner. The following are his characters of *Sciaphila* and of *Hyalisma*, together with those of the known species:—

SCIAPHILA, Blume.—*Aphyllia*, Champ.

CHAR. GEN. *Flores* monoici, v. polygami. *Perianthium* in utroque sexu 6-partitum; laciniis oblongis, acutis, reflexis, æstivatione valvatis, persistentibus. *Masc. Stamina* 6, in hermaphroditis abortu 3–1, in androphorum carnosum ferè sessilia; *filamenta* brevissima; *antheræ* transversim oblongæ, 4-loculares, apice rimâ transversali 2-valvatim hiantes. *Fem. Ovaria* plurima, in gynæcium carnosum subglobosum densè aggregata, obovata, sessilia, 1-locularia; ovulo solitario erecto. *Stylus* lateralis ferè basalis, plus minusve papilloso-subciliatus. *Stigma* truncatum, papilloso-plumosum, rarè simplex obtusum. *Carpidia* plurima, densissimè aggregata, obovata, styli basi persistente notata, monosperma. *Pericarpium* utriculare, subtenuè, papilloso-rugosum, suturâ dorsali hians. *Caryopsis* obovata, brevistipitata: *endocarpium* arilliforme, 8–10-costatum, costis basi apiceque confluentibus, transversim cancellatis, interstitiis membranaceis. *Semen* ovatum, basi apiceque endocarpio adhærens: *testa* testacea, striis paucis longitudinalibus aliisque creberrimis transversis signata, apice saturatiùs colorata: *integumentum externum* pelliculare, reticulatum, testæ adnatum; *integumentum internum* tenuissimum, areolis hexagonoideis magnis oblongis reticulatum, nucleum arcuè cingens. *Nucleus* (Embryo protoblastus) indivisus, homogeneous, carnosus-cereus, opalinus, cellulosus; cellulis parvis, subglobosis, materie grumosâ succoque oleoso farctis.—*Herbæ pusillæ, utriusque hemisphæræ indigenæ, hyalinæ*; rhizomate fibroso; caule simplici, erecto vel subramoso; foliis paucis, bractei-formibus, alternis, ovatis, acutis, adpressis, venis destitutis, celluloso-rugosis; floribus spicatis, monoicis, superioribus ♂, inferioribus ♀; pedunculis unifloris, basi bracteatis; bracteis foliis conformibus.

1. *Sciaphila tenella*, “tenuissima carnosâ aphylla, scapo simplicissimo erecto, floribus mutantibus, perigonii laciniis reflexis apice villosiusculis, stigmatibus sessilibus punctiformibus, baccis pluribus glandulis pellucidis tectis, semine subtriquetro, testâ subcoriaceâ.”

Sciaphila tenella, Blume, *Bijdr.* p. 515.

2. *SCIAPHILA MACULATA*, hyalina, caule simplici, foliis bractei-formibus adpressis lineis interruptis rubris maculatis, perianthii laciniis sublanceolatis reflexis apice intùs barbatis alternis margine ciliatis, floribus inferioribus staminibus 3 cassis (?), carpellis densissimè congestis, utriculo hiante.

Hab. in Insulis Philippinis, Cuming, no. 2088.

3. *SCIAPHILA PICTA*, hyalina, caule subramoso erecto flexuoso, foliis brac-

teiformibus maculis longis rubris pictis, perianthii laciniis oblongis acutis patentibus rubro-maculatis apice intùs barbatis alternis sublterioribus ciliatis; tubo laciniarumque basi lineis punctatis violaceis creberrimis ornatis, floribus (an semper?) hermaphroditis, carpellis plurimis densissimè supra discum carnosum congestis staminibus 2 v. 1 munitis.

Hab. in Venezuela, ad fl. Apure, a cl. *Purdie* lect. Octobr. 1845. (Herb. Hooker., exemplar unicum.)

4. *Sciaphila erubescens*, hyalina tenerrima, foliis bracteiformibus bracteisque acutis rubro-pictis, floribus punctis rubris maculatis, perianthii laciniis æqualibus oblongis acutis glaberrimis reflexis, flor. superioribus ♂ inferioribus ♀ interdùm hermaphroditis, staminibus 3 cassis (?), utriculo bivalvi.

Aphyllia erubescens, *Champ. in Calc. Journ. Nat. Hist.* vii. p. 468.

Hab. in Insulâ Ceylon, ad Narawalle, prope Galle, in sylvis umbrosis.

HYALISMA, Champ.

CHAR. GEN. *Flores* monoici, v. dioici. *Perianthium* in utroque sexu 8-partitum; laciniis lanceolatis, æqualibus, patentibus, celluloso-rugosis, basi in urceolam coalitis, æstivatione valvatis, persistentibus. *Masc. Stamina* 4, in androphorum carnosum prominulum ferè sessilia, laciniis alternis opposita; *filamenta* brevissima; *antheræ* 4-loculares, peltatæ, apice lineâ transversâ bivalvatim hiantes; *pollen* sphæricum simplex. *Pistilli* rudimentum nullum. *Fem. Stamina* nulla. *Ovaria* plurima, (50–60) densissimè in gynæcium carnosum liberum aggregata, obovata, 1-locularia; *ovulo* unico erecto. *Stylus* ferè basilaris, ovario 3–7-plò longior, subulato-filiformis, celluloso-articulatus, apice subobtusum, stigmate inconspicuo. *Carpidia* plurima, utricularia, obovata, breviter stipitata, structurâ omninò *Sciaphilæ*.—Herba *Ceylonica*, *pusilla*, *hyalina*; rhizomate *fibroso*; caule *simplici*, *erecto*; foliis *bracteiformibus alternis*, *ovatis*, *acutis*, *venis destitutis*, *celluloso-rugosis*; *spicâ terminali*; floribus *pedicellatis*, *sæpissimè dioicis*, *interdùm monoicis*, *et tunc superioribus ♂ inferioribus ♀*; *pedicellis unifloris*, *basi bracteatis*.

Hyalisma ianthina, *Champ. in Calc. Journ. Nat. Hist.* vii. p. 466 cum icone.

Hab. in Insulâ Ceylon, prope Galle, in sylvis humidis.

To these plants Mr. Miers adds the following, described from specimens recently sent from Parà by Mr. Spruce.

SORIDIUM, Miers.

CHAR. GEN. *Flores* monoici. *Perianthium* in utroque sexu 4-partitum; laciniis ovatis, acutis, patentibus, celluloso-rugosis, æstivatione valvatis, persistentibus. *Masc. Stamina* 2, supra discum minimum inclusum ferè sessilia, laciniis alternis opposita; *filamenta* brevissima; *antheræ* transversim elongatæ, compressæ, 4-loculares, rimâ verticali longitudinaliter 2-valvatim septucidè hiantes; *pollen* globosum, irregulariter subtrivalvatim rumpens. *Ovaria* plurima, in capitulum densè aggregata,

obovata, sessilia, 1-locularia; ovulo solitario erecto. *Stylus* lateralis, ferè basilaris, pilis longis clavatis plumosus. *Stigma* obconicum, truncatum, piloso-plumosum. *Carpidia* plurima, baccata, radiatim aggregata, obovata, stylo persistenti basilari notata, monosperma. *Pericarpium* siccum, subcoriaceum. *Semen* ovale; *testâ* coloratâ nucleoque omnino *Sciaphilæ*.—Herba *Amazonica*, in *uliginosis umbrosis indigena, hyalina*; rhizomate substolonifero, *radiculas hinc inde emittente*; caule *simplici erecto*; foliis *paucis, bracteiformibus, alternis, ovatis, acutis, venis destitutis, celluloso-rugosis*; floribus *spicatis, superioribus ♂, inferioribus ♀*; pedunculis *1-floris, basi bracteatis*.

SORIDIUM SPRUCEANUM, Miers.

Hab. prope Parâ Brasiliæ, ad Caripi, in sylvis umbrosis.

Having concluded the description of these remarkable plants, which he gives in much detail, Mr. Miers proceeds to observe on their affinities. They evidently belong to one common group with *Triuris*, which the author originally suggested would form the type of a distinct order (*Triuriaceæ*), subsequently adopted by Dr. Gardner, under the name of *Triuraceæ*. He first dismisses without hesitation the hypothesis that they have any relationship to *Menispermaceæ* or *Smilaceæ*, as suggested by Dr. Gardner with reference to *Hexuris*; or to any section of *Urticeæ*, to which *Sciaphila* was referred by Dr. Blume, and in which he was followed by Endlicher and Gardner. He commences his investigation by calling particular attention to their habit as plants destitute of real leaves; composed of little more than cellular tissue; void of green colour, of fibres and of ducts; and furnished with a seed not merely acotyledonous, but without distinct embryo. He refers to Mr. Brown's memoirs on *Rafflesia*, and to Mr. Griffith's on the plants referred to *Rhizantheæ*, for instances of inembryonal seeds; and observes that we have no satisfactory evidence of the existence of an embryo, in the ordinary sense of the term, in *Burmanniaceæ*. He notices also the imperfect condition of the embryo in *Cuscuta*, in *Orobancheæ* and in *Monotropa*; and the striking discrepancy between the well-developed cotyledonous embryo of the leaf-bearing *Cacteæ* and the solid and undivided embryo of the leafless genera of that family. Admitting then, in *Triuriaceæ*, *Burmanniaceæ*, *Balanophoreæ*, &c., the existence of an organ endowed with the function, but wanting the usual structure, of the embryo, he proposes for this organ the name of *protoblastus*, with the view of distinguishing between a *protoblasteous* and a *cotyledonous* embryo. Modifications of the protoblasteous structure may occur; and the author refers to *Ceratophyllum* and to several genera of *Aroideæ* (especially *Cryptocoryne*) as furnishing instances of ano-

malous forms of embryo, which are best explained by a reference to this view of the subject. He also notices some peculiarities in the structure of the seed of *Pistia*, which he regards as in some points analogous to that of *Sciaphila*, although widely different from it in others.

Setting aside then the Acotyledonous embryo as a character of primary importance, and regarding it only as an imperfect condition of development, common to all the great divisions of the vegetable kingdom, it is evidently among the *Endogens* that *Triuriaceæ* should take their place, and the author concludes that upon the whole the greatest amount of approximative characters leans towards *Fluviales*. He then gives the characters of the order and its subdivisions as follows:—

TRIURIACEÆ, *Miers* (1841). Triuraceæ, *Gardn.* (1843). Triuridaceæ, *Lindl.* (1846).

CHAR. ORD. *Herbæ* parvulæ, subhyalinæ; *rhizomate* fibroso, interdum substolonifero; *caule* subsimplici, texturâ cellulosâ, vasis deferentibus in axi centralibus; *foliis* alternis, bracteiformibus, sessilibus, nervis destitutis. *Flores* monoici, v. dioici, rariùs polygami, spicati; *pedicellis* alternis, 1-floris, basi bracteatis. *Perianthium* in utroque sexu 3-4-6-8-partitum, hyalinum, texturâ celluloso-bullatâ, v. papilloso-rugosâ; laciniis ovatis, acutis, basi in tubum brevissimum coalitis, apice interdum processu elongato donatis, æstivatione valvatis. *Stamina* numero varia, pauca, in fundo perianthii ferè sessilia, supra androphorum sæpissimè magnum carnosum inserta; *antheræ* 4-loculares, 2-valves, rariùs in lobos 2 sejunctæ. *Ovaria* plurima, in gynæcium toro adnatum densissimè aggregata, 1-locularia; *ovulo* unico, e basi erecto. *Stylus* excentricus, introrsum lateralis, sæpissimè ferè basilaris, glaber aut plumoso-fimbriatus. *Stigma* obsoletum, v. truncato-clavatum. *Carpidia* plurima, baccata, excentrica, obovata, stylo persistente ferè basilari notata, coriacea et indehiscentia, v. interdum utricularia dorso valvatim dehiscentia; *caryopside* obovatâ, telâ arillæformi donatâ; *testâ* ovatâ, durâ, testaceâ, coloratâ, transversim scalariformi-striatâ. *Nucleus* (embryo protoblasteus) opalinus, integumento areolis elongatis reticulato inclusus, texturâ mollis, cellulosus; cellulis materie oleosâ grumosâ fartis.—Triuriaceæ in locis humidis umbrosis sylvarum inter-tropicarum Asiae et Americae epigeæ.

1. TRIURIEÆ. Perianthii laciniæ appendice lineari, æstivatione spiralter tortâ et inclusâ, demum exsertâ, munitæ. Stylus cum ovario gibboso lateraliter continuus. Antherarum lobi disjuncti, singuli 2-locellati.

Perianthii laciniæ 3. Stamina 3 1. *Triuris*.

Perianthii laciniæ 6. Stamina ignota 2. *Hexuris*.

2. SCIAPHILEÆ. Perianthii laciniæ ecaudatæ. Stylus ferè basilaris. An-

therarum lobi confluentes et inde 4-locellati, rimâ transversali v. verticali bivalvatim hiantes.

Perianthii laciniæ 4.	Stamina 2	3. <i>Soridium</i> .
Perianthii laciniæ 6.	Stamina 6	4. <i>Sciaphila</i> .
Perianthii laciniæ 8.	Stamina 4	5. <i>Hyalisma</i> .

May 7.

R. Brown, Esq., President, in the Chair.

M. Alphonse DeCandolle, and Asa Gray, M.D., were elected Foreign Members.

The President exhibited a leaf of the Victoria Water-lily, obtained by him from the stove of the Duke of Northumberland at Syon Park, where the plant is now flowering freely, and made some observations on the characters and affinity of the genus.

Read a letter, dated May 19, 1845, addressed by the President to Admiral Sir Francis Beaufort, for communication to Baron Alexander von Humboldt, "On the Origin and Mode of Propagation of the Gulf-weed." The letter is as follows:—

"My dear Captain Beaufort,

"I am vexed to have kept Baron Humboldt's letter so long, and now in returning it, that it should be accompanied by so little satisfactory information on the only one of its queries with which I could have been supposed to deal, namely that which relates to the origin and mode of propagation of the Gulf-weed.

"On this subject it appears that M. de Humboldt (in his Personal Narrative) first supported the more ancient notion, that the plant, originally fixed, was brought with the stream from the Gulf of Florida, and deposited in what Major Rennell calls the recipient of that stream. More recently, however, Baron Humboldt has adopted the opinion*, also held by several travellers, that the Gulf-weed originates and propagates itself where it is now found. To the adoption of this view it appears that he has been led chiefly by the observations of the late Dr. Meyen, who in the year 1830 passed through a considerable portion of the great band of Gulf-weed, and

* Histoire de la Géographie du Nouveau Continent, vol. iii. p. 73, and Meyen, Reise, vol. i. p. 36-9.

who ascertained, as he states, from the examination of several thousand specimens, that it was uniformly destitute both of root and fructification; he concludes, therefore, that the plant propagates itself solely by lateral branches: he at the same time denies that it is brought from the Gulf of Florida, as, according to his own observation, it hardly exists in that part of the stream near the great band, though found in extensive masses to the westward. I have here to remark that, as far as relates to the absence of root and fructification, Meyen has only confirmed by actual observation what had been previously stated by several authors, particularly by Mr. Turner (in his 'Historia Fucorum,' vol. i. p. 103, published in 1808), and Agardh (in his 'Species Algarum,' p. 6, published in 1820). But Meyen materially weakens his own argument in stating that he considers the Gulf-weed (*Sargassum bacciferum* of Turner and Agardh), and the *Sargassum natans*, or *vulgare*, specifically distinguished from it by these authors, as one and the same species; adding, that he has observed among the Gulf-weed all the varieties of *Sargassum vulgare* described by Agardh; and finally, that on the coast of Brazil he has found what he regards as the Gulf-weed in fructification. Now as *Sargassum natans* has been found fixed by a discoid base or root, in the same manner as the other species of the genus, and as according to Meyen the Gulf-weed has been found in fructification, the legitimate conclusion from his statements seems to be, that this plant is merely modified by the peculiar circumstances in which it has so long been placed. I am not, however, disposed to adopt Dr. Meyen's statement that he actually found the true *Sargassum natans*, much less all its supposed varieties, mixed with the Gulf-weed, having reason to believe that at the period of his voyage his practical knowledge of marine submersed Algæ was not sufficient to enable him accurately to distinguish species in that tribe. It is not yet known what other species of *Sargassum* are mixed with the Gulf-weed, what proportion they form of the great band, nor in what state, with respect to root or fructification, they are found; though, in reference to the questions under discussion, accurate information on these points would be of considerable importance.

“ That some mixture of other species probably exists may be inferred even from Dr. Meyen's statement, and indirectly from that of Lieut. Evans, who, in his communication published in Major Rennell's invaluable work on the Currents of the Atlantic, asserts that he found the Gulf-weed in fructification, which he compares with that of Ferns, a statement which would seem to prove merely that he had found along with the Gulf-weed a species of *Sargassum* with

dotted leaves, the real fructification of the genus bearing no resemblance to that of Ferns, though to persons slightly acquainted with the subject the arranged dots on the leaves might readily suggest the comparison.

“ With regard to the non-existence of roots in the Gulf-weed as a proof of specific distinction, it is to be observed that the genus *Sargassum*, now consisting of about sixty species, is one of the most natural and most readily distinguished of the family *Fucaceæ*, and that there is no reason to believe that any other species of the genus, even those most nearly related to, and some of which have been confounded with it, are originally destitute of roots; though some of them are not unfrequently found both in the fixed and in considerable masses in the floating state, retaining vitality and probably propagating themselves in the same manner (see Forskal, Fl. Ægypt.-Arab. p. 192, n. 52). It is true indeed that a *Sargassum*, in every other respect resembling Gulf-weed, has, I believe, not yet been found furnished either with roots or fructification, neither Sloane’s nor Browne’s evidence on this subject being satisfactory*. But the shores of the Gulf of Florida have not yet been sufficiently examined to enable us absolutely to decide that that is not the original source of the plant: and the differences between the Gulf-weed and some other *Sargassa*, especially *S. natans*, are not such as to prove these two species to be permanently distinct. The most remarkable of these differences consists in the leaves of the Gulf-weed being uniformly destitute of those dots or areolæ so common in the genus *Sargassum*, and which are constantly present in *S. natans*. These dots, in their greatest degree of development, bear a striking resemblance to the perforations or apertures of the imbedded fructification in the genus. But as the receptacles of the fructification, as well as the vesicles, are manifestly metamorphosed leaves; and as the production of fructification is not adapted to the circumstances in which the Gulf-weed is placed, it is not wholly improbable, though this must be regarded as mere hypothesis, that the propagation by lateral branches, continued for ages, may be attended with the entire suppression of these dots.

“ That the Gulf-weed of the great band is propagated solely by

* See Sloane’s Jam. i. p. 59. I have examined Sloane’s specimens in his Herbarium; they belong to Gulf-weed in its ordinary form, and are alike destitute of root and fructification; hence they are probably those gathered by him in the Atlantic, and not those which he says grew on the rocks on the shores of Jamaica. Browne’s assertion to the same effect is probably merely adopted from Sloane.

lateral or axillary ramification, and that in this way it may have extended over the immense space it now occupies, is highly probable, and perhaps may be affirmed absolutely without involving the question of origin, which I consider as still doubtful.

“ My conclusion, therefore, is somewhat different from that of Baron Humboldt, to whom I would beg of you to forward these observations, which will prove that I have not been inattentive to his wishes and to your own, though they will at the same time prove that I have had very little original information to communicate.”

Read also “ Notes on the Dry-rot, as observed in the Church of King’s Wear, Devonshire.” By A. H. Holdsworth, Esq. Communicated by the President.

The church of King’s Wear is immediately opposite to Dartmouth, and stands about 100 feet above the harbour, on the north-west side of a very steep hill, which rises 200 feet above it. The walls of the old church having become unsafe, the whole of it was taken down except the tower at the north-west angle, to which a new church was attached, standing within the site of the old one, and the new building was completed about two years ago. From the north and south doors eastward the ground rises rapidly, and an area is formed round the church to preserve it from damp; from the same doors to the westward the ground falls far below the level of the floor within. The floor and ground beneath the old church were removed and the graves filled up. The new seats, which were open, rested on oak-sleepers, supported by new dwarf walls, the floors of the seats being about sixteen inches above the ground; but the earth on which the paving of the aisles or passages was laid was as high as, and rested against the sleepers on, the dwarf walls. The other parts of the seats were of Baltic deal. Good limestone masonry was used in the construction of the walls; the pillars and windows were made of stone from France; and the aisles were paved with closely-jointed fine black slate.

Within a few months after the completion of the church a fungus was observed at the seat at the corner immediately behind the south door, and soon after decay appeared in other seats near it. Fresh passages for air were made through the walls running under the seats, but in a few months these were filled with a species of vegetable matter looking like fine mould. This was found to spread under the whole of the seats to the west of the south door, and successively affecting those to the eastward of the same door and those

of the centre of the church, but always that part which adjoined the aisle or passage. A suspicion arose, from taking up some of the stones of the aisles, that there was a plant which had its origin near the south door, which crossed under the paving of the aisles, and travelled along the sleepers and framing of the seats, causing all the mischief; and a thorough investigation was determined on. On taking down some of the seats, a fungus was found having some of its branches as large as straws, and others as fine as horse-hair, spreading out under the floors of the seats in the very finest fibres, breaking into forms resembling the finest leather, and wherever it obtained a good supply of air by means of an air-channel, becoming half an inch thick, attached on one side to the dry floor, and having on the other side a spongy surface, fitted for the collection of moisture from the atmosphere; for although the floor was perfectly dry, the fungus by which it was eaten out was as wet and cold as a sponge filled with water. The seat next the south door was removed; its framing was entirely decayed, and beneath it was found a root-like portion of the fungus descending nearly perpendicularly to the depth of sixteen inches. In the north aisle the seats were not affected, and it was presumed that they had not been reached by the fungus; but on taking up the paving-stones of that aisle, it was found to have approached within a foot of the reading-desk, growing from the seats of the opposite side of the aisle in the form of a semicircle increasing gradually on all sides.

Mr. Holdsworth is convinced that one plant, beginning near the south door, was the cause of all the mischief; when, however, the whole of the paving of the aisles was removed, other plants were found spreading in a fine film under it in a circular form, and six or eight inches in diameter; and these, when carefully taken up, were seen to have a stem in the centre running two inches or more into the ground, and usually attached to a bit of decayed wood. Thus the habit of the plant appears to be to travel on through grooves or under pavements, and in other concealed places, where it can find wood on which to feed, and which it renders dry and of a character as if destroyed by fire. Mr. Holdsworth exhibited dried specimens of the fungus in various states, which he has presented to the British Museum.

May 24.

Anniversary Meeting.

R. Brown, Esq., President, in the Chair.

This day, the Anniversary of the birth of Linnæus, and that appointed by the Charter for the election of Council and Officers, the President opened the business of the day, and the Secretary read the following notices of those Members who had died since the last Anniversary.

William Townsend Aiton, Esq., one of the oldest Members of the Society, having been elected a Fellow in 1797, was the eldest son of William Aiton, gardener to the Princess Dowager of Wales, mother of King George the Third, and was born on the 2nd of February 1766. When seven years old he was sent to the school of Dr. Rose at Chiswick, and after remaining there for six years he was removed to that of the Rev. W. Smith at Camberwell, where he continued for two years and a half. At the close of his school education he was placed under his father, who was appointed in 1783 Superintendent of the forcing and pleasure gardens at Richmond and Kew, and he had thus ample opportunities of becoming a practical gardener and botanist, and of pursuing his studies as a landscape gardener, the profession for which he was destined, and in which he attained much skill and eminence. In this capacity he was employed by the Earl of Chesterfield, Lord Boston, Sir William Ashton, Lord Harrowby, the Earl of Powis, Lord Palmerston, the Hon. E. Greville, Lord Heathfield, Sir F. Drake, Sir H. Stracey, H.R.H. the Duke of Kent, and many other noblemen and gentlemen. On the death of his father in 1793, he was appointed to succeed him in the Royal gardens at Kew and Richmond; and like his father, he was highly esteemed by King George the Third, to whom his own early abode at Kew Palace, together with the subsequent appropriation of it as a residence for his children, had rendered that garden a favourite place of resort. To his intercession on behalf of his friend William Forsyth, that he might succeed his father as gardener at Kensington Palace, the King replied that the place was already disposed of; and on his return home he found a letter, written in the King's own hand, appointing him to the duties of gardener at Richmond, Kew and Kensington, and his brother John gardener at Windsor Castle and the Great Park. He was also honoured with the kind notice

and regard of Queen Charlotte, and of the Princes and Princesses of the Royal Family, and in particular by the Duke of Kent, who kept up a confidential correspondence with him to the time of his death. On the accession of King George IV. Mr. Aiton was not only continued in all his appointments, but received the Royal command to make the new garden at the Pavilion at Brighton, and also that of Buckingham Palace, in the arrangements connected with which, together with the various alterations made in the Conservatory, Cottage Garden, Virginia Water, the Castle Garden and Slopes, and the extensive plantations of the Royal domain at Windsor, he was long and actively engaged. In connexion with these duties, he was named by the Royal warrant Director-General of all the Royal Gardens and Plantations. Soon after the accession of William IV., in consequence of the great changes which took place in the establishments of the Royal Gardens, Mr. Aiton retired on the charge of the Botanic Garden and Pleasure Grounds at Kew, which he retained till 1841, when they too were voluntarily resigned by him after a service of nearly fifty years. Among the remarkable men with whom he was in habits of kindly intimacy were Dr. Pitcairn, John and William Hunter, Cruickshanks, Sir W. Farquhar, Sir D. Dundas, and Sir E. Home; and he was also on friendly terms with the poet Cowper, whose biographer, Hayley, regarded him with affectionate esteem, as evinced in many of his letters and verses, and by the dedication of Cowper's posthumous poem on the Yardley Oak. In the years 1810-13 he published a second edition of his father's '*Hortus Kewensis*,' in 5 vols. 8vo. In this and all his botanical undertakings he constantly received the most friendly encouragement and assistance from Sir Joseph Banks; and as in the first edition the botanical matter had been supplied by Dr. Solander and Mr. Dryander, so in the second the general superintendence and the complete elaboration of several important families and genera were the work of Mr. Dryander and Mr. Brown. From the period of his final retirement Mr. Aiton led a tranquil life, still continuing to occupy the house in which he was born, and which was built expressly for his father by King George the Third, but passing much of his time with his brother at Kensington. He enjoyed in general good health and spirits, notwithstanding that his pulse seldom reached to 50; but finding himself unwell in the beginning of last October, he became desirous of being entirely with his brother and under his roof; here he gradually became weaker till the morning of the 9th October, when without apparent bodily suffering he calmly breathed his last, being then in the 84th year of his age.

Sir David James Hamilton Dickson, Knt., M.D., F.R.S.Ed. &c., was the youngest son of the Rev. George Dickson, Minister of Bedrule in Roxburghshire. He entered the Navy as Surgeon's Mate in 1795, was promoted to the rank of Surgeon in 1798, and to that of Physician of the West India Fleet in 1806. In 1813 he was superintending Physician of the Russian Fleet then lying in the Medway, and afterwards received the order of St. Wladimir from the Emperor Alexander in acknowledgement of his services. His public services in the British Navy were in various climates; and he accompanied the expeditions to Holland in 1799 and to Egypt in 1801, and was present at the capture of the French and Danish islands in the West Indies, and in the expedition to the Chesapeake, New Orleans, &c. He was appointed Physician of Plymouth Hospital in 1824, and in 1840 his designation was changed to Inspector of Hospitals, that of Physician having been abolished in the naval service by order in Council. He published various professional papers in the medical journals, was knighted in 1834, and died at Stonehouse on the 2nd of January, in the 70th year of his age, having been elected into the Linnean Society in 1816.

Edward Doubleday, Esq., was descended from a respectable Quaker family long resident at Epping, and was born on the 9th of October 1810. In common with his brother Henry he early attached himself to the study of Natural History, to which he became wholly devoted. In 1832 he commenced a series of contributions to the 'Entomological Magazine,' in which, during the six following years, he published a great variety of notes and memoirs on entomological subjects. In 1837, in company with Mr. Foster, also a member of the Society of Friends, he took a voyage to America, and visited, in the course of a tour of nearly two years, almost all the States of the American Union. His communications to the 'Entomological Magazine' during this period bear date from Trenton Falls, Philadelphia, Louisville, Shawnee Town, from which he ascended the Mississippi to Pera, proceeding thence to Chiago on Lake Michigan, and by steamer across the Lakes of Michigan, Huron, St. Clair and Erie to Niagara, whence he returned to Trenton Falls, and then proceeded south to New York, Baltimore, Washington, Charlestown, Jacksonville, St. John's Bluff, Savannah, and the Warm Springs of North Carolina. His collections, which were very extensive, and consisted chiefly of insects, but were by no means limited to that class, were most liberally distributed by him after his return to England. He subsequently applied for permission to accompany the ill-fated expedition to the Niger, from which,

however, he was happily dissuaded; and in 1841 he was appointed one of the Assistants to the Zoological Department of the British Museum, where his attention was chiefly directed to the Lepidopterous Insects of the National Collection, which contains one of the finest and most extensive series of specimens in that department of Entomology that has ever been brought together. Since this period he has communicated numerous papers to the 'Annals of Natural History,' to the 'Entomologist,' the 'Zoologist,' and the 'Phytologist'; to the 'Transactions' of the Entomological Society and the 'Proceedings' of the Zoological. The second part of the twentieth volume of the Linnean Transactions contains a memoir by him, "On the genus *Argynnis* of the 'Encyclopédie Méthodique,' especially in regard to its subdivision by characters drawn from the neuration of the wings," in which he lays the foundation of a more complete and systematic classification of Butterflies on the principle indicated than had before been attempted. Besides these scattered memoirs he drew up a complete "List of the Diurnal Lepidoptera" in the Collection of the British Museum, and commenced in 1848, in conjunction with his friend Mr. Hewitson, the publication of a magnificent work entitled 'The Genera of the Diurnal Lepidoptera,' which he continued nearly up to the period of his death, but which, it is greatly to be regretted, he did not live to complete. In the summer of last year he was attacked by an obscure disease, which proved (on examination after death) to be a fungous tumour attacking and destroying the vertebræ of the loins and pressing upon the spinal cord; and after suffering, for several months, the most excruciating pain, as well as a complete paralysis of the lower extremities, he died on the 14th of December last, in the fortieth year of his age. He became a Fellow of the Linnean Society in 1843, and had long been an active Member of the Entomological Society, of which, for the last two years of his life, he was Secretary. His knowledge of Systematic Entomology was extensive and profound; his acquaintance with the literature of the science very considerable; and the large share of general information which he possessed, together with his readiness in communicating it to others, acquired him great and deserved esteem.

Mr. Newman has kindly supplied the following list of his contributions to the 'Entomological Magazine,' the 'Entomologist,' the 'Zoologist,' and the 'Phytologist,' many of which were anonymous, and could therefore have been indicated only by Mr. Newman himself.

In the 'Entomological Magazine':—

“Abstract of M. Straus-Durckheim’s *Considérations Générales sur l’Anatomie comparée des Animaux Articulés*,” i. 1, 277, 466 ; ii. 121. The first of these was published in September 1832, the last in April 1834.

“Review of *Sphinx Vespiformis*, an essay by Edward Newman,” i. 44 ; published September 1832.

“Capture of *Aspidophorus orbiculatus*,” i. 85. September 1832.

“Larva of *Cræsus septentrionalis*,” i. 313. April 1833.

“Metamorphosis of *Aleyrodes*,” i. 313. April 1833.

“Notes on the Habits, &c. of Insects,” by DELTA:—i. 385, “On the Economy of a Solitary Bee, *Chelostoma florissomne*, and its parasite *Chrysis cyanea*; also *Osmia bicornis*, and *Lampronia capitella*, a microlepidopterous insect that is very injurious to currant bushes:” i. 466, containing, amidst much miscellaneous information, a description of the larva and economy of *Nonagria Typhæ*: ii. 44, “On the Geographical Distribution of Insects,” and ii. 280, the same paper continued and concluded: ii. 451, concluding the history of *Nonagria Typhæ*, a valuable note on raising the larva of *Meloë* from the egg, and some observations on *Stylops* and other insects. The first of these papers was published in July 1833, the last in January 1835.

“Exposure of the Fallacy of the Septenary System in Natural History,” i. 434 ; published in October 1833, under the signature D D.

“Note on the genus *Castnia*,” i. 517.

“Moths swallowed alive by a *Caprimulgus*,” i. 519.

“Notes on a Review in the Athenæum of Mr. Swainson’s Preliminary Discourse on the Study of Natural History,” iii. 98.

“Remarks on the Entomology of Epping and its vicinity,” iii. 147, 283 ; published July 1835 and October 1835.

“Note on one of the Fossorial *Hymenoptera*,” iii. 413 ; published January 1836.

“Note on *Medeterus loripes*.”—*Ibid.*

“Note on *Phytomyza flava*.”—*Ibid.*

“Note on *Melolontha Tutto*.”—*Ibid.*

“Some Scraps by the Author of the Delta Letters,” iv. 106 ; published October 1836. This paper relates to a “Plague of Ants” which occurred in St. Domingo and Porto Rico during the years 1519–21. The paper consists principally of a translation from Oviedo.

“Communications on the Natural History of North America,” v. 21, 199, 269, 402 and 409 ; being extracts from Letters written

during his tour in North America, commencing October 1837 and ending October 1838.

In the 'Entomologist':—

"Characters of three new genera of *Notodontidæ*," p. 55; published February 1841.

"Remarks on some new North American *Lepidoptera*," p. 95; published April 1841.

"*Sympetrum rubicundum*," p. 159; published August 1841.

"Description of a new North American *Polyommatus*," p. 209; published November 1841.

"Description of a new Lepidopterous Insect," p. 297; published May 1842.

In the 'Zoologist':—

"Notes on the occurrence of Alligators in East Florida," p. 41; published in January 1843.

"Notes on Lepidopterous Insects," i. 109, 197; May and July 1843.

"Capture of *Stauropus Fagi*," p. 199; July 1843.

"Note on the capture of *Claviger foveolatus*," p. 200; July 1843.

In the 'Phytologist':—

"Note on the occurrence of *Lilium Martagon* in Essex," i. 62.

In this paper the author advocates the *naturalness* of the habitat he records for this plant, arguing that there is no ground for supposing the plant a garden escape.

Charles Lyell, Esq., of Kinnordy, in the county of Forfar, and a Vice-Lieutenant of the County, was the only son of a father of the same names, and was born on the 7th of March 1767. He was educated first at St. Andrew's and afterwards at Cambridge; and after passing many years in England, he retired in 1826 to his paternal estate, where he continued to reside until his death, which took place on the 8th of November in the last year. During his residence in England Mr. Lyell attached himself to the study of Botany, and more especially of British plants; and the dedication to his name of a genus of Mosses, by our President, and in our 'Transactions,' is the best evidence of the estimation in which his botanical acquirements were held. He also cultivated an intimate acquaintance with the mediæval literature of Italy, and in particular with that of Dante and his contemporaries, and published several editions of the Lyrical Poems of that author, with English translations, and an Essay on his Anti-Papal Spirit, which has been translated into Italian by Polidori. Mr. Lyell has left behind him an extensive

botanical library. He became a Fellow of the Linnean Society in 1813; and his eldest son, Sir Charles Lyell, is also a distinguished Member of our body.

Donald Mackinnon, M.D., became a Fellow of the Linnean Society in 1816, and died at his residence in Norland Square, Notting Hill, on the 10th of last June.

Edward, Lord Bishop of Norwich, late President of the Society, was born on the 1st of January 1779. He was the younger of two sons of the late Sir John Thomas Stanley, Bart., of Alderley Park in the county of Cheshire, his elder brother having been raised to the Peerage in 1839 by the title of Baron Stanley of Alderley. His earlier education was received at the Grammar School of Macclesfield; first under Dr. Inglis, who subsequently became head master at Rugby, and afterwards under the late Dr. Davies. The bent of his own inclination was early manifested towards the sea-service; but the strong objections of his parents prevailed over the aspirations of his active and energetic spirit, and it was decided that he should enter the Church. He became a Member of St. John's College, Cambridge, and took a high degree as B.A. in 1802. In 1805 he obtained his degree of M.A., and in the same year he was presented by his father to the Rectory of Alderley, which he filled for more than thirty years. In this capacity his unwearied activity, his zeal for every benevolent object, his exertions for the education of his parishioners in particular, and for the cause of education in general, his frequent and kindly visits to the poorer classes, and his liberal and conciliatory disposition towards all, justly earned for him the character of an exemplary parish priest. When nominated to the see of Norwich in 1837, such had been the influence of his example as well as of his teaching, that he left his parish with scarcely a dissenter; and left it (as is well known) with reluctance, to enter on the cultivation of the wider field to which he was unexpectedly called.

During his residence at Alderley he became warmly attached to the study of Natural History, and gave occasional lectures at the Mechanics' Institutes of Chester and Macclesfield on geological and zoological subjects. His favourite relaxation was the investigation of the habits of birds; and his 'Familiar History of Birds,' in two vols. 12mo, 1835, of which a new edition appeared in 1847, affords abundant proof of the extent of his acquaintance with the manners of the feathered tribes. At the same time he was an occasional contributor to the pages of the British, Blackwood's, and other Magazines, among his contributions to which may be particularly

noticed his "Account of the South Stack near Holyhead," and his description of a perilous adventure, of which he was himself the subject, in the "Mauvais Pas" of the Valais of Switzerland, from the MS. communication of which Sir Walter Scott derived the opening scene of "Anne of Geierstein." He also wrote an interesting account of the condition of Western Ireland, and of the Island of Achill in particular, which he visited for the purpose of personal inspection during a period of severe distress. His other published works, for the most part given to the world after his elevation to the Episcopal Bench, consist of Sermons, of Charges to his Clergy, of Speeches in the House of Lords, and of pamphlets on religious and educational subjects, in all of which he exhibited a liberal tolerance for the opinions, and a conciliatory forbearance for the feelings of those from whom he differed.

In 1811 he married Catherine, daughter of the Rev. Oswald Leicester, Rector of Stoke-upon-Terne in Shropshire, by whom he has left three sons and two daughters. The eldest of the sons, Captain Owen Stanley, R.N., inheriting his father's predilection for the naval service, was a Lieutenant in Captain Sir George Back's Expedition to the Arctic Regions, served subsequently under Sir Edward Belcher in the South Seas, and has been engaged since 1846 as Commander of the *Rattlesnake*, in effecting a survey of Torres Straits, New Guinea, and the adjacent coasts, from which naturalists have already derived, and still hope to derive, much interesting information.

In his diocese the late Bishop has left behind him a character universally respected and esteemed, about 260 of his clergy having been present at his funeral. As a singular proof of his disinterestedness in the administration of his high functions, it is stated by Dean Pellew, in his sermon on that occasion, that out of the numerous vacancies that occurred during the twelve years of his residence in the diocese, not one had been filled by a relation or family connexion.

The late Bishop became a Fellow of the Linnean Society in 1828, and was chosen, on the resignation of the Duke of Somerset in 1837, his successor to the office of President. In this room it is quite unnecessary to speak of the manner in which he fulfilled the duties of that office; for the benevolence of his disposition, the frankness of his manners, and the warm enthusiasm of his temper, have made too deep an impression on all those who were in the habit of witnessing them to be readily or speedily effaced. Had the graver duties of his ecclesiastical station permitted, his love of science would

unquestionably have impelled him to devote a considerable portion of his time to the pursuit of Natural History, and this Society in particular would have benefited largely by the increased attention which he would have been enabled to dedicate to the advancement of its interests. Our warm and grateful acknowledgements are so much the more especially his due, that he contrived, amid the many and weighty calls of his high office, to appropriate so much of his time and energies to the promotion of the objects of the Linnean Society, in whose affections his memory will long survive. Many other societies have lost in him a valuable member. He became a fellow of the Royal Society in 1840; and was from the first an active supporter of the British Association for the Advancement of Science, and of the Archæological Institute, the members of which will not fail to remember the kind and hospitable reception which they met with at his hands during their meetings in the chief city of his diocese. He took much pleasure and interest in such peripatetic meetings; and it had been his practice for many years to devote about six weeks of every summer to a tour in pursuit of healthful relaxation, not unfrequently in connexion with some scientific object. His death took place on one of these excursions on the 6th of September last, after a few days' illness, terminating in congestion of the brain, at Brahan Castle near Dingwall, in the north of Scotland. His remains were placed on board a steamer at Invergordon, and conveyed by sea to Yarmouth, whence they were removed to Norwich and interred in the centre of the nave of the Cathedral on the 21st of the same month, amid the general mourning of the city and of the diocese.

Louis Hayes Petit, Esq., M.A., F.R.S., F.S.A., F.G.S., Vice-Pres. R.S.L., F.R.A.S. &c., was descended from an ancient family in Normandy, his great grandfather having come to England on the revocation of the Edict of Nantes. His father practised as a physician in Marlborough Street, where he was born on the 9th of November 1774. He was educated at Queen's College, Cambridge, where he took his degree of B.A. in 1796, and M.A. in 1799, and was called to the Bar in 1801. For some years he was a distinguished member of the Oxford Circuit, but quitted the practice of his profession in 1821, and sat in Parliament for the borough of Ripon from 1827 to 1832. From 1802 to the time of his decease he resided uninterruptedly at No. 9 New Square, Lincoln's Inn, where he occupied himself with literary pursuits, and collected a library unusually rich in philology, and of great value in other departments. His kindness of disposition, his cheerfulness and hospitality, and that benevolence of heart which

led him to take an active interest in, and to contributively largely to, many of our public charitable institutions, secured him the warm attachment of a numerous circle of friends. He was unmarried, and died on the 13th of November last, a few days after the completion of his 75th year. His election into the Royal Society took place in 1807, and into this Society in 1810.

Anthony Todd Thomson, M.D., Fellow of the Royal College of Physicians, was educated at Edinburgh, where his father held an appointment in the Post Office. On the establishment of the London University he was named the first Professor of *Materia Medica* in that Institution, to which, after the retirement of Dr. Gordon Smith, he added the duties of Professor of Forensic Medicine. As a lecturer he obtained great and deserved reputation; and his extensive knowledge of the *Materia Medica*, together with his acquirements in chemistry and botany, peculiarly fitted him for the professorship which he so long and ably filled. His principal publications were his 'Conspectus of the Pharmacopœias of the London, Edinburgh and Dublin Colleges,' 12mo, 1810, which in 1845 reached its fifteenth edition; 'The London Dispensatory,' 8vo, Lond. 1811, of which a tenth edition was published in 1844; and 'Elements of *Materia Medica* and Therapeutics,' 2 vols. 8vo, Lond. 1832-1833, which reached a third edition in 1843. But besides these greater works, which are manuals of reference to almost every practitioner of medicine, he published a multitude of dissertations on professional subjects, either separately, or in the *Medico-Chirurgical Transactions*, and in the various medical journals, as well as several contributions to polite literature, which he successfully cultivated through a long and useful life. Previously to taking his degree, he pursued his profession in London as a general practitioner, and gave lectures on botany, of which in 1822 he commenced the publication under the title of "Lectures on the Elements of Botany, Part I., containing the Descriptive Anatomy of those organs on which the growth and preservation of the Vegetable depends," vol. i., 8vo; but of this, his only strictly natural history publication, no further portion appeared. He died at Ealing on the 3rd of July last, at the age of 71, having been a Fellow of the Linnean Society since 1812.

Two important losses have also been sustained in the *Foreign* list of the Society.

Henri-M. Ducrotay de Blainville, a profound zoologist and comparative anatomist, was born at Arques, in the Department of the Seine-Inférieure, about the year 1778. At an early age he went to Paris, where he attended the lectures of Cuvier, and acquired the

taste for natural history which he pursued to the last with undiminished ardour. He became Suppléant to Cuvier at the Jardin des Plantes and at the Collège de France, and was soon afterwards named Professeur-Adjoint of Zoology, Anatomy and Comparative Physiology, at the Faculté des Sciences. In 1810 he took the degree of Doctor of Medicine; in 1825 he was elected a Member of the Institute; and on the death of Cuvier, in 1831, he succeeded to the Chair of Comparative Anatomy at the Jardin des Plantes. During his long career he published a multitude of memoirs and separate works, which have contributed largely to the progress of zoological science. His earlier memoirs appeared in the 'Journal de Physique,' in the 'Journal de la Société Philomathique,' and in the 'Annales' and 'Mémoires du Muséum,' and embrace the study of a great number of animals of almost every class. Of his separate works the most important are his 'Prodrome d'une Nouvelle Distribution Systématique du Règne Animal,' 1816; 'Principes de l'Anatomie Comparée,' 1822; 'Manuel de Malacologie et de Conchyliologie,' 1826; and 'Ostéographie Comparée,' a magnificent work not yet completed. In comparative anatomy he seems to have taken for his model Vicq-d'Azir, several of whose unfinished works he completed; and his views, always more or less original, and not unfrequently involving bold hypotheses, indicate a lively imagination as well as the possession of extensive knowledge of his subject. All those who have attended his lectures bear testimony to the copious flow of his ideas, to which a clear and lucid mode of expression gave the most agreeable form, and which were further illustrated by his ready use of the pencil, all contributing to render his class extremely popular. He was found dead at one of the stations of the Paris and Rouen Railway on the night of the 1st of May, while on his way to England, which he had several times visited. He became a Foreign Member of the Linnean Society in 1827, and was also on the Foreign List of the Royal Society, to which he was elected in 1832.

Karl Sigismund Kunth was born in Leipzig on the 18th of June 1788, and educated until the age of sixteen in the free school of his native city, where he exhibited an early inclination towards natural history, and acquired the protection and favour of the celebrated anatomist Rosenmüller, who afforded him opportunities of improvement as an anatomical draughtsman. In 1805 he entered the College of St. Thomas; but the death of his father having deprived him of the means of pursuing his studies, he obtained in 1806, through the influence of an uncle, an appointment in the naval administration at Berlin. Averse, however, to so mechanical an em-

ployment, he sought and found in Baron Alexander von Humboldt a patron, who gave him the means of attending the natural history courses of the University of Berlin. In 1813 he published his first botanical work, 'Flora Berolinensis,' of which a second and enlarged edition was published in 1838. After the death of Willdenow, he undertook the arrangement and publication of the very extensive collections of plants made by Humboldt and Bonpland in Equinoctial America. For this purpose he took up his abode in Paris from 1813 to 1819, engaged chiefly in the preparation of his principal work, 'Nova Genera et Species Plantarum,' in seven vols. folio, Paris 1815-25; of which he also published a 'Synopsis,' in five vols. 8vo, Paris 1822, &c. During the same period he completed Bonpland's 'Plantes Equinoxiales,' and 'Melastomées,' and published a Monograph of the "Mimoses et autres Plantes Legumineuses" of the same countries. To these at a later period he added a Monograph of the Grasses of Tropical America, in two vols. fol. Paris 1829-33. These elaborate works, containing together descriptions of 6000 species, and figures in folio of 1000, for which he himself drew the anatomical details, established his character as a descriptive botanist, and secured for him an extensive reputation. In 1819 he returned to Berlin, where he was appointed Professor of Botany, and Vice-Director of the Botanic Garden. In 1829 he became a Member of the Academy of Sciences of Berlin, and he was also a Correspondent of the Botanical Section of the Academy of Sciences of the Institute of Paris. He visited London in 1830 as the representative of the Berlin Herbarium, to assist in the distribution of the great East Indian Herbarium, of which this Society, through the munificence of the East India Company, and under the auspices of Dr. Wallich, possesses the type collection. For many years past he had occupied himself in the preparation of a general systematic work, of which six volumes have appeared under the title of 'Enumeratio Plantarum omnium hucusque cognitarum,' Berlin 1833, &c. He is also the author of numerous papers in the 'Annales des Sciences Naturelles,' and in the 'Mémoires de l'Académie Royale de Berlin.'

As a systematic botanist M. Kunth deservedly enjoyed a high reputation. His descriptions are copious, minute and accurate, and his analyses carefully and clearly executed. By his important publications connected with the journey of Humboldt and Bonpland, he contributed more than any other botanist to our knowledge of the plants of Equinoctial America; and on these publications his fame will chiefly rest. He died at Berlin in the month of March in the

present year. His election as a Foreign Member of the Linnean Society dates from 1825.

At the election which subsequently took place, Robert Brown, Esq. was re-elected President; William Yarrell, Esq., Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the Council in the room of others going out, viz. Professor Edward Forbes, Edwin Lankester, M.D., Edward Newman, Esq., William Spence, Esq., and Sir George T. Staunton, Bart.

Among the presents announced were the following:—

An Oil Portrait, by Maguire, of the late President, the Bishop of Norwich; presented by J. S. Bowerbank, Esq., F.R.S., F.L.S. &c., in the name of the subscribers.

Lithographed Portraits of Robert Brown, Esq., Professor Ansted, Professor Bell, the Dean of Westminster, John Curtis, Esq., Charles Darwin, Esq., Professor Edward Forbes, Professor Lindley, Sir Charles Lyell, and the present Bishop of Norwich; all presented by George Ransome, Esq., F.L.S. &c. &c.

June 4.

Robert Brown, Esq., President, in the Chair.

Read a "Notice of a peculiar Structure of the Cells on the surface of *Callitriche verna*." By E. Lankester, M.D., F.R.S., F.L.S. &c.

The peculiar cells described by Dr. Lankester were found by him in the summer of 1849 on the stems of a specimen of *Callitriche verna* preserved in a glass vessel with other water plants. They project from the surface of the plants, are of a stellate form, and consist of a central cell surrounded by six or eight others. They are easily detached from the epidermal tissue, and may thus readily be procured for microscopic examination. They vary in size as well as frequency, and are not confined to the stem, but occur also on the leaves; and Dr. Lankester is inclined to believe that they are most abundant in the younger states of the plant. In the first stages

of their growth they are to be distinguished from the surrounding cells only by their peculiar arrangement; but as the development proceeds, the epidermal (including these stellate) cells contain a smaller proportion of chlorophyll than those under and above them on either side of the leaf, and become gradually freer from cell-contents, until at last they appear perfectly clear. In other water plants, such as *Lemnæ*, *Potamogeta*, &c., Dr. Lankester had not succeeded in detecting any similar bodies. As regards their function, he states, that it at first occurred to him that they might perform the office of stomata; but he was unable to discover any orifice among the cells, or any communication with intercellular spaces below them. In their structure and general arrangement they bear a closer resemblance to certain modifications of hairs than to any other epidermal organs; and the author considers it not improbable that they are the result of the same tendency of the epidermal tissue under water as that which produces hairs when this tissue is exposed to the influence of the atmosphere.

The paper was accompanied by drawings of the stellate bodies, with details of their structure and composition.

Read also the commencement of a paper entitled "Observations on the Botany of Texas." By William Bollaert, Esq., F.R.G.S. &c. Communicated by R. H. Solly, Esq., F.R.S., F.L.S. &c.

June 18.

Robert Brown, Esq., President, in the Chair.

The President exhibited portions of trunks of Winter's Bark Trees from the Straits of Magellan, cut down in 1826 by Captain P. P. King, R.N., offering inscriptions made through the bark by a midshipman who accompanied the Spanish expedition under Captain Cordoba in 1786, and by one of the companions of Captain Bougainville in 1767; the annual rings in the former case distinctly corresponding with the interval between 1786 and 1826. He also made some observations on the structure of the woody vessels of the genus.

Mr. Adam White, F.L.S., exhibited several elaborate drawings by Mr. P. H. Gosse, A.L.S., representing various species of *Rotifera*

found in the neighbourhood of London, and stated that Mr. Gosse had confirmed the opinion which Cuvier entertained in regard to the true position of the *Rotifera*, and that they have no connexion with the *Radiata*, by his observations on their internal structure, and especially by the presence of mandibles, maxillæ and maxillary palpi. The drawings exhibited the development of *Stephanoceros Eichhorni* from the egg to the adult state, as also that of the males of *Asplanchna Brightwellii* and a species of *Brachionus*. Mr. White added, that in 1843 at least, Professor Milne-Edwards was also aware, from the researches of Ehrenberg, of the true division of the animal kingdom to which the *Rotifera* belong. He further stated his own belief that the so-called *Acarus folliculorum*, Simon (Demodex, Owen; Entozoon, Wilson), and probably also *Tardigradus*, are parasitic *Rotifera*, with legs or leg-like appendages adapted to their peculiar habits; and that their retractile antenna-like subtelescopic appendages may have eyes passing through them as in the snails, and may also be the equivalents of the *rotæ*, but from the limited, or rather the absolutely restricted, power of motion of these animals, having neither the ciliary processes nor the movements and economical uses of the appendages so characteristic of most of the *Rotatoria*.

Read a paper "On the Structure of the Fruit in *Punica*." By H. F. Hance, Esq., Ph.D. Communicated by Mr. Wm. Pamplin, A.L.S.

Mr. Hance's observations were made chiefly on double flowers, exhibiting several varieties of monstrosity, obtained from a plant growing in his garden at Hong Kong, and compared with the normal state. He refers to the opinions of Mr. Griffith and Dr. Wight, and agrees with the latter in considering the pistillum as compound, many of the double flowers distinctly exhibiting the imperfect cohesion of the carpodia, and the styler laminae being even in some instances quite separate to the very summit. His own explanation of the remarkable disposition of the cells of the fruit of the Pomegranate is given in the following terms:—"The lower cells arise from a central row of carpella, the cohering apices of which constitute the diaphragm, the ovula springing from the two united margins of the same carpellary leaf, and consequently being directed towards the circumference of the ovarium; while the upper cells are formed by an exterior series of longer carpels alternate with the others, their cohering summits constituting the whole, or at all events the external portion, of the style, and the ovula are borne on the entire inner

face of the carpidia, as in *Nymphæaceæ*, the cells being in addition frequently divided by spurious septa arising from the midribs."

With respect to the affinities of the genus, Mr. Hance would certainly remove it from *Myrtaceæ*, and believes it must be viewed as an osculant genus connecting the Myrtles with *Onagrariæ* and *Lythriariæ*, and hereafter to form with other yet undescribed genera a new natural order.

In conclusion, he refers to some remarks of Mr. Griffith in a letter to Dr. Wight, which he had not met with until some time after writing his paper, in which Mr. Griffith speaks of *Punica* as belonging to an order, with *Duabanga* and *Sonneratia*, between *Myrtaceæ* and *Lythraceæ*, and describes it as being 6-7-carpellary-leaved.

Read also the conclusion of "Observations on the Botany of Texas." By William Bollaert, Esq. F.R.G.S., &c. Communicated by R. H. Solly, Esq., F.R.S., F.L.S. &c.

In this memoir Mr. Bollaert gives some account of the physical geography of the State of Texas, with notes on its geological character and mineral productions; he describes the soil and climate of its various regions; and, lastly, enters into a detailed account of its vegetable productions, describing successively the forests and forest-trees, together with the fruits, and the herbaceous plants, including the cereals, grasses and other plants useful to man, especially those cultivated either for food or ornament. Among these he enters into particular details with respect to the *Zea Mays* or Indian Corn, and a species of *Smilax* which he believes to be new, but which appears to be identical with *Smilax lanceolata*, L., and is known to the inhabitants by the name of Indian Bread. Of Maize he states the average crop to be sixty bushels per acre; and adds that a man and young boy have been known in Eastern Texas to raise and gather in one year fifteen hundred bushels from two crops. He describes a great variety of modes in which this valuable plant is turned to advantage, and gives a rough analysis of the component parts of the grain. From this it results that the starchy matter in malting takes on a saccharine character, which by fermentation produces alcohol, and independently of the carbonic acid evolved, another acid is formed, which may be either a new acid or the acetic. When the fermented liquor is allowed to stand for some days, a bright yellow oil floats to the surface, and appears to be composed of three proximate substances: viz. 1. a body like Elaine; 2. a small portion like Stearine; and 3. a substance which he calls Maizaline, which last has a decided diuretic quality, and is regarded by the author as

the cause of the diuretic effects produced by Maize-bread upon persons unaccustomed to its use. With regard to the Indian-bread, called by the Carancahua Indians *Toqui*, Mr. Bollaert states that he found it in great abundance in the pine-woods of Huntsville, lat. 31° N., long. 95° 30' W. The edible part is the root: immediately below the stem commences the formation of irregularly-shaped potato-like tubers, rather larger than the potato, and so abundant that one plant will yield two bushels. These are used by the Indians made into a sort of bread; and the pioneer, trapper and backwoodsman are frequently obliged to have recourse to it for the same purpose, and sometimes obtain from it by fermentation a liquor of a pink colour to which they give the name of beer. Of this plant, and of the mode of growth of its tubers, sketches accompanied the paper, which concludes with a notice of some of the botanists who have visited the State of Texas for the purpose of collecting plants, and with a list of the plants collected by Mr. Lindheimer in his Earlier Journey, and by Dr. Kenan.

November 5.

Robert Brown, Esq., President, in the Chair.

Robert Ellis, Esq., and William Henry Hallett, Esq., were elected Fellows.

Mr. W. W. Saunders, F.L.S., exhibited specimens and a drawing of a species of *Cyclamen* (probably *C. hederæfolium*, Dec.), found by him in the neighbourhood of Hastings; he regards it as undoubtedly wild.

Read a Paper on "The Ternstrœmiaceous Plants of Hong Kong." By Capt. Champion, 95th Regiment. Communicated by the President.

The author commences by referring to the number and beauty of the trees and shrubs of this family which are natives of India and China; and suggests that the elevation at which they are generally found, flowering in China alongside of the Azaleas which have been

so successfully introduced into England, indicates that many of them might also be advantageously cultivated here as hardy or half-hardy plants. He then proceeds to the enumeration of the species which have been found in the small island of Hong Kong.

1. *CAMELLIA SPECTABILIS*; arborea, foliis lanceolatis acuminatis glabris crenatis subtùs reticulatis, floribus solitariis (magnis albis) axillaribus et subterminalibus, sepalis coriaceis fructibusque (pomi magnitudine) sericeis.

Hab. in Insulâ Sinensi Hong Kong, in sylvis.

2. *Camellia Japonica*, *L. Sp. Pl.* 982.

Of this species Capt. Champion states that but two trees are at present known growing wild in Hong Kong; they were discovered by Col. Eyre, R.A., and are loaded in October with single pink flowers. The leaves are more elongate than in most cultivated plants.

3. *CAMELLIA SALICIFOLIA*; arbuscula, ramulis pubescentibus flexuosis, foliis subsessilibus elongato-ovatis acuminatis serratis pubescentibus, floribus parvulis (albis), sepalis acuminatis pubescentibus, capsulis glabris parvis rostratis 1-3- sæpiùs 1-spermis.

Hab. in Insulâ Sinensi Hong Kong, in sylvis.

As species this and the next are most nearly allied to *C. caudata*, Wall. A specimen of the present has recently been introduced by Mr. Braine into Kew Gardens.

4. *CAMELLIA ASSIMILIS*; frutex, ramulis glabris, foliis subsessilibus lanceolatis acuminatis serratis glabris, floribus parvulis pendulis (albis), sepalis sericeis obtusis, capsulis glabris parvis rostratis.

Hab. in Insulâ Sinensi Hong Kong, in Monte Victoria et Monte Gough.

5. *Thea Bohea*, *L.*, is cultivated in Hong Kong, but is not indigenous. As a genus Capt. Champion does not regard it as distinct from *Camellia*.

6. *EURYA MACARTNEYI*; dioica, frutescens, glabra, foliis majusculis coriaceis subellipticis margine revolutis serrulatis, floribus majusculis; ♂ staminibus 19-22; ♀ stylis distinctis revolutis, fructibus (purpureis) circiter 14-spermis.

Hab. in Insulâ Sinensi Hong Kong, in sylvis rupibusque. Floret et fructus fert Aug.-Nov.

A shrub from 6 to 8 feet high, and as a species coming near *E. elliptica*, Gardn. Specimens brought from China by Lord Macartney are in the herbarium of the British Museum.

7. *Eurya Japonica*, Thunb., and *Eurya Chinensis*, R. Br.

These two species Capt. Champion finds mixed up indiscriminately in his collection, and he believes them to be identical.

8. *PENTAPHYLAX EURYOIDES*, Gardn. & Champ.

This new and curious genus is described in Hooker's Journal of Botany, No. 8. p. 244-246.

9. *IXIONANTHES CHINENSIS*; subarborea, foliis petiolatis alternis glabris integris elongato-ellipticis apice emarginatis reticulatis, corymbis longè pedunculatis axillaribus plurifloris dichotomis, staminibus 10 longissimis, capsulis supra-uncialibus.

Hab. in Insulâ Sinensi Hong Kong, in sylvis.

Seeds of this species, which forms a small tree, sent by Capt. Champion to the Royal Gardens at Kew, have vegetated. The author states that having since compared his specimens with Jack's description of his Sumatran species (*Ixionanthes reticulata*), he feels some doubt of the distinctness of the plant of Hong Kong. It differs however in the larger size of the leaves (5 in place of 3 inches long), and will probably on comparison be found to do so in other particulars.

The paper was accompanied by drawings of *Pentaphylax euryoides* and *Ixionanthes Chinensis*, with details of their fructification.

Read also "Descriptions of two new species of *Paussidæ* from Australasia in the collection of the Jardin des Plantes at Paris." By J. O. Westwood, Esq., F.L.S. &c.

Genus CERAPTERUS.

Subgenus *Arthropterus*, MacLeay.

Cer. (*Arthropterus*) *parallelocerus*; ferrugineus, antennarum lateribus parallelis; articulo penultimo tribus præcedentibus simul sumptis longitudine exactè æquali, capite et pronoto rude punctatis; hoc capite latiori subquadrato anticè parum latiori angulis anticis rotundatis setosis, elytris tenuiter transversim punctatis punctis setigeris, tibiis anticis extùs acutè productis; quatuor posticis extùs acuminatis angulo extremo truncato.—Long. corp. lin. 5.

Hab. in Australasiâ. In Mus. Hist. Nat. Paris. (Verreaux) et Westw.

This species is most nearly allied to *C. subsulcatus*, but is broader, with the thorax more broadly quadrate, the clava of the antennæ broader and of uniform width, the elytra without any appearance of longitudinal sulci, the pronotum slightly channelled in the middle, the tibiæ broader, the head more thickly punctured, and the elytra much less setose.

Cer. (Arthropterus) brevis; nigro-piceus nitidus lævis, capite punctato, antennis latis; margine antico subrecto; margine supero vel postico serrato, prothorace cordato-truncato lineâ mediâ tenui longitudinali impressâ disco tenuissime punctato, elytris brevibus ferè lævibus nitidis, tibiis anticis apice subemarginato angulo apicali acuto; tibiis quatuor posticis apice externo obtusè rotundatis.—Long. corp. lin. 3.

Hab. in Australasiâ. In Mus. Hist. Nat. Paris. (Verreaux) et Westw. (Mossman).

November 19.

Robert Brown, Esq., President, in the Chair.

Dr. Pereira, F.L.S., exhibited a specimen in fruit of the species of *Myrospermum* which yields the Balsam of Peru and White Balsam, from the Balsam Coast, San Salvador; together with samples of both kinds of Balsam and of a new chemical principle (*Myroxocarpine*) obtained from the White Balsam.

Read the commencement of "A Memoir on the Position of the Carpels when two and when single, including Outlines of a new Method of Arrangement of the Orders of Exogens, and observations on the structure of Ovaries consisting of a single Carpel." By Benjamin Clarke, Esq., F.L.S. &c.

December 3.

Robert Brown, Esq., President, in the Chair.

John Hutchinson, Esq., and Samuel Stevens, Esq., were elected Fellows.

Read a continuation of Mr. Clarke's "Memoir on the Position of the Carpels," &c.

Dr. Adolph Schlagintweit, at the request of the President, gave a summary of some of the principal results of the investigations of himself and his brother into the Vegetation of the Alps in connexion with height and temperature, as contained in their "Untersuchungen ueber die physikalische Geographie der Alpen."

He stated that very remarkable differences are to be observed in the limits of the altitude of vegetation in the district of the Alps. In the *mean results* for large divisions, we may plainly recognize the influence of geographical position, as well as that of the nature of the soil, and of the massiveness of the mountain range. The limit in fact becomes higher the more we approach the southern and western groups, a phænomenon which is connected with the general changes of climate. The mean temperature varies in these latitudes from 0.5° to 0.7° of Celsius for one degree; and at the same time the isothermal lines show an evident inclination from west to east. Many very essential differences cannot, however, be explained by geographical position alone; another important influence is dependent on the form of the mountain-range, the limits of vegetation being generally connected with the mean magnitude of the elevation, and reaching higher in massive and lofty groups of Alps than in the lower chains. The favourable influence which the massiveness of the elevation exercises on the vegetation, is essentially the same as that which is also evidenced with regard to the temperature of the air and soil; and corresponds to the difference which is remarked between the climate of a plateau, and that of a ridge or free peak in the neighbourhood. In different valleys or on the spurs of a mountain remarkable differences in the altitude of the limit of vegetation often manifest themselves according to the exposure, the direction of the wind, or the proximity of separate and extensive masses of glacier; but these influences are for the most part merely local, and the general variations of the limit of vegetation dependent on the massiveness of different groups of Alps are but little affected thereby. A comparison of the annual isotherms with the limits of vegetation proves that the different groups of vegetation do not always terminate at *the same* annual isotherm. With the exception of the Beech, he showed that up to the height of *Conifera*, these limits in the Northern Alps are reached at warmer isotherms than in the Central Alps; and a somewhat lower mean temperature is observed on corresponding points of the group of Monte Rosa and Mont Blanc. This is immediately dependent on the fact that the growth of plants is not determined alone by the mean temperature of the year, but also by that of the seasons and of the months. The

warmth of the summer is in this view of peculiar influence ; the greater this is in connexion with the same mean temperature of the whole year, the higher plants ascend, and the colder are the annual isotherms which mark their limits. A review of all the meteorological observations made in the district of the Alps shows that in the Central Alps and in the group of Mont Blanc and Monte Rosa, the summer warmth is greater and the climate consequently more extreme than in the lower chains of the Northern Alps ; by which means the relation of the limits of vegetation to the annual isotherms in these different mountain-groups is explained.

He further stated that his and his brother's investigation of the periodical development of the vegetation at heights of from 1500 to 8000 Paris feet showed among other things that the retardation of the development by the elevation is in general less during the flowering than during the ripening of the fruit ; it amounts in the Alps during the former period to ten days, during the latter to twelve and a half, and on the average of the whole period of vegetation to eleven days. The mean temperature is diminished in general about 2° of Celsius for the same difference of height, during the period of the development of vegetation. From their own observations on the influence of height on the growth of *Coniferae*, he concluded that in *Pinus Larix*, *P. Abies*, *P. sylvestris* and *P. Cembra*, an evident diminution in the thickness of the annual rings takes place at greater elevations. A regular diminution, however, must not be expected for each degree of elevation. Not only the variations in the temperature of the air, of the soil, and in the climate generally (which concur to disturb the *Coniferae* at greater heights) produce a diminution of their yearly growth ; but the different nature of the soil has also great influence on their growth. The mass of well-decomposed earth, the presence of boulders or firm rock, the exposure of the locality, the humidity of the soil, and in some degree also its inclination, have so great an influence on the growth of the tree, and are moreover especially in the lower regions so irregularly distributed, that the influence of elevation, which should be most closely connected with the changes of climate, may be and is partially obliterated. Very frequently indeed in investigations of the geography of plants, a similar concurrence and a mutual correlation of the various causes by which the changes of vegetation are produced, are to be recognized. The observation of the progress from year to year shows that very frequently considerable variations occur in the amount of growth in separate stems. These are not, however, connected with definite years of the development, but irregularly dis-

tributed during the life of a tree. As they commonly extend over a long series of years, and do not agree in different trees for definite numbers of years, they cannot be produced by the climatic circumstances of unfavourable years. The larger oscillations of growth are dependent, on the contrary, on the nature of the soil, inasmuch as the roots during their extension meeting with more or less favourable and rocky spots, the productiveness of a tree may be essentially changed during many years.

An enumeration of all the phanerogamous plants found in the Upper Möll district (in the Tauern, in Upper Carinthia) at between 7000 to 8000 Paris feet high, and between 8500 to 10,000 feet, gave for the former region, the subnival, 224 species, for the latter, the nival, 32; while Prof. O. Heer obtained from the same regions in Glarus in Switzerland 219 and 12. Many families, as for example *Boragineæ*, *Euphorbiaceæ*, *Geraniaceæ*, *Labiatae*, *Liliaceæ*, *Stellatae*, *Umbelliferæ*, &c., compared with the lower regions and with Germany, diminish evidently and sometimes very strikingly in species in relation to the sum of *Phanerogamæ*. In some others no such regular differences are found in relation to height. A remarkable relative increase of species in connexion with increased elevation, is found in *Saxifrageæ* and *Primulaceæ*; and may also be remarked in *Campanulaceæ*, *Caryophylleæ*, *Compositæ*, *Gentianeæ*, and others. This depends, not on an absolute increase of species of these families, but on a diminution of the species of the other families. *Monocotyledones* generally diminish with height in relation to *Dicotyledones*; except that in the nival region and in the highest localities this proportion appears to be somewhat undefined. The covering of snow also is not completely universal in the high regions. In spots free from snow and furnished with earth, phanerogamous plants, as well as Mosses and Lichens, are found far above the snow-line. Among the species which are found at the extremest limits in the Central and Southern Alps, at 10,000 to 11,000 Paris feet high, are *Androsace glacialis* and *A. Helvetica*, *Cerastium latifolium*, *Cherleria sedoides*, *Chrysanthemum alpinum*, *Gentiana Bavarica*, *Ranunculus glacialis*, *Saxifraga bryoides*, *S. oppositifolia*, *Silene acaulis*, &c. &c. The extreme limit of Mosses is in general little above that of phanerogamous plants. The last Lichens are to be found on the highest summits of the Alps, attached to projecting rocks, without any limitation of height. The number of species and varieties, up to this time between 40 and 45 species, which have been found in the Alps between 10,000 and 14,780 Paris feet, is not inconsiderable, but this vegetation is limited to very few spots, surrounded by extensive masses

of snow. Among the *Lecideæ*, *Parmeliæ* and *Umbilicariæ*, collected by Saussure, Agassiz, and themselves, on the *highest localities*, Dr. Schlagintweit enumerated *Lecidea geographica*, *L. confluens*, *Parmelia elegans*, *P. varia*, *P. polytropa*, *Umbilicaria proboscidea* β . *cylindrica*, &c.

December 17.

Robert Brown, Esq., President, in the Chair.

Mr. Westwood, F.L.S., gave some account of a large wingless Bird, probably new to science, but of which no specimens have yet reached England, observed by Capt. Poole in Lord Howe's Island, in the Southern Pacific Ocean, intermediate between New Holland, Norfolk Island and New Zealand, which has been recently colonized under Capt. Poole's superintendence. The bird was described as resembling a Rail.

Read the conclusion of Mr. Benjamin Clarke's "Memoir on the Position of the Carpels when two and when single, including outlines of a new Method of Arrangement of the Orders of Exogens, and observations on the structure of Ovaries consisting of a single Carpel."

In this memoir Mr. Clarke details the results of his observations on the position of single and double carpella in reference to axis, with the view of ascertaining the mode in which the reduction of the carpella from a higher number takes place, and the value of the characters thus obtained in the formation of a natural arrangement of plants. He commences with dicarpous ovaries, in which he observes three different positions in relation to axis: 1st, *right and left*, resulting generally (as he believes to be shown by an examination of the genus *Carex* and of certain *Malpighiaceæ* and *Euphorbiaceæ*) from the suppression of a third and usually posterior carpellum, but occasionally also (as for example in *Lonicera*, *Fortunea*, *Diosma*, and probably *Cruciferæ*) from the abortion of the anterior and posterior carpella of an ovary originally consisting of four divisions; 2ndly, *anterior and posterior*, resulting in *Houttuynia cordata* from the disappearance of one of the lateral carpella and the displacement of the

other so as to become opposed to the persistent posterior carpellum ; in *Agrimonia* and *Spirea* (when dicarpous) from a similar suppression ; as also in reduced fruits of *Reseda luteola*, &c. ; 3rdly, *oblique*, which he describes as of frequent occurrence both in plants in which the carpella are generally anterior and posterior, and in those in which they are as predominantly right and left, and which he supposes to arise from the remaining lateral carpellum of a tricarpous ovary retaining nearly its original position when the other lateral carpellum has disappeared, in consequence of which the posterior carpellum is somewhat displaced, becoming obliquely posterior. He regards the single carpellum as the result of the non-development of one of the carpella of a dicarpous ovarium, and its position may consequently vary in three different ways : 1st, *anterior*, as occurs in 1-carpellary ovaries of *Myrtaceæ*, *Onagrariæ*, *Polygaleæ*, *Leguminosæ* and *Acanthaceæ*, to which may probably be added *Hippurideæ*, *Bruniaceæ*, &c. ; 2ndly, *posterior*, as in the 1-carpellary ovaries of *Houttuynia cordata* and *Piperaceæ* ; 3rdly, *lateral* or *oblique*, instances of which occur in *Moreæ*, in *Elatostemma*, and in *Celtideæ*. The normal number of carpella in all ovaries he regards as three or a multiple of three ; the additional series being frequently reduced by abortion in the same manner as the first, and thus giving rise to the formation of ovaries with four and five carpella. Tricarpous ovaries generally have their component parts placed two laterally and one posteriorly ; but exceptions to this rule occur, as for example in *Viola*, where the third carpellum is anterior, and in *Clethra*, *Pittosporum* and *Delphinium*, in which the position of the carpella varies in the same plant.

Mr. Clarke next proceeds to consider the value of the characters derived from the position of the carpella, for which purpose he has framed a large table containing the results of long-continued observations on a multitude of exogenous plants with monocarpous or dicarpous ovaries. In this table he constitutes two primary divisions, viz. *Proterocarpous*, in which the carpella when single are anterior or lateral, never posterior ; and *Heterocarpous*, in which the single carpellum is for the most part a mixture of lateral, anterior and posterior, and is rarely wholly posterior. The position of the component parts of the dicarpous ovarium also appears to be more permanent in the first than in the second division. From this table Mr. Clarke deduces various inferences in relation to the systematic arrangement of plants, and the importance of the characters derived from the position of the carpella, and more especially from that of the single carpellum, which is liable to fewer and less important

exceptions. Thus for instance he considers the posterior position of the single carpellum of *Ceratophylleæ*, corresponding as it does with that of *Piperaceæ* and their allies, and differing as far as known from that of any other order with which it could be associated, as a strong argument of affinity. He refers to the case of two-celled ovaries with unequal cells, and regards the superior development of the larger cell or of the corresponding stigma as indicative of what would be the position of the single carpellum, were the ovary to be so reduced. These remarks are followed by observations on the general character of his divisions and subdivisions, and by some notes on the position of carpella as regards endogenous plants and *Rhizanthææ*, and on the relation of didynamous stamens and carpella as regards their order of suppression; and the first part of the memoir concludes with some remarks on the difficulty of determining with precision the true axis of the inflorescence, and the means of obviating this difficulty in certain cases.

The second part of the memoir is more especially devoted to the consideration of ovaries consisting of a single carpellum, to the relations borne by this carpellum to the axis in various families referred by the author to each of his two principal divisions, and to the grounds from which this relation is deduced. This being entirely matter of detail is scarcely susceptible of analysis, but some of the incidental observations connected with it may properly be noticed here. Mr. Clarke states that in *Scleranthus annuus* the funiculus is uniformly posterior to the seed and on the same side with the cotyledons, in which character that plant differs from *Chenopodeæ* and *Amaranthaceæ*, and as far as he has been able to ascertain from *Illecebreæ*, in which the funiculus is either anterior or lateral, and the cotyledons (in pendulous seeds) on the opposite side of the seed or less frequently lateral. Of thirty-two ovaries of *Circæa alpina*, thirteen had two cells with an ovule in each, but the posterior cell constantly smaller than the anterior, in twelve the posterior cell was empty, and in seven entirely absent; and this analogy with some particularities in structure led him to regard the single cell of *Hippuris* as most probably resulting from a single anterior carpellum. He shows by a series of diagrams that the position of the fertile cell in *Valerianeæ* is always lateral and external; and observes that in the genera with an irregular corolla it always bears the same relation to the irregularity of the flower. He infers from an inferiority of development of the posterior carpellum in *Stylidium graminifolium*, that if the ovary in that genus were reduced to a single carpellum, that carpellum would be anterior; a case which he has since found to

occur in *St. adnatum*, in which there is a single anterior carpellum, or if two carpella are present the anterior only is fertile, the ovula being always attached to the posterior angle of the cell. He describes the carpellum of *Isopogon* and *Leucospermum* among *Proteaceæ* as anterior; and notes that in *Grevillea* the carpellum always alternates with the two larger sepala, but varies most extensively with reference to what he considers the axis. In *Anadenia* he states that the carpellum is always anterior in the lower half of the raceme, but varies in position towards the summit, and in rare instances is perhaps even posterior. In some species of *Acacia* also he believes that he has found instances of posterior carpella, but as the flowers were for the most part in threes, these carpella might belong to the lateral flowers. In *Pedicularis palustris* he has always found the anterior carpellum and the anterior division of the style larger than the posterior; and the same is the case with *Mendozia*, resulting in the latter instance in the suppression of the posterior carpellum in the fruit. He gives at length his reasons for regarding the carpellum as anterior in *Casuarina*, *Cannabis*, *Humulus*, *Parietaria*, *Urtica*, *Elastostemma* and *Celtis*; and he concludes his remarks on the Proterocarpous division by some observations on *Cuphea* and *Lythrum*; on *Magallana*; and on *Fumaria*.

Under the head of the Heterocarpous division he begins by recurring to the relations already mentioned as existing between *Ceratophyllum*, *Piperaceæ*, *Houttuynia* and *Chloranthus*. He then proceeds to notice *Gentianeæ*, among which he states that the dichotomous *Erythraea linarifolia* is an example of the two carpella being anterior and posterior, and infers from thence and from other variations, taken in connexion with the general statement that in this family the carpella are right and left, that their position (as in *Apocynææ* and *Loganiaceæ*, according to M. Alphonse DeCandolle) is variable. He next refers to *Broussonetia* and *Morus* and to *Stilbe*, which latter he is disposed to consider as related to *Empetreeæ* and *Euphorbiaceæ*, and then proceeds to the examination of *Cupuliferææ*, among which he finds extensive variations. He refers to *Coriaria* as agreeing with *Malpighiaceæ* in having its raphe turned away from the placenta and consequently next to the dorsal rib of each carpellum, which he describes as corresponding with the general position of the funiculus in that family. He describes the carpella of *Mirabilis* as being all lateral and internal; and again notices the peculiarities which he had before referred to in the position of the funiculus in *Chenopodeææ*, *Amaranthaceææ* and *Illecebreææ*, adding some remarks on the carpella of *Polygoneææ* and *Alsineææ*. He indicates certain cha-

acters in the flower of *Casearia* in which it approaches *Monotropa*, *Drosera*, and especially *Francoa*. In *Thymeleæ* he finds considerable variation in the position of the carpellum, and states that the relative position of carpellum and segments of perianthium is the reverse of what takes place in *Proteaceæ*, the carpellum being always opposite to one of the segments of the perianthium. The tendency to the suppression of stamens in *Thymeleæ* is also the reverse of that of *Proteaceæ*, being on the side opposite to the carpellum. In *Pimelea* and *Lachnæa* he states that the carpella are all posterior, while in *Daphne* the carpella of the two-flowered axillæ stand with their backs to each other, or more or less turned towards the stem: *Dais* is a mixture of these. Lastly, he notices various peculiarities in the ovary of *Sassafras officinale*, in *Sanguisorbeæ*, in *Combretum*, in *Aucuba Japonica* and in *Marlea*.

The memoir was illustrated by a large tabular view of the proposed arrangement, a series of diagrams, and numerous figures.

January 21, 1851

William Yarrell, Esq., V.P., in the Chair.

James William Bryans, Esq., was elected a Fellow.

Mr. Gould, F.L.S., exhibited a specimen and drawing of a new and very extraordinary genus and species of Bird, to which he has given the name of *Balæniceps Rex*, and entered into some details with regard to its structure and affinities.

Read a memoir "On the various forms of *Salicornia*." By Joseph Woods, Esq., F.L.S.: with some additional remarks by Richard Kippist, Esq., Libr. L.S.

The paper relates almost exclusively to the British species of *Salicornia*, and more particularly to those which occur on the coasts of Sussex and Hampshire.

The author begins by noticing what he considers as the typical form of *S. herbacea*. This he describes as always erect, except that late in the autumn, the branches, usually spreading or ascending,

are sometimes borne down by the weight of the fruit-spikes. The colour is green, generally glaucous, but never red. The spikes of fruit are cylindrical, 2 or 3 inches long, (ten to fifteen times their thickness,) and contain from ten to fifteen sets of seeds.

The second form (*S. procumbens*, Sm.), which is stated to be more common than the first, is described as procumbent, decumbent, or ascending, but always with a bend at the top of the root, and therefore never erect: the branches and their subdivisions are much shorter and more numerous than in the typical form, and at the same time much more divaricate, the lower ones especially being frequently recurved; and these lower branches being much longer than the succeeding ones, give to the entire plant a triangular outline. The colour at maturity is always red. The spikes hardly exceed half an inch in length (about four or five times their own thickness) and contain about six sets of seeds each.

The next form noticed by Mr. Woods, and which he proposes to call *S. ramosissima*, is described as much larger than either of the preceding, erect, very much branched and bushy, of a grass-green colour, but touched with red, the branches ascending, and the spikes not cylindrical or oblong, but somewhat lanceolate, the longest about an inch in length (six or seven times their thickness) and containing about the same number of sets of seeds as *S. procumbens*. This, which appears to be a rare form, was gathered in Haling Island.

Mr. Woods now proceeds to describe two intermediate forms, apparently serving to unite the three preceding. The smallest of these, which the author proposes to designate *S. pusilla*, seems closely to resemble *S. procumbens*, from which it differs in its smaller size and less triangular outline, its erect or suberect branches, the lowest of which are neither larger nor more branched than the succeeding ones, and in its still shorter spikes, which scarcely exceed $\frac{1}{4}$ inch in length, being sometimes almost globular, and containing about five sets of seeds. The other form, which the author calls *S. intermedia*, and which is stated to be the most abundant on the muddy salt marshes of Sussex, embraces several subvarieties, all of which are erect, but vary much in other respects, sometimes resembling *S. pusilla*, but with much longer and redder spikes; in other cases approaching the typical form of *S. herbacea*, in their yellowish green colour, hardly tinged with red, cylindrical spikes an inch or more in length (eight or nine times their width), but with not more than eight or nine sets of seeds; while others again, in their bushy habit and colour, and in the form of their spikes, show an affinity to *S. ramosissima*.

All the above-mentioned varieties have oval or oblong seeds, about half as long again as broad, and thinly covered with hooked hairs, upon an even surface. In the two following the seeds are shorter, nearly globular, but covered in the same manner with hooked hairs.

S. radicans, the next species, is described as differing exceedingly in its mode of growth from any of the foregoing. In all these the root is evidently annual, and produces a single stem, which is hard, and in *S. ramosissima* may fairly be called woody. In *S. radicans*, however, a small plant, with only one or two branches, rises at first from the seed. The stem of this lies down, and, generally burying itself in the mud, sends out radical fibres and new shoots. The process is continued from year to year, the old stems of one year becoming the rhizomes of the next, and these successively dying away as new rhizomes are formed, thus producing a very rambling and diffuse plant. In the preceding forms, every branch and subdivision is terminated by a spike of flowers. In *S. radicans* many are barren. The spikes, when they occur, are sometimes interrupted, half an inch to an inch long, and composed of about six joints. The colour is a dull greyish green; with the ends of the spikes brownish, but never red. Though much less abundant than the first, second, and fourth forms, it is by no means rare in the muddy creeks of Sussex and Hants.

The last form mentioned, under the name *S. lignosa*, bears some resemblance in its diffuse mode of growth to *S. radicans*, and Mr. Woods found some indications of radical fibres from the lower part of the stem, but was unable to ascertain positively the existence of a creeping rhizome. It differs however from *S. radicans* in the thickness, and firm solid structure of the lower part of the stem, which as in every European species is destitute of annual rings, and attains its thickness and hardness in the course of one year. From *S. fruticosa*, L., to which it approaches nearly in many respects, it is distinguished by the multitude of its slender branches, and probably also by the structure of its seed, which Koch and Bertoloni describe as tubercled and not hairy in *S. fruticosa*. The spikes of our English plant are an inch or a little more in length, and about six times their width: those of the true *S. fruticosa* are usually both absolutely and relatively longer.

Mr. Woods next makes some observations on the synonymy of the *Salicornias* described by Ray, who appears originally to have admitted but two species; the first including all the forms of *S. herbacea* and also *S. procumbens*; the second attributed by Smith to *S. fruticosa*, L., but now generally regarded as *S. radicans*. To these Dillenius adds

three others, of which the first, *S. myosuroides procumbens*, &c., is considered by Mr. Woods as *S. radicans*; the second, *S. ramosior procumbens*, &c., as probably *S. procumbens*, Sm.; and the third, *S. erecta foliis brevibus cupressiformis*, he refers with some doubt to his *S. intermedia*.

Then follow some remarks on the characters of *Arthrocnemum*, a genus separated by M. Moquin-Tandon from *Salicornia*, principally on account of the different form of its embryo, and to which he refers *S. fruticosa* and *S. radicans*. In all specimens of *S. radicans*, and in some of what is called *S. fruticosa*, Mr. Woods finds the seeds apparently destitute of albumen, and with the radicle lying against the edges of the cotyledons; but in the true *S. fruticosa*, supposing that name to be correctly applied only where the seed is tubercled and hairless, he finds a portion of albumen, but the extremity of the cotyledons still close to the point of the embryo.

The author concludes with the following résumé:—"If I were to sum up the result of my observations of this year on the genus *Salicornia*, I should say that *S. procumbens* is a distinct species; that *S. radicans* and *S. lignosa* are certainly specifically distinct from *S. herbacea*; but whether they are so from each other, and whether, if that be the case, *S. lignosa* ought not to be considered as a variety of *S. fruticosa*, L., and the plant with tubercled seeds to be called *S. megastachya*, I do not feel competent to decide. The other forms of *S. pusilla*, *S. intermedia* and *S. ramosissima*, may perhaps be varieties of *S. herbacea*, but this also is a subject for further investigation."

The paper was accompanied by specimens of the various forms therein described, for the Society's herbarium; and a note was added by Mr. Kippist, Libr. L.S., who at the request of Mr. Woods had examined the seeds of the specimens sent. He had found the structure of the embryo to be nearly the same in all the British forms; consisting of thick, fleshy, almost semicylindrical, bright green cotyledons, in some species scarcely wider than the radicle, which is bent sharply round, and lies not against their edges, but on the back of one of them, the radicle being therefore *incumbent*. In one or two instances the cotyledons were found to be inclined rather obliquely towards the radicle, but this appeared to be the result of accidental pressure, the majority of the seeds examined of each variety presenting the same character of incumbent cotyledons. In all, the albumen was either entirely wanting, or in very small quantity. This seems to be equally the case with *S. radicans*, notwithstanding that M. Moquin-Tandon refers this species, as a variety, to his *Arthro-*

cnemum fruticosum, to which he ascribes copious albumen. As regards the structure of the seed, Mr. Kippist agrees with Mr. Woods in thinking that the *S. radicans*, Sm., would be much better placed in *Salicornia*, as defined by Moquin-Tandon, than in his genus *Arthrocnemum*, to which he attributes a crustaceous testa and semi-annular peripheral embryo, characters which Mr. Kippist had not met with in any British species. In all the specimens gathered by Mr. Woods on our own coast, the covering of the seed is thin and membranous, and clothed with hairs, which differ much in length in different species. In *S. herbacea* and the species most nearly related to it, they are of a sigmoid form, spreading at the base, but curled inwards at their extremity, unbranched, and destitute of septa or spiral fibre. They are longest in the form which Mr. Woods calls *intermedia*, much shorter in *lignosa*, while in *radicans* they are so short, and so closely pressed against the integument of the seed, that it is difficult to distinguish them: the seeds of this species, however, were all obtained from one specimen, and may not have been thoroughly ripe.

In the plant for which Mr. Woods proposes the name of *S. megastachya* (and which is in all probability a species of *Arthrocnemum*), a native of the South of Europe, the structure of the seeds is extremely different. The testa is hard, black, and crustaceous, quite destitute of hairs, and covered with concentric rows of little tubercles. The albumen is very evident, and principally confined to the straighter side of the seed, the convex side being occupied by the embryo, which is cylindrical and but slightly curved; the thick, fleshy cotyledons, taken together, are about equal in diameter to the radicle, which seems to be nearly continuous with them in direction, not bent sharply round upon them as in *S. herbacea*, and probably in all the true *Salicornias*.

February 4.

Robert Brown, Esq., President, in the Chair.

The President exhibited specimens of stems of *Kingia australis*, R. Br., and *Xanthorrhæa arborea*, R. Br., together with drawings of No. XLV.—PROCEEDINGS OF THE LINNEAN SOCIETY.

the former, illustrative of its structure, especially of the siliceous covering of the vascular fasciculi of the persistent bases of the leaves; and in both genera, the means by which the stems are protected from the scorching fires of the natives.

Read the following "Notice concerning Linnæus's *Iter Dalecarlicum*," extracted from a letter of Mr. Charles Hartman, M.A., to the Secretary of the Royal Academy of Sciences of Stockholm, in which he gives a report of his examination of the collections and manuscripts of Linnæus in the possession of the Linnean Society of London; which letter is printed in the Academy's Proceedings at the Meeting on the 12th September 1849 (being No. 7 of the 6th year), p. 185. Translated from the Swedish by N. Wallich, M. et Phil.D., V.P.L.S. &c.

After mentioning the library of Linnæus, Mr. Hartman proceeds as follows:—

But what especially interested me was to find a manuscript of Linnæus, consisting of 176 folio pages, containing a complete account of his journey in Dalecarlia in 1734, arranged according to the plan adopted in his other published Travels, and enriched with remarks on divers subjects, marginal notes of contents, such as 'Œconomica, Geographica, Botanica,' &c. After the proper diary follows a small appendix of the names, and an extremely short but graphic character of clergymen and other persons in the parishes of the Dalas (valleys, Dalecarlia) which were visited; a faithful chart executed by the geographer to the party; and lastly, a seemingly jocose warrant, issued to their mineralogist, in the handwriting and under the sign manual of Linnæus himself. As this journey has never, as far as I know, been published, or even noticed, it may not be improper to give here a transcript of its title and preface, which will best serve to give an idea of the contents of the MSS., and the plan and object of the journey itself. The writing as well as the whole report being in Swedish, in the not always very legible handwriting of Linnæus, I have had some difficulty in deciphering it, and have been obliged to omit some words in two places.

The title is as follows:—*Caroli Linnaei, P.S.R. Iter Dalecarlicum jussu & impensis Viri Generosissimi et Excellentissimi Dni Nicolai Reuterholmi Gubernatoris Provinciæ Dalecarlicæ institutum per Dalecarlicam Sueciæ provinciam quoad orientalem, Alpinam & occidentalem*

partem, observationibus constans Geographicis, Physicis, Mineralogicis, Botanicis, Zoologicis, Domesticis & Oeconomicis quotidie collectis a mensis Julii die 3 ad Augusti d. 17 Anni 1734.

The first page contains the following preface, relating to the extent of the journey, &c.

“L. B.

“Having been charged, last summer, by Governor Reuterholm to make a tour through the Eastern and Western Dalas (valleys) in his province, I proceeded to Fahlun, where I enjoyed that distinguished gentleman’s hospitality, and obtained a generous stipend for the journey. As soon as the time and objects of the journey became known, I was visited by some of the cleverest and most zealous Students of the Academy of Upsala, who were anxious to accompany me at their own expense. I very thankfully accepted of their prompt offer; and in order that everything might be properly regulated, my companions formed themselves into a Society, with laws and statutes to be kept conscientiously: *e. g.**

C. Linnaeus Smoland. Praeses publice et privatim.
 Reinh. Näsman. Dalekarl. Geographus. Pastor.
 Carl Clenberg Helsing. Physicus Secretarius.
 Ingel. Fahlstedt Dalekarl. Mineralogus Master of the Horse.
 Claud Sohlberg Dalekarl. Botanicus Quartermaster.
 Eric Emporelius Dalek. Zoologist. Huntingmaster.
 Petr. Hedenblod Dalek. Domesticus. Aide-de-Camp.
 Beniam. Sandel. Americ. Oeconomus Accountant.

“Thus organized, the journey commenced on the 3rd July, 1734, from Fahlun through the Eastern Dalar, the hills, the Western Dalar, through Biursås, Lexan, Rättvik, Ore, Orsa, Mora, Elfdahl, Serna, Fiell, Rörås in Norway, Lima, Malung, Näs, Floda, Gagne, Åhl, ending at Fahlun the 17th Aug. ej. anni. Observations were made daily, as far as possible, according to the subjects assigned to each of our party, by which the duties of the undertaking were facilitated. Thence it may be seen that much remains still unknown in the country and ; that each province possesses its advantages and how they may be developed; that it would be of incredible advantage to Sweden were all her provinces similarly examined, and that one province might thus be assisted by another. Should the reader approve, thanks are due to him who originated the journey, without whose aid it could not have been undertaken, and who deserves to be looked

* Consult *Egenhändig Anteckningar af Carl Linnaeus* (C. L.’s own Annotations), p. 107.

to as a pattern to all, who love, pursue and patronize studies, who excels in reasoning powers, and who deserve to To the Great God, who has ordered this world in such an indescribable manner, and has created and preserved us to be its and Spectatores, be praise and thanks for our having performed our journey in safety.

“Dabam Fahlu Kongsgård

“CARL LINNÆUS.”

1734 Aug. 25.”

The following list of acquaintances made during the journey, with remarks on each, is placed at the end of the journal :—

Biursås	Pastor	Lundvall, Mr. Joh.	juvenis, fidus.
Rättvik	Dean	Humblæus, Mag. Olaus. . . .	sublimis, 60genarius.
		Accountant. Olof Laresu.	simplex, Mineralogus.
Orsa	Pastor	Schedevin, Mag. Dan. . . .	doctus, oconom.
		Commander Olof Laresu.	simpl., bonus.
Mora	Dean	Emporelius, Mag. Joh. . . .	70genarius.
		Adjunctus . Wistblad, Mag. Tob. . . .	sibi sapiens.
Elfdahl	Pastor	Näsman, Eric	hospitalis.
Serna	Pastor	Floraeus, Mr. Gabr.	adustus.
Rör s } Norveg. }	Director . .	Bredahl, Mr. Land.	{ humanissimus omnium.
		Hyttskrifv. Irrgens, Mr. Hennig. . . .	bonus & astutus.
		Overstigare. Bortgrevin, Mr. Leonh. . .	{ bonus animus ger- manic.
Lima	Pastor	Gezelius	phlegmat.
Transtrand .	Comminist. Dale, Mr. Lars		{ curiosiss. pauperri- mus, abjectiss. doc- tissimus.
Malung	Pastor	Harkman, M. Vindikt	phlegmat.
Näs	Pastor	Dicander, M. Eric	doctus, sapiens.
Floda	Pastor	Rabenius, Mr. Joh.	humaniss., sapiens.
Gagne	Comminist. Biörkman, Mr. Sven		bonus vir, non hospitalis.
Åhl	Pastor	Lundberg, Mr. Joh.	simplex.

Lastly is added a copy of the warrant alluded to above, which is furnished with the seal and signature of Linnæus :—

“We præses and membra of the *Reuterholmian Travelling Society through Dalecarlia* make known by this letter patent to all concerned, that we have nominated and appointed our master of the horse, Mr. Ingel. Fahlstedt, at his own request and on account of his science, as our ordinary Membrum Mineralogicum, and as such to be as industrious as is in his power, to attend to his branch of researches as regards the province of Dalecarlia for the good of the

public and the honour of our country, and to consider himself responsible to the Society for the due execution thereof. Done at Fahlun Kongsg. 1734 July 2.

CARL
LINNÆUS.
(Sigill.)

C. CLENBERG.
Secret. Societ.

Warrant for Ingel. Fahlstedt,
Mineralogist.

(L.S.) The cost of Charta Sigillata 1 Rtdr. Speue paid into the Treasury.

BEN. SANDEL,
Account.

February 18th.

W. Yarrell, Esq., Vice-President, in the Chair.

Thomas Moore, Esq., was elected a Fellow.

Read a note from Benjamin Clarke, Esq., F.L.S., supplementary to his paper read at previous meetings, and describing the position of the raphe in the ovula of *Knowltonia* and *Glaucium*, *Hedera* and *Cornus*.

Read also, "A Catalogue of Recent Land and Freshwater *Mollusca* found in the neighbourhood of Nottingham." By Edward Joseph Lowe, Esq., F.R.A.S. &c. Communicated by Prof. Lindley, F.R.S., F.L.S. &c.

The following are the Land and Freshwater *Mollusca* which are to be found in the neighbourhood of Nottingham.

WATER SHELLS (*Univalves*).

Neritina fluviatilis. Abundant in the river Trent near Beeston and near Nottingham, and in the river Soar near Thrumpton.

Paludina achatina. Common at Thrumpton in the river Soar, in the river Trent below Nottingham, and in the Lenton Canal.

Bithinia tentaculata. Swarms in a stagnant ditch near Lenton Priory, common in most ditches at Lenton, in a clear brook at Bees-

ton and another at Attenborough, in the river Trent and tributaries to that river near Beeston and Sawley, and also under the Seven Arches in Nottingham Meadows.

B. ventricosa. Only found in a narrow ditch near the railway at Lenton, where it is tolerably abundant, and under the Seven Arches in Nottingham Meadows.

Valvata piscinalis. Abundant in brooks at Beeston, Lenton, and Bulwell, and in the river Trent near Beeston.

V. cristata. In rare numbers in a brook on Bulwell Bogs.

Succinea putris. Rather abundant at Thrumpton.

S. Pfeifferi. Common at Sawley and near Highfield House, and found between Beeston and Attenborough.

Limneus auricularius. Abundant in the Musco-Sic dike near Highfield House; found at Lenton, Beeston, Attenborough, and Sawley.

L. pereger. Very abundant at Lenton, Beeston, Attenborough, Sawley, Bulwell, Thrumpton, Highfield House, and Nottingham Meadows.

L. stagnalis. Abundant in a dike at Lenton, a dike at Attenborough, a mill-dam at Bulwell, a backwater at Sawley (called the 'Old Trent'), and in few numbers in the river Trent near Beeston, and a stagnant ditch between Beeston and Attenborough.

L. palustris. Abundant on moist mud at Sawley and near the railway at Thrumpton, and very large in a stagnant ditch between Beeston and Attenborough.

L. truncatulus. Rare in a ditch at Lenton and under the Seven Arches in the Nottingham Meadows.

Ancylus fluviatilis. Tolerably abundant in clear dikes at Highfield House, Attenborough, Bulwell and Oxton, and at the mouth of a well at Newstead Abbey.

Valletia lacustris. Tolerably abundant in a small ditch at Lenton near the railway, and under the Seven Arches in Nottingham Meadows.

Physa fontinalis. Abundant in dikes at Lenton and Attenborough, the canal at Lenton and a pond at Wollaton, and in small numbers in the Musco-Sic brook near Beeston.

P. acuta (of Sowerby). Abundant in the river Trent at Beeston and Attenborough, rare in a brook on Oxton Bogs, in the canal at Lenton, and in a ditch between Beeston and Attenborough.

Aplexus hypnorum. Abundant in a dike at Beeston and rare in a ditch near the Beeston railway station.

Segmentina lineata. Rare in a brook on Oxton Bogs.

Planorbis corneus. Very abundant in brooks at Lenton, Beeston, Bulwell, Sawley, Attenborough, &c.

P. carinatus. Very abundant in brooks at Lenton, Beeston, Bulwell, and Attenborough, in the river Trent at Beeston, and under the Seven Arches in Nottingham Meadows.

P. marginatus. Abundant in dikes at Beeston, and of large size in a stagnant ditch between Beeston and Attenborough.

P. vortex. Very abundant in the river Trent, and in dikes at Beeston, Lenton and Attenborough, and under the Seven Arches in Nottingham Meadows.

P. spirorbis. Abundant in the river Trent at Beeston, and in dikes at Beeston, Lenton, and Attenborough.

P. albus. In few numbers in the river Trent near Beeston.

P. contortus. Not common on the bogs at Bulwell, and rare in a ditch at Lenton.

P. imbricatus. Not common on dead leaves in the lake at Highfield House.

P. nitidus. Rare in the lake at Highfield House and in a pond at Wollaton.

(*Bivalves*.)

Cyclas rivicola. Rather abundant in the river Trent near Beeston and in the river Soar at Thrumpton.

C. cornea. Very common in the river Trent near Beeston, and in brooks at Lenton, Beeston, Attenborough, Bulwell, and Highfield House, and under the Seven Arches in Nottingham Meadows.

C. lacustris. Very abundant in a brook at Beeston and another at Highfield House.

Pisidium amnicum. Abundant in the river Trent at Beeston, in a ditch near Beeston railway station, and in a brook at Beeston.

Anodon cygneus. Abundant in the lake at Highfield House, in the Old Trent at Sawley, and in mill-dams at Bulwell.

A. cellensis. Abundant in the lake at Highfield House and in the river Trent near Beeston.

A. anatinus. Abundant in the lake at Highfield House, a stream and canal at Lenton, and the rivers Trent and Soar.

A. avonensis. Rare in the river Trent near Beeston.

A. anatinus, var. (very ventricose). In the lake at Highfield House.

Unio pictorum. Common in the lake at Highfield House, the river Trent at Beeston and Sawley, and the river Soar at Thrumpton.

U. tumidus. Not uncommon in the river Trent near Beeston, and rare in the lake at Highfield House.

U. ovalis. Found in the lake at Highfield House and in the river Trent at Beeston.

U. Deshayesii (if a var.). Not common in the river Trent near Beeston.

Dreissena polymorpha. Very common and large in the lake at Highfield House, common in the canal at Lenton (where it is small), the river Soar at Thrumpton, and a pond at Wollaton, and in few numbers in the river Trent near Beeston.

LAND SHELLS.

Helix aspersa. Very common at Beeston and around Nottingham.

H. hortensis. Rare at Bulwell.

H. nemoralis. Very abundant in most hedges.

H. hybrida (if a var.). Rare at Highfield House.

H. arbustorum. Rare at Thrumpton, Sawley, and Highfield House.

H. pulchella. Tolerably abundant at Highfield House, rare at Beeston and Oxtun.

H. fulva. Not uncommon at the foot of a hill at Thrumpton, rare at Highfield House, Oxtun, and Stanton-on-the-Wolds.

H. hispida. Common at Nottingham Castle, Beeston, Bulwell, Sawley, Oxtun, Highfield House, Thrumpton, Stanton-on-the-Wolds, &c.

H. concinna. Tolerably abundant at Highfield House, and found at Stanton-on-the-Wolds.

H. depilata. Found in small numbers at Stanton-on-the-Wolds.

H. sericea. Rare at Bulwell, Oxtun, and Stanton-on-the-Wolds.

H. virgata. Rare at Stanton-on-the-Wolds and at Highfield House.

H. ericetorum. Abundant at Stanton-on-the-Wolds.

H. rotundata. Very common at Highfield House and Nottingham Castle, and found at Bulwell.

H. alliaria. Not abundant at Sawley and Thrumpton.

H. cellaria. Abundant at Nottingham Castle, Sawley, and Highfield House.

H. aculeata. Rather rare under decayed leaves at Highfield House and Stanton-on-the-Wolds.

H. caperata. Very abundant at Stanton-on-the-Wolds in one field, but not found elsewhere.

H. crystallina. Not abundant at Highfield House, Bulwell, and Oxtun.

H. granulata. Rare on Bulwell Forest.

H. lucida. Not common at Bulwell, Oxton, Highfield House, and Stanton-on-the-Wolds.

H. nitidula. Rare at Bulwell and Oxton.

H. pura. Rare at Oxton.

H. pygmæa. Rare at Highfield House and Stanton-on-the-Wolds.

Vitrina pellucida. Common at Oxton both on the warren and on the bogs, less abundant at Highfield House, Beeston, Bulwell, and Stanton-on-the-Wolds.

Carychium minimum. Tolerably abundant under leaves at Highfield House, Bulwell, Beeston, and Stanton-on-the-Wolds.

Bulimus obscurus. Abundant at Nottingham Castle and Highfield House.

B. lubricus. Common at Highfield House, Sawley, and Thrumpton, and found at Bulwell, Oxton, and Stanton-on-the-Wolds.

Azeca tridens. Rare at Highfield House.

Pupa umbilicata. Very abundant at Nottingham Castle and at Highfield House.

Clausilia nigricans. Exceedingly common at Thrumpton, Bulwell, and Highfield House.

The following Mollusca are to be found associated together in the same localities.

A dike running at the foot of Beeston and passing behind the lake at Highfield House contains, where it passes through Mr. Barker's field, the following shells: *Planorbis corneus*, *P. marginatus*, *P. carinatus*, *P. vortex*, *P. spirorbis*, *Limneus pereger*, and *Aplexus hypnorum*. The dike is choked with weeds and filth from the village, and warm water from a neighbouring mill here runs into it; *P. corneus* is found much larger in this warm dike than elsewhere in this neighbourhood. 200 yards lower down the dike contains (where it runs through the Rev. J. Wolley's fields), besides the above *Planorbis* tribe, *Cyclas lacustris*, *Limneus auricularius*, *L. pereger*, *Pisidium pulchellum*, and *Valvata cristata*. A few hundred yards beyond this the water becomes free of weeds and clear, and the whole tribe of *Planorbis* are left behind. From Broadgate, all through the Highfield House estate, the dike only contains *Limneus pereger*, and in one or two places *Ancylus fluviatilis*, and on the moist mud on its banks *Succinea Pfeifferi* and *Limneus truncatulus*. The Musco-Sic brook branches out from it at Broadgate and joins it again at the east extremity of the Highfield House estate; this brook at first contains *Planorbis marginatus*, *P. vortex*, *P. carinatus*, *P. corneus*, *Bithinia tentaculata* (very large), *Val-*

vata piscinalis, *Limneus pereger*, *Cyclas cornea*, *Pisidium pulchellum*, and *Limneus auricularius*.

A very clear brook at Attenborough with Algæ growing in it, contains *Planorbis corneus*, *P. carinatus*, *P. marginatus*, *P. vortex*, *P. spirorbis*, *Ancylus fluviatilis*, *Bithinia tentaculata*, *Limneus pereger*, *L. auricularius*, *L. stagnalis*, and *Physa acuta*.

A similar brook at Lenton near the railway contains *Planorbis corneus*, *P. vortex*, *P. spirorbis*, *P. carinatus*, *Limneus stagnalis*, *L. auricularius*, *L. pereger*, *Physa acuta*, *P. fontinalis*, *Valvata piscinalis*, *Cyclas cornea*, and *Bithinia tentaculata*.

A small ditch some fifty yards from the last-named locality contains:—*Bithinia ventricosa*, *B. tentaculata*, *Limneus truncatulus*, *L. pereger*, *Valletia lacustris*, *Planorbis vortex*, *P. spirorbis*, *P. carinatus*, and *P. contortus*.

The lake at Highfield House contains:—*Anodon cygneus*, *A. cellensis*, *A. anatinus*, *A. var. of anatinus*, *Unio pictorum*, *U. tumidus*, *Dreissena polymorpha* (very large), *Planorbis nitidus*, *P. imbricatus*, and *Limneus pereger*.

The river Soar at Thrumpton contains:—*Cyclas rivicola*, *C. cornea*, *Unio pictorum*, *Dreissena polymorpha*, *Anodon cygneus*, *A. anatinus*, *Limneus pereger*, *L. stagnalis*, and *Paludina achatina*.

The river Trent near Beeston contains:—*Pisidium pulchellum*, *Anodon anatinus*, *A. avonensis*, *A. cygneus*, *Cyclas cornea*, *C. rivicola*, *Bithinia tentaculata*, *Limneus pereger*, *L. stagnalis*, *Physa acuta*, *Neritina fluviatilis*, *Planorbis carinatus*, *P. vortex*, *P. spirorbis*, *P. albus*, *Unio pictorum*, *U. tumidus*, *U. ovalis*, *Limneus palustris*, *Valvata piscinalis*, and *Dreissena polymorpha*.

Under the Seven Arches in Nottingham Meadows are, *Planorbis carinatus*, *P. spirorbis*, *P. vortex*, *Bithinia ventricosa*, *B. tentaculata*, *Valletia lacustris*, *Cyclas cornea*, and *Limneus pereger*.

In the river Lean at Bulwell there are *Valvata piscinalis*, *V. cristata*, *Planorbis carinatus*, *P. contortus*, *P. vortex*, *Bithinia tentaculata*, *Limneus pereger*, *Anodon cellensis*, and *Ancylus fluviatilis*.

A moist mud-bank left by the Trent floods at Sawley contains *Limneus truncatulus*, *L. palustris*, *L. pereger*, and *Helix alliaria*.

A dry bank near has *Helix nemoralis*, *H. arbustorum*, *H. hispida*, and *Bulimus lubricus*.

A cool bank at Thrumpton contains *Helix nemoralis*, *H. arbustorum*, *H. hispida*, *H. fulva*, *Clausilia nigricans*, *Bulimus lubricus*, *Succinea Pfeifferi*, *S. putris*, *Helix cellaria*, and *H. alliaria*.

A sand-bank in the lane at Highfield House has *Helix nemoralis*, *H. hispida*, *H. concinna*, *H. virgata*, *H. arbustorum*, *H. rotundata*,

H. cellaria, *H. pulchella*, *Bulimus lubricus*, *B. obscurus*, *Azeca tridens*, *Pupa umbilicata*, and *Clausilia nigricans*.

The Nottingham Castle-yard contains *Helix aspersa*, *H. hispida*, *H. nemoralis*, *H. cellaria*, *H. rotundata*, *Bulimus lubricus*, *B. obscurus*, and *Pupa umbilicata*.

Oxton Bog and Warren has *Helix fulva*, *H. lucida*, *H. pura*, *H. pulchella*, *H. hispida*, *Bulimus lubricus*, *Vitrina pellucida*, *Physa acuta*, and *Segmentina lineata*.

The Hill Farm at Stanton-on-the-Wolds has *Helix hispida*, *H. sericea*, *H. depilata*, *H. concinna*, *H. fulva*, *H. aculeata*, *H. pygmæa*, *H. caperata*, *H. ericetorum*, *H. nemoralis*, *H. virgata*, *Bulimus lubricus*, *Carychium minimum*, and *Vitrina pellucida*.

Read further, a memoir "On the *Aquilaria Agallocha*, Roxb., the Agallochum or Aloë-wood Tree of Commerce." By the late William Roxburgh, M.D., F.L.S. &c. Communicated by the President.

The memoir, which appears to have been written in 1810 or 1811, contains a detailed description of this important tree, as well as much other information in addition to that published in the posthumous 'Flora Indica' of the author. The plants described were sent to the Calcutta Botanic Garden by Mr. Robert Keith Dick, Judge and Magistrate at Silhet; and an extract is given from a letter addressed by that gentleman to Dr. Roxburgh, in which he states that the wood is brought for sale from the country of Kuchar and from the southern parts of the zillah of Silhet, particularly the divisions of Puthureea and Lunglah, where the tree is known by the Bengal name of *Tuggur*. Its extreme height is from sixty to seventy cubits, and the trunk from two to two and a half cubits in diameter. No part of the wood, except that which is used for the extraction of the *Uttur*, is applied to any useful purpose. Few trees contain any of this precious perfume, and such as do, have it very partially distributed in the trunk and branches. The people employed in its collection, however, cut down all the trees indiscriminately, and then search for the *Aggur* by chopping through the whole tree, and removing such portions as are found to contain the oil or have the smell of it. In this state Mr. Dick describes four different kinds, of which the first, called *Ghurkee*, sinks, and sells at from 12 to 16 rupees per seer of 2 lbs.; the second, called *Doim*, produces from 6 to 8 rupees per seer; the third, *Simula*, floats, and is sold at from 3 to 4 rupees; and the fourth, *Choorum*, in small pieces, which also float, at 1 to 1½ rupees per seer. The oil is obtained by bruising the

wood in a mortar, and then infusing it in boiling water, when the *Uttur* collects on the surface. Neither root, leaves nor bark yield any *Uttur*. Some trees will produce a maund (80 lbs.) of the four sorts. So far Mr. Dick. Dr. Roxburgh thinks that there is a wonderful agreement between the various but imperfect accounts of the trees said to produce the *Calambac* or *Agallochum* of the ancients and that which he describes. He notices the descriptions given by Lamarck and Cavanilles; which he thinks, as far as they go, agree well with the plant of the Botanic Garden; as do those of Rumphius, making some allowance for the imperfection of his figures. Kæmpfer's figure and description also exactly correspond with young specimens in the Botanic Garden sent from Goalpara by Dr. Buchanan and from Silhet by Mr. Smith; and a description of the fruit by Mr. James Cunningham is quoted as very exact. Dr. Roxburgh gives his reasons for believing that not only the *Ophispermum Sinense* of Loureiro, but also the *Aloëxylum Agallochum* of that author, are both of the same genus, if not the very same species, with the plant from Silhet. There runs indeed so uncommon a coincidence through the whole of these notices as to induce him to believe that they all relate to the same identical object. He concludes by retracting what he had previously said, in his account of *Amyris Agallocha*, as far as relates to its yielding *Calambac*, which he acknowledges to have been founded on erroneous information.

Dr. Roxburgh's memoir was accompanied by some remarks by the late H. T. Colebrooke, Esq., F.L.S., consisting chiefly of references to and extracts from various Oriental authors, in relation to this fragrant wood, the countries in which it is found, the tree from which it is derived, its various kinds, and the processes used in extracting the oil. On the subject of the etymology of the word *Agallochum*, he observes that it is not right to derive it from the Arabic, which on the contrary is confessedly borrowed from the Greek, that is to say, from the *Agallochon* of Dioscorides. Neither is its origin to be sought in the Hebrew *Ahalim* and *Ahaloth*, as proposed by Salmasius, since it is more obvious to deduce it from the language of the country whence the drug was brought; and the Indian name *Aguru*, or with the Sanscrit pleonastic termination *ca*, *Aguruca*, is much nearer to the sound of the Greek term. The Portuguese *Pao de Aquila*, he adds, is an undoubted corruption either of the Arabic *Aghálují* or of the Latin *Agallochum*; and it is by a ludicrous mistake that from this corruption has grown the name of *Lignum Aquilæ*, whence the genus of the plant now receives its botanic appellation.

The paper was accompanied with a coloured drawing of the young plant, and of a flowering branch, together with a detailed analysis of the parts of fructification.

March 4.

N. Wallich, Esq., M.D., Vice-President, in the Chair.

Read "Notes on Bdelium." By B. A. R. Nicholson, Esq., M.D., of the Bombay Army. Communicated by the Secretary.

Dr. Nicholson states that the tree which he identifies as producing the Bdelium of Greek and Roman authors, occurs in the hilly districts of North-western India, where it is known to the natives by the name of Googul. He extracts the account of Bdelium from Ainslie's 'Materia Indica,' and comments on some of the statements therein contained. Thus, for example, Ainslie says that "all of this gum-resin found in India is brought from Arabia, where the tree is called Down;" but Dr. Nicholson states that wherever the tree is found in the North-western provinces, the bazaars are supplied with the gum from it; and that he never heard the tree called Down in Arabia, although he has been in many parts of that country, where he has seen the Googul. Dr. Ainslie again quotes Sprengel, who erroneously states that Down is the Arabic name for *Borassus flabelliformis*, and cites Kämpfer and Rumphius in proof that Bdelium is procured from that tree; but Dr. Nicholson believes the Arabic name Doom to be exclusively applied to the dividing-stemmed Palm (*Hyphane Thebaica*, Gærtn.), which is common on the banks of the Nile, in the Thebaid and Upper Egypt, two or three trees of which he has seen growing at Mocha, and a single tree at the west end of the native village opposite to the Portuguese settlement in the Island of Diu in Kattiawar. He has frequently examined this Palm without detecting any gum; and it is well known in India that the Tari, *Borassus flabelliformis*, does not produce gum. Another Palm, *Chamærops humilis*, L., has been also affirmed to produce Bdelium, and Matthioli is quoted as having witnessed the fact at Naples; but Dr. Nicholson states that he particularly examined this *Chamærops* at Girgenti in Sicily in all stages of its growth, in flower, in fruit, and without either, and never observed anything like gum.

After refuting these erroneous notions as to the origin of the gum,

Dr. Nicholson proceeds to state that he met with the Googul plant for the first time in 1832 on the Hills of Balmeer, in the Chotee Thur or Little Desert, on taking and sacking which town large quantities of the gum were found in several of the Banyan houses. The bush is also plentiful about Joolmaghur, thirteen miles southwest from Balmeer; and the author has observed it on the Kulinjur Hills in Parkur, as well as on those of several parts of Kutch and Wangeer. Having been shipwrecked in 1836 on the southern coast of Arabia, about 200 miles east of Cape Furtash, and being carried by the Arabs to the town of Geda, about three miles distant from the coast, he observed that large quantities of the gum Googul, there called Aflatoon, were brought to Geda by the Bedouins from the interior, where he was informed that the tree producing it was very plentiful, and that the gum is annually carried thence to Mocha on camels, and exported from Mocha to Bombay and other places. He subsequently found the Googul bush on the hills of Yemen, and in 1841 on the hills above Wankaneer in Kattiawar. The gum is chiefly used as a frankincense; but the natives of Guzerat, and probably of other provinces where the tree is found, collect and bruise the recent berries and twigs, boiling the juice out in cauldrons, and having mixed it with their chunam (lime), to which it imparts increased tenacity, commence all their dwellings with lime thus mixed, it is said from a religious motive. The gum is found most abundantly after the rains, when it is collected in pieces as it exudes from the tree, and is often very dirty from the careless way in which it is gathered, being mixed with the bark and twigs, and sometimes even with the subjacent soil. The harder and nearly transparent drops are picked out by the Banyan merchant, and fetch a higher price than the rest.

The author states that he is indebted to the late Dr. Charles Lush, F.L.S., Superintendent of the Honourable East India Company's Botanical Gardens at Darpoorie, who in 1842, from the sketches and specimens then in the author's possession, identified the plant as the *Amyris Kataf* of Forskåhl, and assisted in identifying the gum with the *Bdellium* of the ancients. He believes that if at all known to Roxburgh, it must be under the names of *Amyris nana* or of *Boswellia*.

The paper concluded with a description of the plant, and with some remarks on the geological character of the localities in which it is found; and was accompanied by a sketch of a branch, and by specimens of the gum in its pure and mixed states.

March 18.

R. Brown, Esq., President, in the Chair.

Dr. Wallich, V.P.L.S., read some extracts from his "Notes on the Germination of 1643 species of Plants," the details of which, with the deductions to be drawn from them, he proposed giving at a future Meeting.

April 1.

N. Wallich, Esq., Vice-President, in the Chair.

Read a continuation of Dr. Buchanan Hamilton's "Commentary on the Ninth Part of Van Rheedé's 'Hortus Malabaricus.'"

April 15.

R. Brown, Esq., President, in the Chair.

Mr. Matchwick exhibited a flowering specimen of the Tussack Grass of the Falkland Islands (*Dactylis cæspitosa*, Forst.), raised from seed in the Orkney Islands by Messrs. Lawson of Edinburgh.

Mr. Benjamin Kennedy, F.L.S., exhibited a large block of sandstone, sent to him by his son from the neighbourhood of Swellendam, South Africa, and gave the following extract from the letter accompanying it:—

"The fossil (if fossil it is) which I have sent you is about one-sixth part of one I saw in Kerqua's Kloof, eighteen miles west of this place [Swellendam]. It covered the face of a rock which projected from the side of a mountain at its base. Four branches radiated from a centre. I was in hopes that I should have been able to have got off the whole piece, but unfortunately it split into three pieces when I applied the wedges, having previously drilled holes, which took four men a whole day to do. This stone has been known to the people here for the last twenty-six years. The plane of the fossil was perpendicular, and another piece had split off from the

rock, and which piece I found lying at the foot of the other, and also having an indented impression, but not so distinct, at least only in parts. I have been unable to meet with any geologist here who can explain it, or give any history of the formation in which it is found. Some have pretended to know something about it, but their opinions differ considerably. Some say the plant has grown there since the rock was found; others that it is a Zoophyte, and not a plant at all; while one man, a German, says that it was imprinted in the rock whilst soft, and has been subsequently hardened by great heat, as the crystals show. I think he is nearer the mark. The place in which it was found is most wild-looking. It is a mountain pass; so you would call it in England; we call it a Kloof. This pass runs through a low range of mountains, the end as it were of the great range which begins near Cape Town, but separated from that by the river Zondereuch. Curiously enough, although it appears to be a continuation of the great range, its structure is totally different in appearance. The whole mountain seems to have been broken up into huge blocks of rock, but yet preserving a stratified appearance, more regular in some parts than in others. In some places, too, the strata are horizontal, in others inclined at an angle of 20 degrees. All the rocks are more or less crystallized, and *nearly all* have the traces of vegetable remains (sea-weeds, as I think) upon them. I walked over the mountain, or rather climbed amongst the rocks, crowbar in hand, and found many similarly marked; not, I mean, with the same plant, but in the same sort of way as the one sent. Mr. Vigne showed me a stone that he had found on the mountain behind his house; there was an appearance of a fossil plant, very much resembling the one I sent you; but the plant itself was there changed into stone or coal quite black; but instead of being an impression, it might be called a basso relievo. The stone was quite different, being a dark-coloured sandstone, and not at all crystallized."

It appeared to be the prevalent opinion of the members present that this remarkable impression was the result of dendritic crystallization.

The President exhibited specimens of the three known species of *Rafflesia* (*R. Arnoldi*, *R. Patma*, and *R. Cumingii*), particularly with the view of showing that they are all three dioicous.

May 6.

R. Brown, Esq., President, in the Chair.

Richard Chandler Alexander, Esq., M.D., was elected a Fellow; and Dr. Hermann Burmeister, the Chevalier Giovanni Gussone, Prof. J. E. Purkinje, and Prof. Johann Røeper, were elected Foreign Members.

Read some "Notes on the Leaf of *Guarea grandifolia*, Dec." By R. C. Alexander, Esq., M.D., F.L.S., as follows:—

In the enclosed specimens of a *Guarea* from Jamaica, the *G. grandifolia*, Dec., it will be seen that the lower leaflets have fallen off, while younger ones are being developed at the extremity of the same petiole. At the time of flowering, the number of leaflets varies from a single pair to eight or ten pairs; but as these fall off in the course of a few months, the petiole elongates, and at each successive rainy season, of which there are two in the year, throws out from the end a fresh foliage of several pairs. The lower and older part of the petiole in the meantime remaining attached to the stem, becomes completely ligneous and round, and acquires a rind distinct from the wood, and covered with lenticelles and a resemblance to pith in the centre;—takes on, in short, the character of a branch, from which it is only to be distinguished by the axillary inflorescence, the absence of buds in the axillæ of the leaflets, and the analogy with the closely-allied genus *Trichilia*, in which the same phenomenon is seen in leaves deciduous after the second development. In *Guarea*, at least in this species of it, the leaf seems to be continuous with the branch, without articulation, and to have no definite term of life, hanging on till overtopped and killed by other leaves. Its usual length at that period is from a yard to four and a half feet.

In Adrien de Jussieu's Memoir on the *Meliaceæ* are the following remarks:—

"The resemblance of the leaflets borne on the same petiole to leaves borne on the same branch becomes more striking still in certain genera, as *Guarea*, where the extremity of the petiole, after a series of leaflets perfectly developed, presents some which are not yet so, and which appear to belong to another shoot. It would be interesting to ascertain what becomes of them, a thing that I have not been able to do, having had none but dried specimens to examine."

This shrub usually grows at the base of large timber trees, such as the *Eriodendron anfractuosum*, in the pasture districts of St. Ann's parish, establishing itself between their elevated buttress-like roots, and with its leaves hanging down to the grass, forms natural arbours, or rather stables, in which the cattle repose during the heat of the day. The negroes use them to wattle the walls of their huts, and call the bush "Alligator Tree," probably from the two Spanish words "*a ligar*," to tie with. Where it stands free, it attains the size of a full-grown apple-tree; but it invariably, I believe, grows within shelter of some other and larger one.

Except this genus and *Trichilia*, I found no other in Jamaica that had the character of leaf above described.

The President exhibited numerous specimens of recent and fossil *Cycadeæ*. Among these was a fine specimen of a new species (*Cycadites Saxbyanus*, R. Br.) found in the Isle of Wight by Mr. Saxby of Bonchurch. The President remarked that all the specimens of *Cycadites* hitherto found in the Isle of Wight agreed in having an elliptical outline, unaccompanied with any inequality in the woody ellipsis, and also in having a bud in the axilla of each leaf; in these respects differing from the *Cycadites* of the Isle of Portland and from all the recent species of *Cycadeæ* with which we are acquainted, which have a circular outline and only scattered buds.

Anniversary Meeting.

May 24.

Robert Brown, Esq., President, in the Chair.

This day, the Anniversary of the birth of Linnæus, and that appointed by the Charter for the election of Council and Officers, the President opened the business of the meeting, and the Secretary read the following Notices of those Members with whose decease the Society had become acquainted since the last Anniversary:—

John James Audubon, deservedly celebrated as one of the first of ornithological painters, was of French extraction, but born in the neighbourhood of New Orleans. At an early age he was taken to France, where he received the rudiments of education, and studied

the elements of design under David ; but at the age of seventeen he quitted France to return to America, and devoted himself to the study of nature, which had from childhood been his favourite and engrossing pursuit. He was presented by his father with a "plantation" on the Schuylkil River, in the State of Pennsylvania, and for nearly twenty years attempted various branches of commerce, but with little success, his mind being wholly intent on rambling through the woods, the lakes and the prairies of the Western World, and delineating the natural objects with which they abound. At length, in 1810, he established a new home for his family in the State of Kentucky, and betook himself entirely to travelling in pursuit of the objects of his ever-increasing predilection. In April 1824, when he had formed a very large collection of drawings, he visited Philadelphia, and there became acquainted with Charles Lucien Bonaparte, and with other naturalists, whose commendations of his labours first led to his idea of publishing the materials which he had spent his life in collecting. Over this idea he long brooded ; and finding that it was in vain to think of publication in his native land, he determined to visit England, for which he set sail in 1825 or 1826. He landed at Liverpool, and proceeded through Manchester and Carlisle to Edinburgh, where he was received with the utmost cordiality, and where he commenced the publication of his ornithological illustrations, under the title of 'The Birds of America.' This magnificent and costly work was completed in 1838, and contains 435 plates of the largest size yet employed for objects of natural history, every bird being figured of the size of life, and the number of figures amounting to 1065. From Edinburgh he proceeded to London, to which city the publication of his work was soon afterwards transferred ; and in 1828, in company with Mr. Swainson, he visited Paris. After spending the winter of that year in England, he set sail for America in the spring of 1829 ; and early in the following year returned to England with his wife. From this time until the completion of his great work he continued to share his time between America and England, making, during his sojourn in the former, numerous journeys and voyages into the less known portions of the North American continent, and adding greatly to his stores of ornithological drawings. These journeys supplied many vivid sketches to the illustrative text of his work, which he published separately under the title of 'Ornithological Biography, or an Account of the Habits of the Birds of the United States of America.' 5 vols. 8vo. London, 1831-1839. In the last-named year he returned to America, which he did not again quit, but busied himself, in conjunction with Dr. Bachman of

Charleston, in preparing for the press 'The Quadrupeds of America,' in the same magnificent form. In this work he also received the assistance of his two sons, Victor Gifford and John Woodhouse, who inherit in a high degree their father's talents as an artist. His death took place, at the age of 76, on the 27th of January in the present year, at his residence on the banks of the Hudson River, in 155th-street, New York. He became a Fellow of this Society in 1828, and was also a Fellow of the Royal Societies of London and Edinburgh, and of many other scientific bodies.

John Brown, Esq., M.D., who had for many years practised as a physician at Boston in Lincolnshire, was one of the magistrates of that borough, and highly respected by his fellow-townsmen. He was fond of botany, and his garden evinced a considerable taste for horticulture. He became a Fellow of the Linnean Society in 1826, and died at Boston on the 30th of January 1851.

Charles Ducane, Esq., Capt. R.N., of Braxted Lodge in the county of Essex, entered the Navy in 1803, commanded a gun-boat in the Walcheren Expedition, was made acting Lieutenant of the Parthian brig in 1809, Commander in 1815, and in 1824-25 officiated as Inspecting Commander of the Coast Guard. Capt. Ducane was much attached to zoological studies; and published several interesting memoirs "On the Metamorphoses of the *Crustacea*." He became a Fellow of the Linnean Society in 1846, and died at Bath on the 17th of last November.

The Rev. Robert Bransby Francis, M.A., one of our oldest Members, having been elected into the Society in 1798, was educated at Corpus Christi College, Cambridge, at which University he took the degree of B.A. in 1790, and of M.A. in 1794. He became Rector of East Carleton in the county of Norfolk, on the presentation of the Corporation of Norwich, in 1812; and continued to reside there till his death, which took place on the 27th of April 1850, at the age of 82. He was much attached to botany, and well acquainted with our native plants.

Edward Horne, Esq., B.C.L., was in early life much attached to botany, and during the time that he continued an inmate with his father at Clapham and at Bookham Grove, was a frequent companion to Mr. Woods in his botanical excursions. After his father's death, he resided for a short time with his mother in Russell-square, and then took up his residence at Florence, where for the last twenty or thirty years of his life he was a martyr to rheumatism. He became a Fellow of the Linnean Society in 1812, and died at Florence on the 18th of March in the present year.

The Rev. Stephen Long Jacob, by seniority the fourth on our List of Fellows, was educated at Worcester College, Oxford, and took his degree of M.A. in 1787. In 1799 he was collated by Archbishop Moore to the livings of Waldershare and Whitfield in the county of Kent, and in 1806 presented by the Dean and Chapter of Windsor to that of Woolavington cum Puriton in Somersetshire, which together with the former he held until his death. He died at Woolavington, on the 4th of February in the present year, at the age of 86. His election into the Linnean Society bears date in 1795, and he had consequently been a Fellow for more than fifty-five years.

The Rev. William Kirby, M.A.—Of this truly excellent naturalist and amiable man a biographical account is now in preparation by a relative well-qualified for the task. In the meantime, as the essential features of his long and useful life had already been sketched in a notice communicated to the Entomological Society by his friend and fellow-labourer Mr. Spence, the Secretary availed himself of the kind permission of that gentleman to repeat the substance of it here:—

Mr. Kirby was descended from a family deserving honourable mention, from its connexion with literature. His grandfather, John Kirby, born in the year 1690, was author of 'The Suffolk Traveller,' a work of no mean reputation in its day. His uncle, Joshua Kirby, was the author of Dr. Brook Taylor's 'Perspective made Easy;' he was an intimate acquaintance of Gainsborough, and frequently his adviser; and such was Gainsborough's regard for his friend, that he made a special request in his will that he might be buried by his side; a desire which was carried into effect. This Joshua Kirby afterwards became a great favourite with His Majesty George III., and received, through his patronage, the office of comptroller of the works at Kew. The celebrated Mrs. Trimmer was his daughter, and consequently first-cousin to our deceased Fellow. Mr. Kirby was born in the year 1759, at Witnessham Hall, in the county of Suffolk, the residence of his father, who was by profession a solicitor; he was educated at the Grammar School in Ipswich, whence he removed, in his seventeenth year, to Caius College, Cambridge. Here he pursued his studies with diligence, and laid so good a foundation, that he subsequently earned the reputation of being a sound and accurate scholar. In the year 1781 he took the degree of B.A.; in the year 1782 he was admitted into Holy Orders, having been nominated by the Rev. Nicholas Bacon to the joint curacies of Barham and Coddendam, near Ipswich. By his exemplary conduct in the discharge of his parochial duties, he

so gained the esteem of Mr. Bacon, that he left him by his will the next presentation to the rectory of Barham; to this he was inducted in the year 1796, so that for sixty-eight years he exercised his ministry in the same charge, residing also in the same parsonage-house. His first taste for natural history was excited by his mother having been accustomed to lend him, when a child, occasionally as a treat, some of the foreign shells in her cabinet to look at and admire. This early admiration of the works of creation led him, soon after he entered on his curacy at Barham, to direct his attention to botany, and he closely studied and made a collection of all the phænogamous plants in his neighbourhood. When these were exhausted, his attention was turned to entomology, by the circumstance of observing on his window a yellow cow-lady (*Coccinella 22-punctata*), his admiration of which led him to collect other insects; and as great events often arise from trifling causes, the whole of his entomological career probably depended on his having been struck by this insect. The energies of his powerful mind were also with equal diligence directed to the study of theology. In the year 1829 he published a volume of Sermons, partly (to use his own language) to show that while he devoted so much of his time to the study of God's works, he had not been negligent of his Word. Subsequently he was appointed to write one of the ' Bridgewater Treatises,' which he published in the year 1835; and the manner in which he executed this task, although then in his seventy-sixth year, is too well known to need any comment.

Mr. Kirby was twice married, but left no issue. Besides being Honorary President of the Entomological Society from the time of its foundation, he was President of the Ipswich Museum, Fellow of the Royal, Zoological and Geological Societies, and Honorary Member of numerous foreign societies. He was elected into the Linnean Society in 1796; and had consequently been fifty-four years a Member at the period of his death, which took place at Barham on the 4th of last July, in the ninety-first year of his age. He was interred on Thursday (the 11th), in the chancel of Barham Church. The funeral, in compliance with his expressed wish, was as private as possible, but a great number of friends, nearly the whole of his own, and many from the adjoining parishes, attended to pay the last tribute of respect to his great worth.

Many years since he presented to the Entomological Society his entire collection of insects; invaluable, as being the depository of his entomological discoveries during a long life, and of the precise individual species referred to in his papers in the ' Linnean Trans-

actions,' and in his general works on the science. Had he published no other work than his 'Monographia Apum Angliæ,' his first separate one, which appeared in 1802, he would have ranked as one of the first entomologists of the age; a title which was at once assigned to him by every student of the science, foreign as well as British, capable of estimating the unwearied perseverance with which he had collected his materials, the value of his new observations on the anatomy of Bees, and the large and philosophical grasp with which he had arranged them, under the families (or, as they are now considered, genera) into which he distributed them. Nothing can show more strikingly the ardour of his zeal for the science, than the fact that he took lessons in the art of etching, to enable him to give from his own hand sketches of the parts of the mouth, on which his family characters mainly depended. But when to this great work we add his 'Monograph of Apion,' 'Century of Insects,' memoir 'On the order Strepsiptera,' and other valuable papers in the 'Transactions of the Linnean Society;' the 'Introduction to Entomology,' written in conjunction with Mr. Spence; his Bridgewater Treatise, 'On the History, Habits and Instincts of Animals;' and the 'Description of the Insects of the Northern parts of British America,' occupying a quarto volume of Sir John Richardson's 'Fauna Boreali-Americana;' it will be evident how extensively and successfully he cultivated natural science, and how deeply it is indebted to him.

In the 'Proceedings of the Entomological Society,' from which the preceding particulars are derived, Mr. Westwood has furnished a critical notice of Mr. Kirby's numerous contributions to science, which completely supersedes the necessity of any other list.

James Macfadyen, M.D., was a native of Glasgow, in which city his father was an eminent music-seller. He himself, while a student of the University there, destined for the medical profession, distinguished himself by his great love of natural history, more especially in the botanical class, and took his degree of M.D. about the year 1821 or 1822. He was on the point of practising as a physician in his native city, when the late Mr. George Hibbert wrote to request Sir William Hooker to recommend a well-educated botanist, competent to take charge of a garden which the local government in Jamaica contemplated forming at Bath (in that island). Dr. Macfadyen was immediately appointed on Sir William Hooker's recommendation, and established the garden, which unfortunately, owing to the very depressed condition of the colony, was too ill-supported to justify his continuing long to superintend it. He con-

sequently gave up the garden and established himself in medical practice, which proved very lucrative. After some years he embarked his savings in the purchase of land and retired from practice. This kind of property, however, becoming greatly reduced in value, and having a family to provide for, he was again obliged, scarcely two years ago, to have recourse to his profession for a livelihood. He was most active among all classes of people during the prevalence of the cholera, which has lately so devastated that island, and in the course of his professional labours he took the disorder himself and fell a victim to it. His kind and benevolent disposition endeared him to a large circle of friends, and his hospitality to strangers, especially naturalists, visiting Jamaica, was almost proverbial.

In 1837 he printed, at Glasgow, and at his own expense, the first volume of his 'Flora of Jamaica,' which extended as far as the end of Leguminosæ, following DeCandolle's arrangement. It described in popular language the then known species of the island, and treated largely on the uses and properties of the native plants. Its limited sale and the arduous duties of his profession retarded the continuation till last year. A great portion of the second volume was actually printed in Jamaica, including a very considerable number of new species, when the further progress of the work was arrested by his sudden decease. He was elected a Fellow of the Linnean Society in the year 1838, and the intelligence of his being chosen a Fellow of the Geological was sent out only a few days before his decease. Besides the 'Flora of Jamaica,' Dr. Macfadyen wrote and published in the island an account of the *Nelumbium Jamaicense* of Patrick Browne, and of the particulars of its re-discovery nearly a century after Browne had noticed it; and he also published several memoirs relating to the commercial and agricultural welfare of Jamaica.

Joshua Milne, Esq., well-known to many among us as an intellectual companion and amiable man, was in early life a clerk in the banking-house of the Messrs. Currie, but subsequently became connected with the Sun Life Insurance Office, of which he was the Actuary for more than thirty years. He was best known as a mathematician, and his two volumes, 'On Annuities and Reversionary Payments,' published in 1815, still keep their place as one of the most complete and satisfactory treatises on that intricate subject. He also contributed to the 'Encyclopædia Britannica' two articles on Annuities and on Mortality, which are regarded by actuaries as of great practical value; and constructed from Dr. Heysham's data

of mortality the so-called Carlisle Tables, which were for many years adopted as the basis of calculation in Life Assurance Offices. He had formed a very extensive and well-selected library, said to contain the most complete collection extant on the subject of Vital Statistics, and rich also in works of Natural History; the latter science constituted the delight and recreation, as the former did the business of his life. He was particularly attached to botany, and latterly to geology also; but his especial favourites were the Mosses and *Jungermannia*, the British species of which he had carefully studied, although he never published anything on the subject. Some years before his death he retired from his official connection with the Sun Insurance Office, and died at Upper Clapton, where he had long resided, on the 4th of January in the present year, and in the seventy-sixth year of his age.

Spencer Joshua Alwyne Compton, Marquis of Northampton, late President of the Royal Society, was born on the 2nd of January, 1790, educated at Trinity College, Cambridge, and took his degree of M.A. in 1810. Lord Compton entered Parliament in 1812, as the successor of Mr. Percival, whose near relation he was, in the borough of Northampton. In 1815 he married Miss Maclean Clephane, daughter and heiress of General Clephane, and for many years Rome became the favourite residence of Lord and Lady Compton, and their house the centre of attraction to the genius and talent of every country congregated there. In 1828 Lord Compton succeeded, by the death of his father, to the Marquisate of Northampton, and in 1830 he had the misfortune to lose his amiable and accomplished wife, who died suddenly soon after her confinement. In science, Lord Northampton attached himself more especially to geology, and he was one of the earliest Presidents of the Geological Society. He presided at the Sixth Meeting of the British Association for the Advancement of Science, held at Bristol in 1836, and at the Eighteenth, held at Swansea in 1848. From 1838 to 1849 he filled the Chair of the Royal Society, in which important position he distinguished himself by his general information in matters of science, literature and art, by his mild and courteous demeanour, by the simplicity of his mind, and the impartiality of his conduct. The death of his son-in-law, Lord Alford, at the commencement of the present year, affected him greatly; his constitution, always weakly, seems to have given way under the shock, and he died on the 17th of January, at his seat at Castle Ashby, of a quiet and almost insensible decay, at the age of sixty-one.

Alexander Raphael, Esq., M.P., was by descent an Armenian,

but of the Roman Catholic religion, to purposes connected with which he is said to have contributed during the last few years of his life sums amounting to £100,000. He served the office of Sheriff of London and Middlesex in the year 1834, was in the following year returned to Parliament for the County of Carlow, but was unseated on petition, and sat for St. Albans from 1847 till the time of his death. He became a Fellow of the Linnean Society in 1835, and died at his house in Great Stanhope Street, May Fair, on the 17th of November last, at the age of seventy-four.

George Thackeray, D.D., and Provost of King's College, Cambridge, was the son of Dr. Thackeray of Windsor, a favourite physician of King George III., and grandson of the Rev. Thomas Thackeray, D.D., head-master of Harrow School. He was born at Harrow, passed his school days at Eton, and proceeded thence to King's College, where he took his degree of B.A. in 1802, and of M.A. in 1805, and became a Fellow of his College in the same year. He was soon after appointed to be one of the Assistant-Masters at Eton, and became one of the chaplains in ordinary to King George III., an office which he continued to hold under that sovereign's successors. In 1814 he was appointed Provost of King's College, and in the same year Vice-Chancellor of the University. Dr. Thackeray was a most erudite classical scholar, and especially distinguished by his critical knowledge of Latin. He was a great lover of old books, and had also paid much attention to natural history, in which department his library, in all respects a very valuable one, was peculiarly rich. He died in Wimpole Street on the 21st of October in the last year, leaving an only daughter the heiress of his very considerable wealth. His election into the Linnean Society bears date in 1821.

James Thomson, Esq., F.R.S., was born at Blackburn on the 6th of February, 1779. His family were nearly connected with that of the late Sir Robert Peel. At the early age of fifteen he went to pursue his studies at Glasgow; there he entered into relations of confidential friendship with Gregory Watt (son of the inventor of the steam-engine), after whose early death he remained on terms of intimacy with James Watt himself, and with Thomas Campbell the poet. He remained at college but for one year, and then entered the mercantile house of Joseph Peel and Co. in London, where he resided for six years, associating with many of the most remarkable literary and scientific men of the age; Sir Humphry Davy, Wollaston and Porson being among his intimate friends. His knowledge of chemistry attracted the notice of his employers, who think-

ing it might be rendered more available in the manufactories of Lancashire than in a London counting-house, removed him to their establishment at Church Kirk, near Accrington, where he remained nine years, having married, meantime, the eldest daughter of the Rev. Thomas Starkie, vicar of Blackburn. In the year 1811 he established himself at Primrose, near Clitheroe, where he pursued the occupation of a calico-printer for nearly forty years. Notwithstanding the claims and difficulties of an arduous business, he devoted much time to the cultivation of general science and literature, and was besides a generous patron of the arts, and a liberal contributor to public institutions. In addition to his knowledge of chemistry, which enabled him to introduce several important improvements in the processes connected with his trade, he was attached to antiquarian pursuits, and published in the 'London and Edinburgh Philosophical Magazine' for 1834 a paper "On the Mummy-cloth of Egypt, with Observations on some Manufactures of the Ancients," in which, with the assistance of Mr. Francis Bauer's microscopical acumen and accurate pencil, he satisfactorily demonstrated that the fibres of the cloth in question were of flax, and not of cotton. He died at Clitheroe, of an attack of paralysis, on the 17th of September last, at the age of seventy-two. His election into the Linnean Society dates from 1798.

James Hewetson Wilson, Esq., B.A., was the only surviving son of John Hewetson Wilson, Esq., of the Grange, Worth, in the county of Sussex. He was educated at Wadham College, Oxford, and became a Fellow of the Linnean Society in 1847. He attached himself to the study of botany, and published in 1849 a very carefully executed translation of the 'Elements of Botany' of Adrien de Jussieu. His death took place on the 12th of November last at the house of his father, while still in the prime of youth.

Robert Wray, Esq., one of the Benchers of the Inner Temple, became a Fellow of the Linnean Society in 1799, and died at Hampstead on the 10th of January in the present year, at the age of seventy-three. He was fond of natural history, and attached himself especially to entomology.

The following losses have also been sustained among the *Foreign Members* of the Society.

Heinrich Friedrich Link was born on the 2nd of February, 1767, in the Parsonage House of the Church of St. Anne at Hildesheim, of which his father was minister, and was educated at the *Gymnasium Andreanum* of his native town. He became early initiated in botanical pursuits, having at ten years old made a journey into the Hartz, in

company with his father, who was an ardent collector of plants, and with Dr. Schneckler, who afterwards married his eldest sister. He paid two other visits to the Hartz, while yet a student, under the charge of Schneckler, who also introduced him to the well-known chemist and mineralogist Von Beroldingen, his intimacy with whom gave a fresh impulse to his studies in the direction of chemistry. In 1782 he lost his father, and in 1786 he entered the University of Göttingen, where he devoted himself seriously to the study of medicine, but not without frequent deviations towards the natural sciences, his early attachment to which was greatly strengthened by his attendance on the lectures of the celebrated Blumenbach. His first published work was a Prize Essay, entitled "*Commentatio de Analysisi Urinæ et Origine Calculi*," 1788, 4to; which was followed two years afterwards by his Inaugural Dissertation on taking the degree of M.D., "*Floræ Gættingensis Specimen, sistens Vegetabilia saxo calcareo propria*," 1790, 8vo. In the last-named year appeared also his first work of any extent, '*Versuch einer Anleitung zur geologischen Kenntniss der Mineralien*,' Göttingen, 1790, 8vo. As the time for his quitting the University approached, he received an invitation from one of the towns of Southern Germany to settle there as a physician; but his nomination in 1792 to the Chair of Natural History and Chemistry in the University of Rostock determined the bent of his future life, and attached him thenceforward entirely to natural science. In the following year he married the sister of Professor Josephi of the same University, and here, in the comparative retirement of a small town and among a limited circle of scientific and literary friends, he passed nearly twenty years of his active and useful life. His next publications were, '*Beiträge zur Naturgeschichte*,' Rost. and Leipz. 8vo, 1794–1804; '*Beiträge zur Physik und Chemie*,' Rost. and Leipz. 8vo. 1795–1797; '*Grundriss der Physik*,' Hamburg, 1798; and '*Philosophiæ Botaniciæ Novæ, seu Institutionum Phytographicarum, Prodromus*,' Gottingæ, 8vo, 1798. In 1797 the Grand-Duke of Mecklenburg gave him leave of absence for two years to accompany Count J. C. Von Hoffmannsegg in a journey through Portugal, the botanical results of which were published in the '*Flore Portugaise*,' Berlin, fol. vol. i. 1809, vol. ii. 1820, one of the most splendidly illustrated botanical works that had then appeared. He also gave a narrative of his journey under the title of '*Bemerkungen auf einer Reise durch Frankreich, Spanien und vorzüglich Portugal*,' Kiel, 1801, 8vo, two parts, to which a third was added in 1804 from the communications of his friend and fellow-traveller; and his geognostic and mineralogical observations formed the subject of a

separate volume, published at Rostock in 1801. In the year 1804, the Society of Sciences at Göttingen offered a prize for the best Essay on the Structure of the Vessels of Plants, among the competitors for which were Link, Rudolphi, and Treviranus. Rarely has it happened that three such men have entered the lists on such an occasion; Link and Rudolphi had the prize divided between them, and Treviranus received the *accessit*. The Essay of the former was published under the title of 'Grundlehren der Anatomie und Physiologie der Pflanzen,' Göttingen, 1807, 8vo, with a supplement added in 1809. In the meanwhile its author had commenced the publication of a 'Beschreibung des Naturalien-Kabinetts der Universität Rostock,' 8vo, six parts, 1806-1808, which contains, among other valuable zoological observations, some important but little-known contributions to the natural history of the *Mollusca*. In the midst of these and other avocations connected with his Professorship, he twice filled the office of Rector of the University, and found time to devote himself with much energy to various patriotic duties connected with the war then raging between his country and France. The year 1811 brought him invitations to fill the Chair of Natural History both from Halle and Breslau. He chose the latter, and remained attached to that University for four years, during which time he had the honour of giving lessons on natural history to the present King of Prussia, then Crown-Prince, whose personal favour he ever afterwards continued to enjoy, and which was evinced among other marks of distinction by the affixing the name of Link to one of the new streets of Berlin. To the Professorship of Botany in the University of that capital, Link was finally removed in 1815, and at the same time appointed to the superintendence of the Botanic Garden. In this great centre of the intellect and science of Germany, his varied talents and extensive acquirements received their full development and became universally known and acknowledged. He became an active Member of the Academy of Sciences and of the Natural History Society, Medical Privy-Councillor and a Member of the Scientific Deputation in the Ministry, Director of the Botanic Garden and of the Garden of the University, of the Royal Herbarium, and of the Pharmacological Collection, and was for many years President of the Horticultural Society. For some time after his appointment to the Professorship he gave Lectures at the University on Physical Geography, Philosophy and Anthropology; but at a later period he restricted himself to General and Medical Botany, Toxicology and Pharmacology. The well-known riches of the Botanical Garden furnished him with ample materials for the prosecu-

tion of his researches; and his 'Prodromus Philosophiæ Botanicæ,' published six-and-twenty years before, now expanded itself into 'Elementa Philosophiæ Botanicæ,' Berolini, 1824, 8vo, of which a second edition was published in two vols. 8vo, Latin and German, in 1837. These were followed by a series of illustrative plates under the titles of 'Icones Anatomico-Botanicæ ad illustranda Elementa Philosophiæ Botanicæ Editionis 2ndæ,' fasc. 1-3, Berolini, 1837-8, fol.; 'Icones Selectæ Anatomico-Botanicæ,' fasc. 1-4, Berolini, 1839-42, fol.; and 'Anatomia Plantarum Iconibus illustrata,' fasc. 1-2, Berolini, 1843-5, 4to. Of the Garden itself he commenced an extensive catalogue, 'Hortus Regius Berolinensis descriptus,' of which only two volumes, published in 1827 and 1833, containing the Ferns, Grasses and Carices, were published; and he also gave his assistance to Otto in the publication of his 'Abbildungen auserlesener Gewächse des Königlichen Botanischen Gartens zu Berlin.' Besides these works, he contributed largely to the memoirs of the Berlin Academy, to the 'Magazin der Gesellschaft Naturforschender Freunde,' (in which he gave some remarkable papers on the structure and arrangement of the lower Fungi,) to the 'Jahrbucher der Gewächskunde' of Sprengel and Schrader; and to the 'Linnæa,' to which for some years he supplied an Annual Report on the progress of Physiological Botany. Among his other contributions to Science and Philosophy, and as demonstrative of the great range of his acquirements, the following cannot be omitted even in this brief sketch of his long and active career: viz. 'Die Urwelt und das Alterthum erläutert durch die Naturkunde,' Berlin, vol. i. 1821, vol. ii. 1822, of which a second edition appeared in 1834; 'Handbuch der Physikalischen Erdbeschreibung,' Berlin, 8vo, vol. i. 1826, vol. ii. 1830; 'Propylæen der Naturkunde,' Berlin, part 1, 1836, part 2, 1839; and lastly, as a remarkable instance of the vigour of his intellect at the advanced age of eighty-four, 'Die Philosophie der gesunden Vernunft,' Berlin, 1850, 8vo. During his annual vacations at the University, he made for many years a series of journeys in various parts of Europe, the scientific results of some of which are to be found among his numerous scattered publications. Thus in 1823 he visited Sweden; in 1830 and again in 1840 England; in 1831 the Tyrol; in 1833 and 1838 Greece; in 1836 Istria; Italy on several occasions, being present at the meeting of Italian Naturalists at Pisa in 1842, at Naples in 1843, at Milan in 1844, and at Venice in 1847; in 1847 he also visited Corsica, and in 1848 Belgium. After the close of the meeting of German Naturalists at Regensburg, in 1849, he travelled through a great part of Southern

Germany; and in the last year of his life he traversed the South of France and crossed the Pyrenees into Catalonia. So strong indeed was he yet in spirit, that he was seriously meditating a voyage to Ceylon, when an attack of *grippe*, combined with stone, from which he had latterly suffered much, carried him off on the first day of the present year. Respectable as a systematist, Link took a high rank as a physiological botanist; and the philosophical bent of his mind is strongly developed in those works, such as his 'Philosophiæ Botanicæ Prodrômus,' and 'Elementa Philosophiæ Botanicæ,' in which he has attempted to give a logical character to the elements of Natural Science. The mere enumeration of the titles of his works is sufficient to show that his ideas of natural history were not limited to genera and species, nor even to the anatomy and physiology of natural objects, but embraced all their relations in reference to Physical Geography, to Geology, to History and Antiquities, to Man, to Medicine and the Arts, and to Philosophy. He was a member of nearly every Scientific Society in Europe, and has left behind him in all quarters where he was known, the character of a most amiable as well as of a most learned and intellectual man. Two daughters, both married, survive him, but he had no son. His election into the Linnean Society dates from 1827, and he was also a Foreign Member of the Royal Society.

Gottfried Christian Reich, M.D., Professor of Medicine in the University of Berlin, was born at the Chateau of Kaiserhammer, in the district of Wunsiedel, in the year 1769, took his degree of M.D. at Erlangen, and became in the year 1794 Extraordinary Professor of Medicine in that University. In 1797 he published a 'Mantissa Insectorum,' supplementary to Hoppe's 'Enumeratio Insectorum Elytratorum circa Erlangam Indigenarum,' and afterwards at Nürnberg, in three volumes, a Gardener's Calendar founded on the English work of Mawe and Abercrombie. On the establishment of the University of Berlin he became first Extraordinary and afterwards Ordinary Professor of Medicine there. He contributed to the 'Magazin der Gesellschaft Naturforschender Freunde,' numerous articles on zoological and physiological subjects; but he has of late years been chiefly known by his medical works and translations, which are both numerous and valuable. He was elected a Foreign Member of the Linnean Society in 1794, and was consequently one of our oldest members. His death took place at Berlin in 1849, at the age of eighty.

George Wahlenberg, M.D., Professor of Medicine and Botany in the University of Upsal, was born in the year 1784 in the province

of Wermland in Sweden, where his father was connected with an iron-work. While a student at Upsal he became conspicuous for his love of science, and especially of natural history. His name appears as the Respondent to an Academical Dissertation by Thunberg as early as 1797; but his own Dissertation for the degree of M.D. bears date in 1806, and was followed, in that and the following year, by three others, which were collected together under the common title of 'De Sedibus Materiæ Immediatarum in Plantis Tractatio,' Upsal. 1806 and 1807, 4to. He was already at this early period an Amanuensis in the Museum of Natural History, and attached to the Royal Academy of Sciences at Stockholm in the capacity of "Stipendiarius Regius." Soon afterwards, at the joint expense of the Baron Von Hermelin and of the Societies of Science at Stockholm and Upsal, he undertook several journeys through the more distant provinces of Scandinavia, visiting Swedish and Norwegian Lapland, and also Gothland, and making extensive researches into their geology and botany. After thus investigating nearly the whole of Scandinavia, he made, at the expense of the University of Upsal, a still more extended journey, in the course of which he travelled through Hungary and Bohemia, visited the Carpathian Mountains and afterwards Switzerland, and returned through Germany to Upsal in the year 1814. His most important botanical works are:—

1. 'Flora Lapponica,' Berolini, 1812, 8vo;
2. 'De Vegetatione et Climate Helvetiæ Septentrionalis,' Turici, 1813, 8vo;
3. 'Flora Carpathorum Principalium,' Gott. 1814, 8vo;
4. 'Flora Upsaliensis,' Upsaliæ, 1820, 8vo;
5. 'Flora Suecica,' Stockholm, 2 vols. 8vo, 1824–26, of which a second edition was published in 1831–33;
6. the ninth volume of 'Svensk Botanik,' of which he was named editor in 1825, but the continuation of which he afterwards resigned to Prof. Wahlberg.

He contributed also many valuable papers to the 'Magazin der Gesellschaft Naturforschender Freunde,' at Berlin, and to the 'Transactions of the Swedish Academy.' In all these works he proved himself a most careful and original observer, admitting nothing which he had not examined himself, unless it were capable of standing the test of the severe criticism to which he subjected his own observations as well as those of others, and constantly exhibiting an earnest desire to contract rather than to increase the number of species. In a critical knowledge of the plants of Northern and Central Europe he scarcely had a rival; and the value of his systematic works is greatly enhanced by his profound researches into the climate, the physical geography, and the geological character of the countries whose flora he has illustrated, which

place him in the very first rank of geographical botanists. As a geologist he is also much distinguished by his description of Kemi-Lapland and by other important works. He died at Upsal on the 7th of April in the present year. His election into the Linnean Society bears date in 1829.

June 3rd.

R. Brown, Esq., President, in the Chair.

A letter was read from Prof. L. C. Treviranus, F.M.L.S., to Dr. Wallich, V.P.L.S., accompanying a present to the Society of a collection of original letters addressed by John Christian Daniel Schreber to Dr. Albert William Roth, and bequeathed by the latter to his friend Dr. Treviranus, who expresses himself anxious for the preservation of this valuable legacy, and presents it to the Linnean Society in testimony of his respect and attachment. To the packet were also added eleven letters from Xavier Wulfen to Roth; and the special thanks of the Society were directed to be offered to Prof. Treviranus for his interesting present.

Mr. Westwood, F.L.S., stated that the large wingless bird which he had mentioned at the meeting of the 17th of Dec., had been found on Cato's Reef, and that a number of living specimens had been procured and sent to Mr. W. S. M^cLeay, F.L.S., at Elizabeth Bay, by whom they had been kept in confinement.

Mr. Newport, F.L.S., gave verbally a summary of his observations on the Impregnation of the Ovum in *Amphibia*, as contained in a paper ordered for publication in the 'Philosophical Transactions.'

June 17th.

Robert Brown, Esq., President, in the Chair.

Dr. Adamson, at the request of the President, exhibited several vegetable fossils from Southern Africa, in the neighbourhood of the No. XLVII.—PROCEEDINGS OF THE LINNEAN SOCIETY.

Cape of Good Hope. These were of two kinds, one occurring as upright cylindrical bodies, and the other in the form of spreading aloë-like groups of fleshy leaves; both being found in the sandstone of the district near Wynberg.

Read a Letter from Thomas Forster, Esq., M.B., F.L.S., dated from Bruges, May 21st, 1851, and addressed to the Secretary, containing some observations "On the present season in relation to the Migration of Birds and other Natural Phænomena."

Dr. Forster commences his letter by referring to a passage in White's 'Natural History of Selborne,' where it is remarked that the Swallow-tribe, and particularly the Martins, must suffer great devastation in the course of their winter migrations, inasmuch as, in certain seasons "the numbers of single birds which return in the spring bear no manner of proportion to those who retire in autumn." Dr. Forster's Journal, now of forty years' standing, shows that this disproportion is greatest in late springs, particularly when accompanied with much wet and windy weather. The present season has been especially remarkable. After a winter the mildest ever remembered in Belgium, the spring was cold and showery, and nearly all the periodical phænomena were later than usual; while many tribes of plants suffered severely from some obscure atmospherical influence, apparently referable to the same class of causes which produce epidemics in the human subject and epizooties among animals. The *Hyacinthus plumosus* died off in most gardens, and also the *Muscari racemosus*. As soon as the flowers showed themselves the stock began to wither and in a few days died away, whole beds going off in the same way. Great numbers of Tulips perished in the ground; the leafing of trees was very late; and the Mulberry had not at the date of the letter shown any signs of budding. The Swallow (*Hirundo rustica*) arrived on the 18th of April, and had become pretty numerous. The Swift (*Hirundo Apus*) came on the 7th of May, in less numbers than usual. Dr. Forster had not yet (on the 21st of May) seen the Sand-Martin (*Hirundo riparia*), which is usually found in April; and even of the Martin (*Hirundo urbica*), usually plentiful at Bruges in the first week of May, the most careful search had not enabled him to detect a single bird. The Nightingale and Black-cap came to their time, but the Grey Wag-tail was not seen until the day of the date of the letter. The remarkable scarcity of flying insects, the usual food of the swallows, caused them to seek for other species, and a naturalist of the neighbourhood had assured Dr. Forster that he saw them hunting for their prey on

walls and trunks of trees, like the Creeper, a fact which Dr. Forster considers as tending to support his opinion of the reasoning powers of animals. Up to this time the Cockchafer (*Melolontha vulgaris*), although usually abundant, had not made its appearance; nor had another constant inhabitant of the gardens, *Buprestis nitens*, yet been seen. The large black Cockroach had increased to an alarming extent in many of the old houses and on the premises of the bakers. Some foreign newspapers had erroneously spoken of the weather as fine in Belgium, but there had been only three tolerably fine days since the 21st of March, and the average temperature since the 25th of that month had been 8° Fahr. below the mean.

Read also, a Memoir "On the position of the Raphe in Anatropal Ovules." By Benjamin Clarke, Esq., F.L.S. &c.

Mr. Clarke believes that this character, which has hitherto attracted but partial attention, is a character of much constancy in the several families, and therefore deserving a more complete examination. He states the most usual position of the raphe, when each of the carpellary margins bears a single row of anatropal ovules, as in *Pæonia*, to be lateral and turned towards the raphe of the ovules of the opposite row; and the curvature of the ovule has the same direction even in cases where the ovule is not anatropal, as in *Colutea arborescens*. The position of raphe with reference to placenta is less regular where the ovules are more numerous, but in some cases, as in *Gomphocarpus*, it is observed to be always next the placenta, the ovules being pendulous with long funiculi; and in *Cuphea* and *Reaumuria* also next the placenta with the ovules erect.

It is, however, when the anatropal ovule is single that Mr. Clarke believes the position of the raphe affords the most important characters, and he proceeds to consider the various relations which it bears to the placenta under six different heads, as follows:—

1. Ovule pendulous; raphe turned away from the placenta.
2. Ovule pendulous; raphe lateral.
3. Ovule pendulous; raphe next the placenta.
4. Ovule erect; raphe turned away from the placenta.
5. Ovule erect; raphe lateral.
6. Ovule erect; raphe next the placenta.

1. *The pendulous ovule, with the raphe turned away from the placenta*, was first observed by Mr. Brown, and afterwards figured and described by Dr. Schleiden as "ovulum spurie pendulum anatropum, raphe aversâ." Mr. Clarke finds it to be of more frequent occurrence than is generally supposed; it is found among Endogenous

plants, not only in *Typha* and *Sparganium*, but also in *Chamædorea elegans* (the ovule of which is, however, not completely pendulous); and *Zannichellia* and *Potamogeton* show a decided tendency towards it by the direction to which the ovule curves. He considers it a principal argument in favour of its being frequent at least, if not constant, in Endogenous plants, that it occurs in those groups by means of which the Endogenous and Exogenous divisions approach each other, as in *Aroideæ* and *Piperaceæ*, and in *Ranunculaceæ* and *Alismaceæ*. As Exogenous plants, in which the raphe is averse, he instances,—1. *Ranunculaceæ* (when the ovule is pendulous); 2. *Nelumbium*; 3. *Malpighiaceæ* (in those genera in which the funiculus is next the dorsal rib of the carpel); 4. *Coriaria*; 5. *Rhus Toxicodendron*, and not improbably *Anacardiaceæ* generally; 6. *Euonymus*; 7. *Visnea*; 8. *Pennantia*, which he thinks should perhaps be referred to *Olacineæ*; 9. *Chenopodiaceæ*; 10. *Amaranthaceæ*; 11. *Paronychia capitata* (in the three last cases the ovule is not completely inverted, being campylotropal, but the direction of the curvature is such, that were the inversion complete, the raphe would be averse); 12. *Plumbagineæ*; 13. *Laurineæ*; 14. *Aucuba*; 15. *Calycanthus* (in which the ovule at the base is erect with the raphe next the placenta, and the upper one or two ovules are bent away from the placenta so as to become nearly horizontal, showing a tendency to *raphe aversa*); 16. *Belvisiæ*?; 17. *Dipsacus sylvestris*; 18. *Galenia* and *Tetragonia*; 19. *Fumaria officinalis* (which shows at least a decided tendency to the same structure in having the radicle beneath the horizontal seed and turned to the hilum). Mr. Clarke adds, that he has examined numerous cases where the carpel when single is anterior, and has not yet met with any examples of this character, except in the instances of *Dipsaceæ*, *Tetragoniæ* and *Fumaria*. He notices some remarkable variations in the position of the raphe in the ovules of *Visnea Mocanera*, both when solitary and when there are two; and concludes this section by some observations on the question whether the campylotropal ovule of *Amaranthaceæ*, &c. (in which the embryo subsequently formed is turned towards the placenta) is a character equivalent to the pendulous anatropal ovule with *raphe aversa*. That it is so, he thinks proved by the examples of *Statice* and *Plumbago*, the structure of which he describes and compares with that of *Gomphrena* and *Philoxerus*; and he adduces the instances of *Trianthema* on the one hand, and *Galenia* and *Tetragonia* on the other, as well as certain genera of *Sapindaceæ*, in which the embryo is more or less curved, to show that there is no absolute distinction between anatropal and campylotropal ovules.

2. *The pendulous ovule, with the raphe lateral*, is a character of frequent occurrence; it was particularly noticed and accurately figured in *Cornus* and *Marlea*, in Sir W. Hooker's 'Journal' for May 1850. Mr. Clarke has hitherto observed it in only two instances in which the carpel may be considered as anterior, viz. in *Goniocarpus* and *Valeriana*; but it is nearly so in *Trichocladus*, and probably also in *Morina*. He has not yet observed it among Endogenous plants. Of its occurrence among Exogenous plants, he enumerates the following instances:—1. *Malpighia*, and other genera of *Malpighiaceæ*, in which the funiculus (representing the raphe) is constantly lateral; 2. *Suriana*, as figured by Prof. Lindley; 3. *Ilex*; 4. *Halesia*; 5. *Viburnum*; 6. *Acrotriche*; 7. *Myoporum*; 8. *Lonicera* (*sp. loculis uniovulatis*); 9. probably in the 1-seeded fruits of *Oleina*; 10. *Thesium*. This section concludes with some observations on the variation from *raphe aversa* to *raphe lateralis*, which sometimes occurs in the same family, as in *Cornea* and *Malpighiaceæ*, which Mr. Clarke believes to offer an explanation of the variable relation of the ovule to the funiculus, which is common to both *Illecebreæ* and *Chenopodiaceæ*.

3. *The raphe next the placenta* is well known as the most ordinary position in pendulous anatropal ovules, and Mr. Clarke only suggests the inquiry whether solitary ovules having this character ever occur among Endogenous plants.

4. *Of the erect ovule, with the raphe turned away from the placenta*, Mr. Clarke has met with only three instances, two of them occurring in cases where there are two ovules. These are *Penæa fruticulosa* and *Calytrix virgata*, in the latter case less completely averse than in the former. The principal instance, however, is that of *Compositæ*, where the raphe in four or five genera examined was always found to correspond with the anterior angle of the ovary. That the anterior is the fertile carpel in *Compositæ* Mr. Clarke thinks is shown (in addition to the arguments previously adduced by him) by the fact that in *Aster Sibiricum*, he has always found the ovule to arise more or less distinctly from the posterior side of the ovary, and that the same circumstance occurs, although less distinctly, in *Centaurea nigra*. In such *Cichoraceæ* as he has examined, he has found the raphe for the most part or always lateral; but as he regards the carpella of this division of *Compositæ* as being right and left of the axis, he concludes that the position of the ovule might be expected to be different. The position of the raphe in *Berberis vulgaris* is occasionally next the placenta, but more frequently tends to be averse from it.

5. The character of *ovule erect*, with the raphe lateral (first observed by Mr. Bennett in *Rhamneæ*, and by him attributed to a torsion of the funiculus), obtains to a considerable extent among Exogenous families. It occurs regularly in *Stilbe pinastra*, and generally in one-seeded fruits of *Berberis vulgaris*; but in two-seeded fruits of the latter the raphe is removed from the placenta and placed nearer to the dorsal rib of the ovary. In *Vitis*, on the contrary, whether with one- or two-seeded cells, the raphe is always next the placenta. In a species of *Justicia*, with two ovules, placed one above the other and quite erect, the raphe is lateral; but in *Mendozia*, with a similar placentation, it is apparently next the axis. As other instances of lateral raphe with erect ovules Mr. Clarke cites *Eleagnus orientalis*, *Calamus viminalis*, and *Trianthema decandra*, the direction of the curvature in the embryo of the latter being regarded as analogous to the position of the raphe in the two former.

6. The position of the raphe next the placenta is well known to be the ordinary condition in erect anatropal ovules, and on this head the author enters into no details.

Mr. Clarke then proceeds to consider the causes by which these differences in the position of the raphe may be produced.

1. He adopts the opinion (first demonstrated by Mr. Brown) that a single ovule pendulous with *raphe aversa* is the result of an erect ovule pressed or growing downwards from the elongation of the cavity of the ovarium in that direction, while its upper part remains stationary; but suggests that it is only when an erect ovule has the raphe properly next the placenta that it has *raphe aversa*, when it thus becomes pendulous. And looking to their affinities, he thinks it not improbable that all pendulous orthotropal ovules should be referred to the same cause.

2. He believes that a single pendulous ovule with the raphe lateral is an ovule originally extending horizontally from the placenta with the raphe lateral, as in *Ranunculaceæ* and *Cucurbitaceæ*, and subsequently pressed downwards as in the former case.

3. He maintains that a single pendulous ovule with the raphe next the placenta is the only true pendulous ovule, with the exception of pendulous campylotropal and amphitropal ovules with the foramen (and subsequently the radicle of the embryo) turned away from the placenta.

4. He conceives that one or two erect ovules with the raphe turned away or obliquely away from the placenta result from pendulous ovules pressed upwards by the elongation upwards of the cavity of the ovarium; and adduces in support of this opinion the pendulous

ovules of *Geissoloma* contrasted with the erect ovules of *Penæa*, the erect ovules of *Calytrix* compared with the pendulous ovules of the neighbouring families, and the pendulous ovules of *Calycereæ* compared with the erect ovules of *Compositæ*, provided further observation should substantiate his belief that in the last-named family the raphe is really turned away from the placenta. Such ovules he would term *spuriè erecta*, in contradistinction to the opposite case to which Sprengel has applied the term *spuriè pendula*.

5. He considers that a single ovule erect with the raphe lateral is a horizontal ovule spontaneously growing or pressed upwards by the corresponding development of the ovary; in proof of which he cites the fact that *Trianthema micrantha* has two seeds in a horizontal position, with the radicle lateral, while *T. decandra* has two erect seeds one above the other, with the radicle also in both cases lateral.

6. He considers one or two erect ovules with the raphe next the placenta (which seems general in Endogenous plants, and is frequent in all the divisions of Exogenous) as for the most part truly erect; although this position may sometimes be derived from horizontal ovules pressed upwards or spontaneously growing erect, the funiculus becoming at the same time twisted so as to bring the raphe into relation with the placenta.

Mr. Clarke then proceeds to illustrate the importance of these characters in a systematic point of view, as regards different families usually regarded as nearly related. He states that *Thymeleæ* differ from *Laurineæ* in having the raphe next the placenta, and that the same difference of relation occurs in *Sanguisorbeæ* and *Amygdaleæ*. In all the Urtical Orders with pendulous ovules the raphe is next the placenta, or if campylotropal the direction of the curvature is equivalent, and the radicle of the embryo is turned away from the placenta; while in the Chenopodal Orders with pendulous ovules the radicle is either turned towards the placenta or placed on one side of it. The characters thus indicated may also, he thinks, tend to a more natural distribution of the Orders related to *Rhamneæ*, *Rutaceæ* and *Sapindaceæ*. He refers also to the differences in this respect existing between *Berberis* and *Ranunculaceæ*, *Hedera* and *Cornus*, *Cinchonaceæ* and *Compositæ*. He states that *Erythroxyton* differs from *Malpighiaceæ* in having the raphe next the placenta; and *Selago* in a similar manner from *Myoporum* and *Stenochilus*, in which the raphe is lateral. *Scleranthus* also differs both from *Illecebreæ* and *Tetragoniæ* in having the radicle turned directly away from the placenta.

In conclusion, Mr. Clarke observes that while *raphe aversa* and

raphe lateral occur in several instances in the same family and possibly in the same genus (as the vertical and horizontal positions of the seed in *Chenopodium* appear to be equivalent characters), yet *raphe aversa*, or even raphe lateral, and raphe next the placenta are not known to occur in the same family—pendulous ovules only being understood. And also, that as far as his inquiries go, raphe next the placenta in pendulous ovules is unknown in Endogenous plants.

November 4.

R. Brown, Esq., President, in the Chair.

Richard Parr Bamber, Esq. and Hugh F. C. Cleghorn, Esq., M.D., were elected Fellows.

Read a communication from J. Couch, Esq., F.L.S., recording the discovery on the Coast of Cornwall of a species of *Onchidium* allied to *O. Celticum*, Cuv.

These *mollusca* were found by Mr. Couch in great abundance on a confined space of rocks at West Coombe, in Lantivet Bay, between Polperro and Fowey, congregated in small groups about a foot or two from the surface of the sea, where the waves break over them, ascending and descending with the tide so as constantly to maintain nearly the same relative position. When wholly immersed (in an attempt to preserve them alive) in a bottle of sea-water, they did not survive the day.

Read an Extract from a Letter addressed to the President by W. K. Loftus, Esq., the Naturalist attached to the Turco-Persian Boundary Commission, dated at Kerrind, Persia, August 6th, 1851.

In this locality, the neighbourhood of which abounds in plants producing fœtid gums, Mr. Loftus, acting on Mr. Brown's recommendation, had procured several different kinds, of which, and of the plants producing them, he gives some particulars in his letter. Two of these belong to the genus *Dorema*, Don; and a third, derived from a plant, which Mr. Loftus regards as belonging to the tribe *Sileridæ*, is called in Kurdish "beeje." The three gums have the same general properties, and grow on a limestone soil, at the

elevation of from 5000 to 7000 feet. Large quantities of gum are also produced by the wild Almond, a species of *Astragalus*, and the *Pistacia vera*, which grow abundantly in the same neighbourhood; and there is, moreover, a kind of thistle, which exudes honey, especially from the bud, on being pierced by a species of *Rhynchohora*. Mr. Loftus proposes to resume his observations, as his party proceeds northward, in the course of the ensuing summer.

November 18.

R. Brown, Esq., President, in the Chair.

Among the presents announced were an extensive Contribution of Natural Productions of Van Diemen's Land, from the Exhibition of the Industry of all Nations, presented by various Contributors through the intervention of Joseph Milligan, Esq., F.L.S., Secretary of the Royal Society of Van Diemen's Land.

Mr. Hogg, F.R.S., F.L.S. &c., presented a branch bearing several bunches of grapes ripened out of doors at Norton, near Stockton, in the county of Durham, in lat. about $54^{\circ} 35' N.$, being a higher northern latitude than any in which Mr. Hogg had previously known them to ripen in that county. The vine was of the common black-cluster kind, and had been transplanted from a hot-house, where it had previously ripened fruit abundantly. At the end of July in the present year it flowered freely; in August the berries set well; they began to change colour about the middle of September; and on the 1st of November they were perfectly ripe and very sweet in flavour, although small from want of water and from not having been sufficiently thinned.

Mr. Adam White, F.L.S., exhibited, on the part of J. H. Gilbert, Esq., Ph.D., of Harpenden, near St. Albans, a portion of a wooden cistern lined with lead and perforated with numerous holes by the *Anobium striatum*, in relation to which he entered into a detailed account of the circumstances in which it had occurred. In this case the cistern, which belonged to Mr. Curtis, a brewer of Harpenden, was made from an old fermenting tub, which had become much

worm-eaten on the outside. In 1838 it was lined with thin lead (of 5 lbs. to the square foot); but in little more than three years it began to leak, when some small holes were discovered in the lead and were soldered over. In 1842, however, the leakage had increased to such an extent that the leaden lining was removed, and a thicker one (of 18 lbs. to the square foot) was substituted. Five or six years afterwards, however, the leakage again commenced; and in 1850 it had proceeded to such an extent that the cistern was entirely removed to make room for one of iron. On taking out the lining it was clearly ascertained that the perforations from which the leakage arose were the work of an insect, which, after boring through the wood, had made its way also through the leaden lining. A specimen sent by Dr. Gilbert to the British Museum was determined by Mr. White to be the *Anobium striatum*; and similar instances of injury to wooden cisterns lined with lead were referred to as detailed in Mr. Westwood's 'Introduction to the Modern Classification of Insects,' in the 'Zoologist,' and in the 'Proceedings of the Entomological Society.'

Read the commencement of a memoir "On two Genera of Plants from the Cordillera of Chili." By John Miers, Esq., F.R.S., F.L.S. &c.

December 2.

William Yarrell, Esq., Vice-President, in the Chair.

Mr. Adam White, F.L.S., exhibited numerous insects belonging to Mr. S. Stevens, F.L.S., collected by Mr. Bates in South America, and others belonging to Mr. Frederick Smith; made some observations on the various species exhibited; and read extracts from Mr. Bates's letters to Mr. Stevens, on the subject of his travels and collections.

Read the conclusion of Mr. Miers's memoir "On two Genera of Plants from the Cordillera of Chile."

Both these plants were collected by Mr. Miers in his rapid journey over the Cordillera in 1825. The first belongs to the tribe of *Erio-*

goneæ, from all the known genera of which it is distinguished by its very slender ramifications, which are in every axil dichotomously divided, the solitary involucre on a lengthened capillary pedicel springing from the middle of each bifurcation, and by the proportion of its floral parts. The author gives his reasons for regarding the floral envelopes in *Polygoneæ* as constituting a calyx and corolla, which, in all described *Eriogoneæ*, have a ternary arrangement with 9 stamina and 3 styles; but the present genus differs in the quaternary disposition of the envelopes, accompanied by 8 stamina and 4 styles. He had at first regarded it as entirely undescribed, the characters of *Oxytheca*, as given by Mr. Nuttall in the 'Journal of the Academy of Natural Sciences of Philadelphia,' 2nd series, vol. i. p. 169, deviating widely from those observed by himself on the Chilean plant; but the examination of a specimen of *Oxytheca* from Mr. Nuttall himself, in Sir W. J. Hooker's Herbarium, has convinced him that, notwithstanding these apparent discrepancies, his plant is referable to the same genus, the characters of which he is compelled to modify as follows:—

OXYTHECA, Nutt.

CHAR. GEN. *Involucrum* 3-5-florum, tubulosum, subtetragonum, ad medium 4-5-partitum; laciniis subæqualibus, acutis, longissimè aristatis. *Flores* hermaphroditi cum masculis interdum intermixti, pedicellati, bracteati, subexserti, demùm cernui. *Sepala* 3-4, petaloidea, æqualia, oblonga, unguiculata, valdè imbricata. *Petala* 3-4, sepalis alterna et subsimilia, tenuiora, glabra, imbricata, et cum illis persistentia. *Stamina* 6-8, e summo gynophoro orta, inclusa, 3-4 alterna breviora sepalis opposita; *filamenta* filiformia, apice inflexa; *antheræ* rotundatæ, cordatæ, dorsifixæ. *Ovarium* ovatum, 3-4-gonum, stipitatum, petalis tertio brevius, 1-loculare; *ovulo* basilari, erecto. *Styli* 3-4, breves, erecti, demùm divaricati; *stigmata* capitata. *Achenium* 1-sperum, ovale, 3-4-costatum, sepalis petalisque emarcidis arcuè tectum. *Semen* loculum implens; *testa* membranacea. *Embryo* spiralis, antitropus, intra albumen farinaceum inclusus; *cotyledonibus* cochleatorotundis, foliaceis, accumbentibus; *radiculâ* illis triplò longiore, teretibus, subulatâ, hemicyclîcâ, apice recto verticem spectante.—Herbæ *suffruticulosæ Californicæ et Chilenses, Andicolæ, sesquipalmares, valdè ramosæ*; ramis *gracilibus, in quâque axillâ 2-3-chotomè divisis*; foliis radicalibus *congestis, lineari-subulatis, caulinis bracteiformibus, axillaribus, ternis, basi connatis, hinc breviter vaginantibus*; involucre *longè pedunculato e quâque dichotomiâ orto*; floribus *minutis, sigillatim præcocioribus*; pedicellis *basi bracteâ lineari, aristatâ, breviorè donatis*.

OXYTHECA SPICULATA, dichotomè ramosa, ramulis gracilibus divaricatis glanduloso-pilosis, foliis radicalibus congestis spathulato-linearibus utrinque pilis eglandulosis asperis, pedunculo axillari capillaceo, invo-

lucris dentibus 4 aristâ acuforni longissimâ armatis, floribus 4-meris, staminibus 8, petalis rubentibus apice patentibus.

Hab. in Andium Chilensium descensu Orientali, inter Mendoza et Aconcagua, circa rivulum S^{te} Mariæ, altitudine 8000 ped.

The other genus described by Mr. Miers is a nearly aphyllous shrub, with straight, erect, virgate branches, terminating in spines, and belongs to the family of *Bignoniaceæ*, from some of the usual characters of which family it offers, however, a striking deviation, the ovarium being simply bilocular, with a few ovules suspended on the two faces of the dissepiment, and the fruit forming a small oval drupe, containing a single osseous indehiscent nut, which is 1-celled by abortion, and contains only a single pendulous seed entirely filling its cavity, and consequently quite apterous, oval, with a small thick superior radicle and two plano-convex fleshy cotyledons. This was discovered by Mr. Miers on the skirts of the eastern declivity of the Andes, near Mendoza, on the margin of the desert tract called "La Travesia," where it was also found by Dr. Gillies. Its characters are as follows:—

OXYCLADUS, *Miers*.

CHAR. GEN. *Calyx* gamophyllus, 5-dentatus, persistens. *Corolla* gamopetala; tubo cylindrico, calyce 2-3-plovè longiore, vix gibbo; limbo brevi, 5-lobo, subbilabiato, lobis rotundatis; labio inferiore 3-lobo, lobis paululò majoribus, superiore bilobo, in æstivatione imbricativâ semper exteriori. *Stamina* 5, corollæ lobis alterna, quorum 4 didynama, quinta superior brevissima ananthera; 2 inferioribus longioribus faucem attingentibus, 2 lateralibus illis tertio brevioribus; *filamenta* paullò supra basin tubi inserta, filiformia, glabra; *antheræ* rotundatæ, reniformes, cordatæ, 2-lobæ, connectivo dorsali cordiformi adnatæ et huic in medio lorum anticifixæ, lobis ovalibus divaricatis anticè longitudinaliter dehiscentibus. *Ovarium* oblongum, pilosum, glandulâ annulari brevi 5-lobâ glabrâ cinctum, 2-loculare; *ovulis* in quoque loculo circiter 6, supernè per paria collateralia, e dissepimenti nervo longitudinali seriatim appensa. *Fructus* subbaccatus, calyce immutato clausus. *Nux* ovata, acuta, 4-sulcata, apice 4-denticulata, 1-locularis, 1-sperma. *Semen* loculo conforme, latere superiori funiculo brevi appensum; *testa* chartacea, favoso-reticulata; *endopleura* membranacea. *Embryo* exalbuminosus; *radiculâ* superiori, crassâ, apice mamillæformi; *cotyledonibus* illâ triplò longioribus, ovatis, plano-convexis, valdè crassis.—Arbuscula Mendozensis, vix non aphylla, spinosa, ramosissima, glaberrima; ramis nitidis, erectis; floribus paucis, aggregatis, parvisculis; corollâ cærulescente.

OXYCLADUS APHYLLUS (v. v.).

Hab. prope Mendoza, ad pedem Orientalem Andium Chilensium.
Vernac. Ala.

For the reception of this curious genus, Mr. Miers has found it necessary to constitute a new tribe of the Order to which it belongs, which he subdivides as follows :—

BIGNONIACEÆ.

Trib. 1. BIGNONIÆ. *Capsula* dehiscens, 2-locularis, 2-valvis; *seminibus* numerosis alatis compressis, dissepimento utrinque affixis. *Embryo* cotyledonibus complanatis foliaceis.

Trib. 2. CRESCENTIÆ. *Fructus* drupaceus, lignosus, 2- vel plurilocularis; *seminibus* numerosis alatis v. compressis. *Embryo* cotyledonibus compressis carnosus.

Trib. 3. OXYCLADEÆ. *Fructus* drupaceus, nucem unicam 1-locularem indehiscentem includens; *semine* solitario suspenso rotundato. *Embryo* radiculâ superiore; cotyledonibus magnis ferè hemisphæricis carnosus.

Figures of both genera with detailed dissections accompanied the paper.

December 16.

R. Brown, Esq., President, in the Chair.

Read a Letter from Mr. Hogg, F.R.S., F.L.S. &c., to the Secretary, recording the capture of two species of Pipe-fish (*Syngnathus*) during the last summer, the one near the mouth of the river Tees, the other in that river near Middlesborough, by the same person, a fisherman of Stockton. The first of these, *Syngnathus Typhle*, L., measured $15\frac{3}{4}$ inches in length, and the formula of its fins, which differs in the descriptions of Donovan and Jenyns, was as follows :— D. 39; C. 10; A. (rubbed off); P. 13? The second, *S. æquoreus*, L., was $17\frac{1}{4}$ inches long; its dorsal fin had thirty-nine rays; and the caudal fin was obsolete, or rather rudimentary, the rays to the number of three (or perhaps four) being inclosed within the skin of the body; the tail was flattened at the extremity.

Read also, a "Note on the Natural History of Shetland." By Adam White, Esq., F.L.S. &c.

In this note, after referring to Dr. Hibbert's researches into the mineral riches of Shetland, to Dr. Fleming's contributions to its zoology, to Mr. Dunn's interesting work on its birds, and Mr. Hewitson's investigation of their eggs, and to the fruitful results of the

dredgings of Mr. Barlee, Mr. McAndrew and Professor Forbes, by which so much has been done to increase our knowledge of the living inhabitants of its surrounding seas, Mr. White expresses an opinion that the zoological riches of the coasts of Shetland will be found to equal, if not to surpass, those of the Firths of Forth or of Clyde, and even of the coasts of Dorset, Devon and Cornwall themselves. He refers to the two principal rarities in the flora of these islands (the *Arenaria Norvegica*, Gunner, and *Ajuga pyramidalis*, L.), and concludes by announcing the discovery by himself of a Lapland species of Humble-bee, new to the British fauna, which occurs not uncommonly in his brother's garden at Lerwick, is still more frequent in that of Mr. Bruce of Sandlodge opposite Mousa, and seems even more abundant in Unst. This was immediately recognized by Mr. Frederick Smith as *Bombus arcticus* of Dahlbom; but as a species of *Bombus* had been described by Kirby under the same specific name in the Appendix to Capt. Parry's First Arctic Voyage in 1822, and consequently ten years before the publication of Dahlbom's species, Mr. White proposes to name the latter *Bombus Smithianus*. He adds that, in accordance with Kirby's rule in his 'Monographia Apum Angliæ,' he would have preferred the specific name of *Smithiellus*, as indicating that it was named after a describer and not merely a collector, but he has felt himself compelled to adopt the name of *Smithianus* to prevent the possibility of confusion with another species of the family of *Apidae* to which the name *Smithella* has been applied.

Read further a memoir "On the Forest-Trees of British Guiana and their Uses in Naval and Civil Architecture." By Sir Robert H. Schomburgk, Ph.D. &c.

This memoir had been read at the meeting of the British Association at York, in October 1844; but as only a simple notice of this reading had appeared in the Reports of the Association, the Secretary (in whose hands Sir Robert Schomburgk had placed it) thought it desirable to read it again before the Linnean Society in order that an abstract might be published in the Society's 'Proceedings.'

The trees are mostly indicated by their colonial names, but to many of them Sir R. Schomburgk has been enabled to add their scientific designation.

Souari, *Sewarri* or *Sewarra* (*Pekea tuberculosa*, *Aubl.*). Of large size and very abundant; excellent for ship-building, mill-timber and planks, and may be obtained from 20 to 40 feet long, and from 16 to 20 inches square.

Siruaballi, Sirwaballi, Siverballi. There are four varieties or perhaps species of this tree, which belongs to the family of *Laurineæ*. They are distinguished as black, brown, yellow and white *Siruaballi*. Its spicy smell and bitter taste preserve it from the attacks of worms, either in or out of water, on which account it is in great request for planking colonial crafts.

Dakumballi. Grows on the side of rivers, and is not much used.

Marsiballi or *Accuribroed.* A tall straight tree, but not of large size. Wood hard and strong, but not very durable when exposed to alternations of wet and dry weather, for which reason it is only used in house-framing and inside work. When dried it is frequently used for torches.

Turanira or *Bastard Bully-tree.* Tall, straight, of large size, and abundant on the banks of the Demerara River. Makes good planks and framing-timbers for inside work, but is not durable when exposed to the weather.

Suradani or *Suridani.* Plentiful and of large size; principally in request for planks and timbers of colony crafts. It is of a light red colour.

Kautaballi or *Kutaballi.* Grows chiefly on the sand-hills which form the first elevations on receding from the sea-coast. Very hard, and much used for beams and inside work, but not durable when exposed to the weather.

Cakaralli or *Kukaralli.* Mostly found on rising ground along the banks of rivers, and belongs to the tribe of *Lecythideæ*. Its straightness and large size (from 30 to 40 feet long and from 6 to 14 inches square) would qualify it for masts or spars for colony crafts; but its heaviness militates against this use. It is very durable and chiefly used in house-framing; but as it is said that barnacles do not attack it, it is also employed in wharfs, &c. The bark is easily stripped off, and consists of numerous layers, which the Indians separate by beating with a stick, and the author has counted as many as seventy of these layers in a strip of bark. When separated they have the appearance of thin satin paper; they are dried in the sun, and used as wrappers for cigars.

Simaruba, or *Sumaruppa* (*Simarouba amara, Aubl.*). Grows on hill-sides to the height of 50 feet, branching and somewhat crooked. The wood resembles white pine, both in colour and quality, and makes good boards for inside work. A decoction of the bark, which is intensely bitter, is considered an excellent remedy in dysentery and other complaints of the bowels, and is much used among the Indians.

Yahou. Grows in valleys in rich soil, and is much used for the staves of casks, &c.

Wallaba (*Eperua falcata*, *Aubl.*). In great abundance along the banks of rivers, reaching 40 feet in height, and being often 2 feet in diameter. Bark reddish brown, with a thin white sap, enclosing a wood of a deep red colour frequently variegated with whitish streaks. It is hard, heavy and shining, and impregnated with an oily resin, which makes it very durable both in and out of water. It splits very easily, and is consequently generally used for palings, shingles and vat-staves, and also for posts and uprights in framing. The bark, which is somewhat bitter, is a good emetic, which is much used by the Arawak Indians in a decoction.

Curahuri or *Kuruhuru*. Tall and straight. Wood used for framing, boards and planks.

Curana, *Samaria*, *Acuyari*, *Mara*, or *Cedar-Wood* (*Icica altissima*, *Aubl.*); two varieties, as they are considered by Aublet, one having red wood and the other white. The *Red Cedar* is found only in the interior, growing to 60 or 70 feet and even higher, and from 4 to 5 feet in diameter. It has a strong aromatic smell, and is much in request for inside furnishing, bookcases and shelves, as it is found to preserve books and papers from injury by insects, and is also light, easily worked and not liable to split. Its great height would qualify it for masts, and the Indians prefer its trunk to that of any other tree for preparing their canoes. One of those employed by the author during an expedition into the interior, which was 42 feet long and $5\frac{1}{2}$ feet wide, was hollowed out of a single trunk of this tree, and was found at the end of four years' service, having previously been much used, to be as sound as when bought for the expedition, although it had been in both fresh and salt water, and hauled over land and cataracts in the interval.

Itaballi or *Copai-yé* of the Macusi Indians (*Vochoy Guianensis*, *Aubl.*). From 50 to 60 feet high, and from 2 to $2\frac{1}{2}$ feet in diameter. Wood hard, but not very durable when exposed to the weather; chiefly used for inside work, staves for sugar hogsheads, boat-oars, &c. Flowers of a beautiful yellow, highly odoriferous and very ornamental.

White Siruaballi. A tall tree; wood much lighter than the *brown Siruaballi* previously mentioned, but not so much esteemed.

Curata-yé of the Macusis (*Curatella Americana*, *L.*). A crooked tree, seldom more than 12 feet high, with crooked and tortuous branches, and a thick rough bark which frequently peels off in large flakes. The crooked branches are much used by the Indians for

their canoes, and might serve for military saddles. It grows only in the Savannahs of the interior. The leaves, which are scabrous, are used by the Indians like sand-paper to polish their blow-pipes, bows, war-clubs, &c.; and the blow-pipe being called *Cura*, the tree has thence received the name of *Curatakié*.

Burracurra, *Païra*, *Letter-wood*, or *Snakewood* (Piritanera Guianensis, *Aubl.*). This tree, which is very scarce within several hundred miles of the sea-coast, is often from 60 to 70 feet high, and from 2 to 3 in diameter. The bark is of a dark grey, and when wounded exudes a white milk. The outer part of the wood is white and very hard; the heart (which in the largest tree scarcely exceeds 6 or 7 inches in diameter) is of great weight, hardness and solidity, of a beautiful deep red, variegated with black spots of different size and figure, which give rise to its name. It is susceptible of a brilliant polish; but the small size of the mottled part, and its great value even in the colony, limits its use almost entirely to veneering, to picture-frames, to some smaller pieces of furniture, and to walking-sticks. The Indians form it into bows more for ornament than use. At the foot of the Canuku Mountains near the river Rupununi, at the Upper Essequibo, and Corentyn, it is still plentiful; but all these places being several hundred miles from the sea-coast, it is both difficult and expensive to convey it to the colony. There appears to be a variety, the heart of which is not mottled, and this the Indians are said to prefer to the other for their bows.

Wamara. A scarce tree, attaining a great height, but the only part used is the heart, which is dark brown and often streaked. Its hardness and weight cause it to be preferred by the Indians for their war-clubs: it may be had from 6 to 12 inches square, and from 20 to 40 feet long.

Cuppa, *Ruyé* (*Clusia* sp.?). A tree of large size, with a hard wood used for inside work.

Curahara or *Kurara*. Plentiful and of large size; and its durability, and not being liable to split, recommend it chiefly for timbers, knees, &c. for schooners. It is also much in request for mill-rollers, mill-timbers and planks of every description.

Yarura, *Porreka-yé*, or *Paddle-wood* (*Aspidosperma excelsum*, *Benth.*). The lower part of the trunk juts out in tabular projections, forming cavities or compartments like the *Mora*, which serve the Indians as ready-made planks, principally for the construction of their paddles. The trunk itself has the appearance of being fluted, or as if it consisted of numerous slender trees grown together along their whole length. The author states that he knows only of one other

similar instance among the forest-trees of British Guiana; in this latter case the tree produces berries, while the fruit of the Yarura is a follicle containing several suborbiculate winged seeds, attached by a long funiculus. The wood of the Yarura is light, elastic, and not apt to splinter; it might prove useful for gun-carriages, bulwarks of vessels of war, &c.; and might also, on account of its lightness, be employed in floats or paddle-wheels of steam-vessels. It is much in request for rollers in the cotton ginning machines, for which purpose it is superior to any other wood in the colony.

Purple-heart, or *Mariwayana* (*Copaifera pubiflora*, *Benth.*, and *Cop. bracteata*, *Benth.*). Rather scarce in the Coast Region, being found in the mountainous tracts above the Cataracts. There are several varieties or species, but all much alike, possessing great strength and elasticity, and used for furniture, on account both of their colour and durability. Used also for mortar-beds, being superior to any other wood in sustaining the shocks produced by the discharge of artillery. The author was assured by Col. Moody, R.E., that the Black Green-heart and the Purple-heart were the only woods that stood the test as mortar-beds at the Siege of Fort Bourbon, in the Island of Martinique. One variety (*Cop. bracteata*) is very common in the Savannahs near the rivers Rupununi, Takutu and Branco; but this is of small size compared with the others. The natives use the bark taken off entire with the ends sewn together, and strengthened by a slight frame-work for river canoes.

Mapurakuni or *Maipayé*. The bark is used by the Indians for colouring their arrow-points and pottery, as it produces a fine red colour when steeped in water and mixed with Currawéru. It is a large forest-tree.

Burueh, *Bully*, or *Bullet-tree* (*Mimusops* sp.). A tree of the largest size, often 6 feet in diameter, and having the trunk destitute of branches nearly to the top. Leaves, branches and trunk producing a whitish milk; fruits the size of a coffee-berry, and when ripe very delicious. Wood extremely solid, heavy, close-grained and durable; dark brown, variegated with small white specks; chiefly used in house-framing, for posts, floors, &c., as the weather has but little influence on it, but also esteemed the most valuable timber for the arms, shafts, &c. of windmills. It squares from 20 to 30 inches, and may be obtained from 30 to 60 feet long. In salt or brackish water it is sure to be attacked by the worms. A tree cut down by the author at Cuyuni, measured 67 feet to the first branches, and thence to the top 49 feet—in all 116 feet.

Payou-yeh (*Etaballia Guianensis*, *Benth.*). A tree growing only

near the Upper Essequibo and very abundantly along the Rupununi and Takutu, the heart of which is highly ornamental, but not more than 6 inches in diameter, and very subject to holes.

Maipurému (*Vantanea Guianensis*, *Aubl.*). Wood very subject to worms, and not likely to become of much use; but the tree presents a beautiful appearance with its large clusters of pink flowers, and is even more remarkable for its drupaceous fruit, which is furrowed like our peaches and almonds, and is cut in half by the Indians to form ornaments, chiefly for the children.

Camara, *Camacusack*, *Makoripong*, or *Ackawai-Nutmeg* (*Acrodictidium Camara*, *Schomb.*). Timber most like the *Siruaballis*, aromatic and bitter, and consequently resisting worms and insects. Trunk 40 or 50 feet high, with a circumference of 8 to 10 feet, and apt (like the *Yarura* and *Mora*) to form tabular projections at the lower part. Chiefly prized for its aromatic fruit, which is considered one of the most efficacious remedies in colic, diarrhœa and dysentery.

Greenheart, *Sipiri* (*Nectandra Rodiaxi*, *Schomb.*). The brown Greenheart is one of the most useful timber-trees of the colony, and is found in great abundance within 100 miles of the Coast Region. It grows to the height of about 60 feet, and is generally used for house-frames, wharfs, bridges, piles and planks. Within the last twenty years a large quantity has been imported into Liverpool and Greenock; and it has been even asserted that in strength and durability it is superior to English oak, than which it commands a higher price. In times of scarcity the Indians obtain from its fruit, grated and macerated in water, a fecula which is mixed with the rotten wood of the Wallaba-tree, pounded, sifted and baked into bread, in like manner with the Cassava. In the bark and also in the fruit, Dr. Rodie of Demerara has discovered a substance which forms an excellent substitute for quinine, and to which he has given the name of *biberine*. The black greenheart appears to be a mere variety.

Cartan-yek of the Macusi Indians, *Pao da Rainha* of the Brazilians. Apparently restricted to the Savannahs in the neighbourhood of the rivers Rupununi, Takutu, Branco, &c. The Brazilian name is derived from the red colour of the wood, which resembles that of the Brazil-wood of Pernambuco, to which the same name (*Queen's-wood*) is applied. It reaches a height of 80 to 100 feet; and being easily worked and of a handsome colour, promises to become of great interest to cabinet-makers. It was used by the author during his sojourn in Pirara for temporary tables, and the large size of its planks induced the military commandant to construct of it a temporary bridge across the river. The leaves are impari-pinnate, the

flowers papilionaceous, and the fruit a samara with a prickly capsule, the wing being from 4 to 5 inches in length*.

Sarabadani. Much used for furniture. It grows to a large size, and is chiefly found in swampy soil and along the banks of rivers.

Ducaballi, or *Guiana-Mahogany*, is very scarce, and is almost regarded as superior to mahogany, whence it is chiefly employed for furniture and commands a high price.

Waranana, or *Wild Orange*. A large timber-tree, which grows chiefly along the banks of the riviers Pomeroon, Supinama, &c. Much used for boat-oars and staves for sugar hogsheads. Its fruit resembles an orange, but is not eatable.

Ducaliballi. Grows to a pretty large size, but is not plentiful; the trunk is about 40 feet high, but seldom exceeds 20 inches in diameter. Wood deep red, finer, more equal and more compact than mahogany, and like the *Ducaballi* much used for furniture. Takes a fine high polish, and resembles or perhaps is identical with the Brazilian Beef-wood.

Haiwaballi, or *Zebra-wood* (*Omphalobium Lambertii*, Dec.). Grows to a large size, but is very scarce. Wood of a light brown with darker stripes, and considered the handsomest furniture-wood of the colony: it is easily worked and makes beautiful bed-posts.

Hubaballi. A light brownish wood, beautifully variegated with black and brown streaks; easily worked, takes a fine high polish, and makes beautiful furniture, and cabinet-work of every description. May be had from 6 to 15 inches square and from 20 to 35 feet long. It is by no means scarce, but is much subject to holes, which frequently render it useless.

Simeri, or *Locust-tree* (*Hymenæa Courbaril*, L.). A tree of large size and plentiful throughout Guiana, often attaining from 60 to 80 feet in height and 8 to 9 feet in diameter. Trunk destitute of branches nearly to the top. Wood close-grained, of a fine brown, streaked with veins, and well adapted for mill-timbers, as it does not split or warp. A good deal of it is sent to England to be used as trenails in planking vessels, and in beams and planks for fitting up steam-engines: it has also been found to answer well for the frames, wheels, &c. of spinning machines. The Indians and Negroes are fond of the farinaceous saccharine pulp enveloping the seeds. The gum, which resembles Copal, and produces an excellent spirit-varnish, is found about the roots of the old trees a few inches under

* From this description of the leaves, flowers and fruit, the tree is probably *Centrolobium robustum*, Mart.—SECR.

the surface of the ground, and occasionally also exuding from the trunk.

Yari-Yari or *Lance-wood* (*Duguëtia Quitarensis*). Is abundant in the interior; but the trees are seldom above 20 feet high clear of the branches, or more than 5 inches in diameter. It is considered by the coach-makers, in consequence of its elasticity and toughness, the best material for chaise or gig shafts.

Black Greenheart is only distinguished from the common Greenheart by the colour of the wood, but is so scarce in proportion to the brown, that not more than one in twenty of the trees cut down are found to belong to this variety. The wood is in great request in the island, being preferred to all others, on account of its well-known durability, for windmill-shafts, spindles and mill-work in general.

Itaka or *Itekitibouraballi* (*Machærium Schomburgkii*, *Benth.*). Wood much used for furniture: it has streaks of black and brown throughout, the outer part being pale yellow. It is not scarce, but rarely squares to more than 14 inches, and is very subject to heart-shakes. Its purple flowers have the odour of violets.

Ebony, or *Banya*. A large tree of fluted surface and uneven growth, the heart of which (seldom more than 8 to 10 inches square) is alone used: it is black, heavy, hard and strong, and generally used by the Indians for their war-clubs.

Mora (*Mora excelsa*, *Benth.*). The most majestic tree of the forests of Guiana, towering over all the rest and often reaching the height of 120 feet. It is abundant along the rivers of the Coast Region, and extends as far south as lat. 3° N. The wood is close, cross-grained, and difficult to split: it is considered by the most competent judges to be superior to oak (as it is not subject to dry-rot) and the very best wood that can be procured for ships' timbers. It may be obtained from 10 to 20 inches square, and from 30 to 40 feet long; and its branches having a tendency to grow crooked it affords natural knees, while the trunk may be used for keels, beams and planking. A full account of this useful tree was published by Mr. Bentham in the Society's 'Transactions,' vol. xviii. p. 207.

January 20, 1852.

Robert Brown, Esq., President, in the Chair.

Mr. Yarrell, V.P.L.S., communicated the following particulars of the growth of a Cedar in the garden of E. B. Johns, Esq., at Bishop's Stortford, Herts, and planted by him in the year 1832, when it was turned out of a 32-sized garden-pot. It is growing in a mild brick earth, and its present measurements (December 1851) are as follows:—

	ft.	in.
Height.....	51	0
Girth at the base.....	8	6
—— five feet from the ground.....	6	6
—— ten feet from the ground.....	6	0
—— fifteen feet from the ground.....	5	0
Length of branches from the trunk to the points.....	22	0

Read a "Note on the occurrence of an Eatable *Nostoc* in the Arctic Regions and in the Mountains of Central Asia." By J. D. Hooker, M.D., F.R.S., F.L.S. &c. Accompanied by a communication from the Rev. M. J. Berkeley, F.L.S., on the same subject.

Dr. Hooker states that on the return of Captain Penny's Expedition from the Arctic Regions, Sir W. Hooker received from Mr. Sutherland a small collection of Cryptogamic plants, among which was one, apparently referable to *Nostoc commune*, which he described as being found in great abundance upon the floating and fixed ice in Wellington Channel, occurring in detached masses drifted about by the wind, forming the only vegetable production of any importance over many square leagues, and affording shelter to *Poduræ*, with other *Crustacea* and some insects. In the neighbourhood of their winter quarters on Cornwallis Island, lat. 75° N., long. 95° W., it was so plentiful that it might be taken advantage of as food, and prove a material addition to the resources of the country in cases of extreme want. Mr. Sutherland added that he had eaten handfuls of it on several occasions, without any inconvenience; and although it was generally infested with swarms of the larvæ of flies and gnats, as well as with myriads of very active *Poduræ*, he considered it much more nutritious and agreeable than the "*tripe de roche*," and perhaps not inferior to "Iceland Moss." On showing the plant to Dr. Thomson, he drew the attention of Dr. Hooker to a very similar plant which occurs in great abundance in Western Thibet, floating

in large masses on the surface of pools and lakes in soils impregnated with carbonate of soda, and of which heaps are drifted by the winds upon their banks. It occurs as high up as 17,000 feet, and is of a green or pale purple colour; and this too appeared to Dr. Hooker to belong to *Nostoc commune*. Samples of both were forwarded to Mr. Berkeley, whose notes to the following effect were also laid before the Society.

Mr. Berkeley states that he has been unable to find any account of the chemical constituents of *Nostoc*. The chemical condition of such species as he has been enabled to examine, under the influence of iodine and sulphuric acid, seems to vary not only in the different species, but in individual specimens, and even in parts of the same specimen. In some the gelatinous matter and the chains of spores assume a more or less deep tint of violet, indicating that the greater portion consists of cellulose, perhaps in some cases partially changed to dextrine by the action of the sulphuric acid; while in other cases the prevailing tint is yellow-brown, indicating rather bassorin. No purple tint occurs where merely iodine is used, and the change therefore is not due to the presence of amyllum. In fresh specimens of *Nostoc commune*, the spores assume a beautiful green tint, which is probably due to the combined tint of the yellow protein contents of the cells and the blue cellulose of which their wall is formed. In the Arctic specimens and in English *Nostoc commune* the bassorin tint prevails, while in specimens from Thibet (probably *Nostoc salsum*, Kütz.), gathered by Dr. Thomson, in pools of water where the soil is covered with an efflorescence of carbonate of soda, cellulose is indicated, but with every intermediate shade. Mr. Berkeley has, however, found that in woody fibres which in bleaching have been exposed to salt water, a deeper purple tint is assumed than when they have been bleached by rain water, so that something may possibly be due to the peculiar place of growth of the Thibetan species. In *Nostoc edule* the yellow-brown tint is stronger than in any other specimen examined; but it is scarcely probable that any very constant chemical characters will be found to prevail in the different species. In either case there would be a very nutritious food, and one from its gelatinous condition probably easily assimilated. The habit of the Arctic species is exactly that of *Nostoc commune*, and Mr. Berkeley would not hesitate to regard it as identical, if there were no other difference than a little increase in the relative size of the threads of spores; but in parts of the fronds the chains are surrounded by a distinct gelatinous envelope, presenting an appearance somewhat similar to that of toad-spawn, which is very

visible in a transverse section. At a later period, when the chains are ready to break up at the connecting joints, no trace of this envelope is to be detected, and the plant then exhibits the true characters of *Nostoc*. It appears indeed, from the remarks of Thuret, that when the threads of *Nostoc* are first generated from the large connecting bodies, there is really such an envelope; but this exists in *Nostoc*, as far as is at present known, merely in the infant state; and consequently if the genus *Hormosiphon* is to be retained, the Arctic species must be regarded as belonging to it, for no such appearance has been detected by Mr. Berkeley either in dried or freshly-gathered specimens of *Nostoc commune*. It is possible that more extended observation may show that this character is not of the consequence attributed to it by Kützing; but in the mean time Mr. Berkeley characterizes these specimens as—

HORMOSIPHON ARCTICUS, foliaceo-plicatus viridis vel fuscescens, filis demùm (gelatinâ diffusâ) liberis.

Fronds foliaceous, variously plicate, sometimes contracted into a little ball. Gelatinous envelope at length effused; connecting cells at first solitary, then three together; threads (which are nearly twice as thick as in *Nostoc commune*) breaking up at the connecting cells, so as to form two new threads, each terminated with a single large cell, the central cell becoming free. Of these threads and of their gelatinous envelope Mr. Berkeley gives figures.

With regard to the Thibetan *Nostoc*, Mr. Berkeley adds that a species of this genus, as is well known, is a native of Tartary and is eaten abundantly in China. There is a box of it, sent by Mr. TraDESCANT Lay, in the Museum of the Linnean Society; and mention is made of it by M. MONTAGNE in the 'Revue Botanique,' ii. p. 247, as having, in the form of a soup, made part of a dinner given by the Mandarin Huang at Macao, to several members of the French Embassy. The Mandarin described it as a freshwater plant, growing in Tartary in streams and running water, and sold at Canton in small boxes: it is highly esteemed by the Chinese, and not very expensive. At this time M. Montagne regarded the species as *Nostoc cæruleum*, but specimens sent him by Mr. Berkeley proved it to be distinct, and it was afterwards published in the 'Revue Botanique' under the name of *Nostoc edule*, Berk. and Mont., and figured by Kützing in his 'Tabulæ Phytologicæ.' In the last-named author's 'Species Algarum,' it is said to have been gathered by Gaudichaud, who, although a great traveller, was certainly never in Tartary. The Thibetan *Nostoc*, like the Arctic, is probably quite as good as

the Tartarian. After some further notes on the chemical changes produced in this plant and in *Nostoc commune* when treated with iodine and sulphuric acid, and a reference to a passage in Kützing's 'Grundzüge der Philosophische Botanik,' where he speaks of these plants as consisting in great measure of gelacin (a substance belonging to the same category as bassorin, and perhaps a modification of it), Mr. Berkeley concludes by stating that a thin slice of gum tragacanth, treated with iodine and sulphuric acid, assumes after a time the same tint as the *Nostoc*. He believes, however, that starch is often present in gum tragacanth, which is not likely to be the case with the *Nostoc*; and thinks we may safely assume the jelly of *Nostoc* to be a state of bassorin, passing into cellulose or dextrine.

Read the commencement of a Paper entitled "Botanical Notes made during a Tour in France." By Joseph Woods, Esq., F.L.S. &c.

February 3.

Robert Brown, Esq., President, in the Chair.

Baron Müller of Stuttgard, John Drew Salmon, Esq., and William Wing, Esq., were elected Fellows.

Read a Paper entitled "Further Observations on the genus *Anthophorabia*, Newp." By George Newport, Esq., F.R.S., F.L.S. &c.

The author stated that having had the good fortune, in September last, to rediscover, at Gravesend, the parasite *Anthophorabia*, which, twenty years ago, he found in the nests of *Anthophora*, at Richborough in Kent, and an account of which is given in a former paper ('Proceedings,' March 20, 1849, vol. ii. p. 24), he felt it necessary to offer a few additional observations on this genus; since one of the most remarkable peculiarities of the male sex, the possession of three stemmata on the vertex, and of a single stemmatous eye on each side of the head, instead of the usual compound one of perfect insects, had been repeatedly denied to be a fact; the denial being printed in the 'Proceedings' of the Society for May 1, 1849, vol. ii. p. 37. At the time the author described this genus it was well known that he possessed only delineations of the insect, which he had made in

the year 1831; at which time the insect occurred in great abundance, and as he then expected to have been able to obtain it at pleasure, he neglected to preserve specimens of it. He now showed in the insect itself the stemmatous eyes which he originally stated it to possess, and consequently that the denial which had been given to this fact had been uncalled for. He felt it but right, however, to mention that there were points of minor importance in the description originally given of the genus which admitted of some revision. These referred to the number of joints in the antennæ, the club of which is formed of a plurality of closely united rings, instead of being but a single joint. The tarsi, too, of both sexes, may be regarded either in the way usual with entomologists, as being formed only of *four* joints, or, if anatomically considered, as he had originally described them, as of *five* joints, the terminal joint being short, soft and pad-like, and usually discarded by entomologists as a distinct joint, which, nevertheless, it is.

With respect to the asserted identity of *Anthophorabia* with another parasite, *Melittobia*, described in the 'Proceedings' for May 1, 1849, vol. ii. p. 37, the author showed that this could not be the case, if the latter insect has been described correctly, as the account there given of *Melittobia* differs greatly from the facts exhibited by *Anthophorabia*. The characters of this genus he now proposed to revise as follows:—

Fam. CHALCIDIDÆ.

Gen. ANTHOPHORABIA, *Newp.*

Fem. Caput latitudine thoracis. *Antennæ* 9-articulatæ, pilosæ; articulo 3tio ad 6tum subæqualibus; reliquis clavam solidam ovalem efformantibus. *Thorax abdomenque* æquales. *Tarsi* (4-?) 5-articulati in utroque sexu; articulo 5to minimo, molli, pulvillo simili, ferè obsoleto.

Mas. Caput magnum. *Oculi* stemmatosi. *Antennæ* 10-articulatæ; articulo 1mo globoso, minutissimo; 2do arcuato, magnoperè dilatato, dimidio anteriore subtùs excavato; 3tio magno; 4to adhuc majore, globoso v. subangulato; 5to 6to 7moque minimis, cyathiformibus; 8vo 9no 10moque auctis, clavam solidam ovalem efformantibus. *Alæ* abbreviatæ.

As the specimens found at Gravesend present some specific characters which were not observed in the insects formerly obtained at Richborough, the author proposed to name those which he now possesses, provisionally, in the event of their proving to be a new species:—

A. FASCIATA. *Mas.* Fulva, fasciis 5 transversis abdominalibus saturatioribus, antennarum articulis anterioribus oculis prothoracis margine

posteriore maculâque subalari utrinque in mesothorace nigrescentibus, pedibus subarcuatis robustis ambulatoriis, trochantere femorumque paris secundi parte terminali subtùs spinulis minutis densè barbatis, tibiis tarsisque omnibus fortiter spinosis.—Long. lin. 1.

Fem. Nigro-ænea nitida, lineis 2 longitudinalibus in mesothorace scutelloque albidis, abdomine ovali elongato acuto fasciis transversis saturatioribus pilis albidis marginatis, oculis rufescentibus, pedibus flavescens, femoribus saturatioribus, tibiis rectis elongatis pilosis, tarsis pilosis fortiter spinosis.

Hab. in nidis *Anthophoræ retusæ* apud Gravesend in Comitatu Cantiano.

The author then gave some account of the habits of the males and females, which he had seen emerge from the nymph state, and remarked that out of about one hundred and fifty specimens of perfect insects and nymphs obtained from one bee's nest, he had only found eleven males. Having placed about one hundred females in a small glass tube closed, as he thought, securely with a cork, he was surprised at the end of a fortnight to find that nearly the whole had escaped, by insinuating themselves into slight fissures in the sides of the cork, between this and the glass. From this circumstance he is now disposed to think that the habit of the female is to penetrate into the bee's nest, after this has been closed, and deposit her eggs on the nearly full-grown larva within; as a few weeks after the escape of these females he discovered three individuals in an open cell of *Anthophora* which contained a nearly full-grown larva, and which had remained nearly close to the glass tube from which the *Anthophorabia* had escaped. Two of these individuals now appeared to be in the act of oviposition. He noticed also on the same bee-larva some larvæ of the parasites in different stages of growth; so that he regards the species as an external feeder, like the larva of *Monodontomerus*.

Specimens of the male and female insects were exhibited at the meeting.

February 17.

Robert Brown, Esq., President, in the Chair.

Read a continuation of Mr. Joseph Woods's "Botanical Notes made during a Tour in France."

March 2.

Robert Brown, Esq., President, in the Chair.

Thomas Thomson, Esq., jun., M.D., was elected a Fellow.

The Hon. Mr. Hope, on the part of Mr. Scott and at the request of the President, exhibited numerous drawings prepared for an intended work on "Australian Lepidoptera and their Transformations, drawn from the Life by Harriet and Helena Scott, with Descriptions, General and Systematic, by A. W. Scott, M.A." Of this work an account had been given by W. Swainson, Esq., F.L.S., in the "Sydney Morning Herald" for the 30th of August last; from which the Secretary read extracts, showing the great novelty and interest attaching to many of the subjects, more especially with reference to the transformations of the several species figured.

Mr. Adam White, F.L.S., exhibited specimens preserved in spirit of *Eurostus validus*, Dallas, collected by Mr. Fortune in China, and made some observations on the importance of colour as a character in various departments of zoology, especially as dependent upon, and consequently indicative of, structure.

Read, a continuation of Mr. Joseph Woods's "Botanical Notes made during a Tour in France."

March 16.

Robert Brown, Esq., President, in the Chair.

Read, the conclusion of Mr. Joseph Woods's "Botanical Notes made during a Tour in France."

Read also a "Notice of the habits of *Myrmica domestica*, Shuck., together with some account of a means of turning the industry of this minute Ant to account in the preparation of Skeletons of small animals." By George Daniell, Esq. Communicated by the Secretary.

Mr. Daniell states that his attention was first attracted to this species of Ant some years ago by observing several individuals engaged, in the window of a house in Edwards Street, Portman Square, in dragging to the edge of the casement a large fly, which they finally succeeded in conveying through an opening in the wall. He found by repeated observations that, like the other species of Ants, they uniformly followed the same track, passing and repassing, but never deviating from the beaten route. There appeared to be a regular chain of correspondence kept up throughout the track; and one of the ants while travelling at its usual rapid rate was frequently observed to be stopped by another, a communication passing between them by means of their antennæ, after which each would return in the opposite direction from that in which they were previously travelling. The track was found to terminate on the ground floor, where it disappeared in the party wall, the adjoining house being occupied by a baker, who stated that in the summer months these ants were a perfect nuisance to him, spreading themselves over all his goods, and especially the sweet cakes and sugar, of which they carried off incredible quantities. He indicated on his premises numerous tracks, traversed by myriads of these minute insects, each engaged in carrying off a grain of sugar or some other description of food to their dwelling-place, which appeared to be in the wall of the cellar, by the side of the oven, and whence he found it impossible to dislodge them. To diminish their numbers he was in the habit of hanging against the wall a boiled sheep's liver, which they speedily covered, and then plunging it into boiling water; but even this wholesale destruction had little apparent effect in thinning their ranks. In the same vault there were also multitudes of crickets (*Gryllus domesticus*) and black-beetles (*Blatta orientalis*, L.), in every stage of growth and variety of colour, from the deep black to the pale albino; all of which appeared to entertain the greatest dread of these apparently insignificant creatures, retreating precipitately when they found themselves in the vicinity of a track, while several of the ants would immediately rush out of the line to chastise their intrusion.

It now occurred to Mr. Daniell that he might make the laborious habits and fondness for animal food evinced by these ants serviceable to himself in the preparation of skeletons. With this view he placed some mice and small birds in boxes against the wall, but although the ants immediately attacked them, so great was the heat of the oven that the subjects were dried hard, and generally abandoned after the brains had been eaten out. Several other

attempts in different parts of the cellar also failed, the skeletons being frequently destroyed by the crickets and beetles after the ants had abandoned them, until which time no other insect could approach without undergoing the punishment of death. Mr. Daniell then determined to endeavour to establish a colony in a cellar adjoining the oven and parallel with it, in consequence of which proximity the wall gave out a certain degree of warmth when the oven was heated. He first placed the most inviting food in the warmest corner, to which he had fitted a box with holes in it on the side next the wall, large enough to admit the ants, but not the larger insects; and this failing to attract them, he caught a large number from a piece of liver placed as a trap, and shook them into a box from which they had no means of escape, in which he closed them with abundance of food, but after seeking in vain for an outlet they congregated in one corner of the box and eventually died. His next expedient was to catch them in great numbers and turn them loose in the cellar; and repeating this process for several evenings, he had at length the satisfaction to see a track established extending from a small hole in the wall to the box in which their food was deposited. After some time another track was formed to another corner of the box at right angles with the first; and these tracks were never abandoned while he continued to avail himself of their services, which he did not cease to employ until he had completed by their means upwards of a hundred beautiful skeletons of small quadrupeds and birds, reptiles and fishes, the greater part of which are now in the collection of the British Museum. In the course of these experiments he made the following further observations on their habits.

They will not touch anything tainted, and prefer animals in the blood to such as have been previously cleaned. The plan which Mr. Daniell found to answer best was to take the object quite fresh, to skin it, extract the viscera and cut off as much as possible of the flesh, and then to place it in the box. It is seldom that a skeleton is so entirely cleaned as to require no further preparation; but the smaller skeletons when taken quite fresh require only a very little subsequent maceration to complete the process, the more delicate and difficult portions, such as the cranium and vertebræ, being almost always cleaned in preference to the ribs and limbs; and even those portions of muscle which are not removed by the ants are generally so much detached by them that a slight brushing or two after well-soaking the object suffices to remove them. One of the great advantages of this mode of preparing small skeletons was found to consist in their perfectly preserving their natural size, the ants seldom

destroying the ligaments and the bones consequently not requiring wires for their attachment, which in some of the more minute skeletons it would be difficult if not impossible to apply. The labourers require, however, careful watching, as after having eaten the muscles, they occasionally destroy the ligaments, and even commence carrying off the smaller bones; a smart tap on the box is sufficient to drive them away from the object, on which they all immediately move off in a regular line to whichever opening they have entered at, leaving the skeleton free. When the objects are too large, they quit them suddenly after devouring what they think proper, so that sometimes where overnight thousands might have been seen at work, in the morning not one is to be found in the box; and nothing is gained by re-moistening the object, for they appear never again to touch anything which they have once abandoned. In the summer their vitality is great; from the cavities of a skeleton that had been three days immersed in water and afterwards placed in the sun, several ants were seen to emerge and to become as lively as ever. But in winter exposure to cold air, or immersion in water, when the thermometer is below the freezing-point, produces instant death, subsequent exposure to warmth failing in these circumstances to revive them. Their sense of smell appears to be very acute; if the finger be drawn across one of their tracks, multitudes rapidly congregate about the spot, examining it and sending out runners to explore the vicinity. But if one of them be crushed by the finger and quickly removed, the next comer is instantly arrested in his progress, encircles the spot, ascertains the death, and communicates the intelligence with such inconceivable rapidity that the whole line falls into confusion, numbers rush to the place, parties set off in pursuit of the offender, and woe to the unfortunate cricket that happens to be found in the vicinity of the track. By degrees the tumult subsides; for some time afterwards, however, every ant that passes makes a halt, but without quitting the line. Light does not appear to have any effect on their operations; they are not disturbed by the approach of a candle, although the slightest touch of the box instantaneously effects their complete dispersion; and the alternations of night and day appear to make no difference in their numbers, perceptions, or labour.

Mr. Daniell was never able positively to ascertain the place of their retreat; he believes it, however, to have been in the earth below the oven, and is inclined to think that they form a nest, inasmuch as they frequently carry off portions of vegetable fibre and even the smaller bones, probably for the purpose of building, as they

were always carried off entire, and he could never observe that any portion of a bone was eaten. In consequence of this latter propensity he was never able to procure the skeleton of the small species of *Gasterosteus*, for example, entire, notwithstanding the closest watching. A single ant will carry away a rib of these small fishes; but in removing a larger bone they act simultaneously, some dragging it forwards and others pushing it on with their heads from behind. If, in ascending the side of the box, the bone fell to the bottom, they returned and recommenced their labour, never abandoning an attempt in which they had once engaged. The largest portion of bone which Mr. Daniell has seen them remove, consisted of the ulna and radius of *Mus Messorius*, with the carpus attached. They appeared more eager in carrying off portions of bone in the months of January and February than at any other period of the year; but they worked most rapidly in the summer months, and it is astonishing with what celerity and perseverance they continued their labours, the most rapidly cleaned skeletons being always the best and whitest, the periosteum being entirely removed. With such pertinacity do they penetrate every cavity, that, minute as they are, they are frequently victims to the ardour of their attack, becoming fixed, for example, between the plates of the cranium, in the cellular texture of which they may be seen entangled and dead. Although, as before observed, very susceptible of cold, they appear also to be affected by heat; for in the summer months they were seen to bring forth their pupæ, when the oven was heated, from the various apertures in the wall, and place them in a box by the side, in which a supply of provision was always provided for them, and to return with them when the oven was cooled. Myriads of them might in this way be seen heaped together, but a tap on the side of the box caused a general rush towards the objects of their solicitude, which were carried off with inconceivable rapidity. The pupæ are white, and the whole duty of transporting them devolves upon the males or workers, of whom each female always has several attendant upon her. Young females are first observed towards the end of January, when the abdomen begins to be enlarged and of a whitish colour; they continue to increase in size until June, at which time the females appear to be most numerous. They progress more slowly than the workers, and deposit their eggs as they move along, which are instantly carried off by the attendants. The greatest number of pupæ are seen between June and September; but the eggs (which are white and have the appearance of grains of sand) are carried to and fro during the whole of the summer. Mr. Daniell noticed that

skeletons cleaned by the ants were rapidly dissolved in a solution of chloride of lime; while others prepared by maceration remained for some time in a similar solution without injury and were much improved in whiteness.

The species was determined by Mr. F. Smith to be the *Myrmica domestica*, Shuck. A notice of "the domestic habits" of this Ant, by the late Dr. Bostock, in relation especially to the almost incredible numbers in which it makes its appearance, the annoyance thereby created, and the means to be employed for its destruction, is printed in the 2nd volume of the 'Transactions of the Entomological Society,' and observations on the same subject by several members of that Society are also to be found in its 'Journal of Proceedings.'

April 6.

Robert Brown, Esq., President, in the Chair.

Mr. Adam White, F.L.S., made some observations on the subject of Alpine and Arctic plants flowering immediately on the disappearance of the snow, in reference chiefly to an observation by Dr. Lortet, recorded in the 'Annales de la Société Royale d'Agriculture, &c. de Lyon,' vol. vii. p. 385, to which Mr. Curtis, F.L.S., had called the attention of the Society at the previous Meeting. From Dr. Lortet's note it appears that he had observed *Soldanella alpina*, L., on the Alps of Switzerland and Dauphiny flowering beneath the last remaining crust of snow within a dome-like cavity, or piercing through that crust, above which its flowers rose while its vegetating organs remained concealed beneath. Mr. White quoted various recorded and unrecorded instances of the flowering of plants following immediately on the deliquescence of the snow, and in particular some passages from the manuscript journal of Capt. Beechey, with which he had been favoured by that gentleman; but in none of these cases was there any well-authenticated instance of a phænogamic plant being seen in full flower beneath a covering of snow, and M. Lortet's observation was, as far as Mr. White was aware, the only one proceeding to that extent.

Read also two Letters addressed by James Motley, Esq., to Sir W. J. Hooker, V.P.L.S., "On the Camphor Tree of Sumatra and Borneo, *Dryobalanops Camphora*, Gærtn." Communicated by Sir W. J. Hooker.

April 20.

Robert Brown, Esq., President, in the Chair.

Read a further portion of Dr. Buchanan Hamilton's " Commentary on the Ninth Part of the *Hortus Malabaricus* of Van Rheedee."

May 4th.

R. Brown, Esq., President, in the Chair.

Alfred Evans, Esq., Henry Kingsley, Esq., and Herbert Shelley, Esq., M.B., were elected Fellows; and Prof. Alexander Braun, Prof. Anders Retzius, and Prof. Francis Unger, were elected Foreign Members.

Among the presents announced was an extensive collection of dried plants formed in the Upper Himalaya, by Capt. Rd. Strachey and J. E. Winterbottom, Esq., F.L.S., presented by the Hon. East India Company.

Mr. Hogg, F.L.S., communicated a letter " On the Artificial introduction of a breed of Salmon into the river Swale, and a tributary stream in Yorkshire," which appeared in the 'Durham Advertiser' for April 16th in the present year, under the signature of Isaac Fisher, together with an unpublished letter from the same gentleman in answer to a request from Mr. Hogg for further information; and added some observations of his own upon the same subject. From the letter published in the 'Durham Advertiser,' it appeared that Mr. Richard Harrison of Richmond had procured from the river Tees a brood of spawn, taken and milted from the living fish, which he deposited on the 29th of December last in a small tributary of the river Swale. On the 21st of March two of the ova were brought to the house of Mr. Fisher and placed in a vessel of water, the foetal signs were clearly distinguished, and in two days more they became living fish; he is consequently satisfied that the salmon is now restored to the river Swale, from which it has of late years been banished. In answer to Mr. Hogg's inquiries, Mr. Fisher states further that the ova and milt were obtained in the Tees, according to the directions given by Boccius, Shaw, and "Ephemera," in his

'Book of the Salmon.' They were taken from three female and two male fishes on the night of the 27th of December, and not deposited in the gravel of a small rivulet until the 29th of the same month. Part of the ova were also placed in a gravel bed in the river Swale; but of the result of this part of the experiment Mr. Fisher has no present information. In one part the ova were placed too deep in the gravel, and on examination were found to be addled; while there is every reason to believe that those which were placed about 3 inches in the gravel have all been hatched. A live fish brought from the spawning-bed leaped out of the vessel in which it was kept and speedily died, and the two mentioned in the published letter also died in the course of about ten days, probably in consequence of the disturbance to which they were exposed from the curiosity of those who came to see them, and who were desirous of observing the extreme velocity with which they moved round the vessel, even while the vitelline bag was still attached to the abdomen. The spawning-bed was formed in a small run of spring-water which is never affected by the frost; it was cleared of minnows, young trout, &c., and at each end of a space of about twenty yards, whins were placed of a good height, kept down with stones, to prevent the entrance into it of other fish. After some observations respecting minnows, Mr. Fisher adds: "We have proved the fact that the river Swale may be again stocked with salmon, provided we can make arrangements with the proprietor of a mill-wear, twenty-five miles from this place, to let the fish, on coming up from the sea, have 'free-gap' from time to time."

On these letters Mr. Hogg observes, that it seems to him there can be little (if any) doubt that, with the precautions indicated, a vast increase of salmon might be obtained, and a sure and valuable source of wealth be secured in many suitable streams in which no salmon are at present found; and the same artificial process of breeding might likewise be applied to trout with an equally advantageous result. He suggests that the breeding might also be carried on in large wooden boxes or cases, having a layer of gravel at the bottom 4 or 5 inches deep, in which the ova and milt, or impregnated ova, might be buried, and the cases filled with pure water, which might be kept constantly fresh by allowing a small stream to run into them. When the fry had grown sufficiently strong, they might be conveyed to any distance in tubs filled with water, which might be occasionally renewed, and having tops perforated with holes. On the subject of the distribution of the species of fresh-water fishes, Mr. Hogg refers to the presence of trout and other

fishes in mountain streams and alpine lakes, for which it seems difficult to account; but he suggests, that as the presence of unusual plants in similar circumstances is only to be accounted for by the seeds having been dropped by birds, the problem with regard to fishes might be naturally solved in an analogous manner, their fry having been conveyed to these distant localities by means of water-birds.

May 24.

R. Brown, Esq., President, in the Chair.

This day, the anniversary of the birth of Linnæus, and that appointed by the Charter for the election of Council and Officers, the President opened the business of the Meeting, and the Secretary read the following notices of those Members with whose decease the Society had become acquainted since the last Anniversary.

James Allan, M.D., a Naval Surgeon of eminence, and one of the Surgeons of Haslar Hospital, was a native of the county of Ayr. After passing through the lower grades of professional rank, he was promoted in 1845 to that of Deputy Inspector of Hospitals, and died at Haslar in the spring of 1851. His election into the Linnean Society dates from 1834.

14.1815. *Henry Beaufoy, Esq.*, was the eldest son of Colonel Mark Beaufoy, and at the head of an extensive commercial firm at South Lambeth, near London. He was a most liberal and benevolent man. His father dying in 1827, bequeathed to him his manuscripts, the most important part of which, consisting of "Nautical and Hydraulic Experiments," he printed in 1834, at his own private press, to the extent of 1500 copies, for gratuitous distribution, and at an expense of upwards of 3000*l.* Shortly before his death, he founded in his own neighbourhood, and endowed with a large sum of money, an educational institution, which promises to become of much importance, and he was also a liberal contributor to the City of London School. He became a Fellow of this Society in 1811, and died at his residence in South Lambeth on the 12th of July 1851, in the 66th year of his age.

James Ebenezer Bicheno, Esq., who for several years filled the office of Secretary of the Linnean Society, was a native of Newbury

in Berkshire, where his father was for a very long period an eminent Minister of the Baptist persuasion, and author of numerous publications of a mixed political and religious character. Of Mr. Bicheno's own early destination we have little precise information, but the nature of his studies is clearly ascertained by his publications, the more important of which treat of the Philosophy of Legislation on the two great questions of Poor Laws and the Punishment of Crime. The titles of these works are as follows: 'An Enquiry into the Nature of Benevolence, chiefly with a view to elucidate the Principles of the Poor Laws,' 8vo, Lond. 1817, of which a new and enlarged edition, with the title slightly varied, was published in 1824; and 'Observations on the Philosophy of Criminal Jurisprudence,' 8vo, Lond. 1819. In 1821 he married a lady of Newbury of the name of Lloyd, but had the misfortune to lose her in childbed, a year after their marriage. He had previously quitted Newbury and entered himself at the Middle Temple, where he was called to the Bar in 1822, and for some years afterwards went the Oxford Circuit. In 1824, on the appointment of Mr. MacLeay to be Colonial Secretary of New South Wales, Mr. Bicheno was elected to supply his place as Secretary of this Society, of which he had become a Fellow in 1812, and to which his taste for natural science had long closely attached him. For some years afterwards he resided at Notting Hill, having ceased to practise at the Bar, but on the death of his father in 1831 at the age of 80, he determined to quit London, and having resigned the Secretaryship in 1832, he removed to Tynmaen, near Pyle in Glamorganshire, in the neighbourhood of some iron-works, in which he had become a partner. Here he resided for several years, acting as a Magistrate for the county, and as the Official Chairman of the Board of Guardians at Bridgend. The iron-works, in which the bulk of his fortune was invested, proving an unfortunate speculation, it became necessary for him to seek elsewhere some profitable employment. In the autumn of 1829 he had made a tour of Ireland in company with a legal friend, and had published the result of his observations in a volume entitled 'Ireland and its Economy,' 8vo, Lond. 1830. This work, in which he recurred to his earlier studies, and examined among other social questions the applicability of Poor Laws to Ireland, assisted in recommending him to the Marquis of Lansdowne, through whose means he was, in 1836, appointed one of the Commissioners for inquiring into the expediency of introducing the Poor Laws into that Kingdom, in which capacity he was the author of an elaborate separate Report founded on the evidence that had been collected on the subject. In 1842 he was appointed by Lord Stanley Colonial

Secretary of Van Diemen's Land, which appointment he continued to hold under the successive Governments of Sir John Franklin, Sir Eardley Wilmot and Sir William Denison. He died at Hobart Town, on the 28th of February 1851, after a short illness, from which no serious result was at first apprehended, it is supposed from disease of the heart; leaving no nearer relations than a nephew and two nieces, the children of a deceased sister, who have been for some time resident in Massachusetts. The branch of natural history to which Mr. Bicheno especially attached himself was botany, and our 'Transactions' contain the following papers from his pen:— "Observations on the *Orchis militaris* of Linnæus," vol. xii. p. 28; "Observations on the Linnean genus *Juncus*, with the characters of those species which have been found growing wild in Great Britain," vol. xii. p. 291; "On Systems and Methods in Natural History," vol. xv. p. 479. He also printed "An Address delivered at the Anniversary Meeting of the Zoological Club of the Linnean Society," on the conclusion of his year of office as Chairman of the Club, in 1826. His information on a great variety of subjects was accurate and extensive, and his conversation in a high degree agreeable and instructive. His society was consequently peculiarly acceptable in the several circles in which he successively moved, and the genial amiability of his disposition contributed to render him a universal favourite. It can scarcely be necessary to recall to the recollection of the Members of this Society the general regret with which we saw him depart for the distant scene of his later labours, or the pleasing anticipations of his return in which many of us vainly indulged.

William Arnold Bromfield, M.D., was the son of a clergyman, formerly Fellow of New College, Oxford, and was born at Boldre in the New Forest, Hants, in the year 1800. His school-days were passed at Tunbridge and Ealing; and after a short residence with a clergyman in Warwickshire, he was entered as a student in the University of Glasgow, and became an inmate in the family of the distinguished Chemical Professor, Dr. Thomas Thomson. In the botanical class of that University, and more particularly in the excursions connected with it, he first acquired that enthusiastic love of botany, which led to its becoming the engrossing pursuit of his life. After two years' residence at Glasgow he there took his degree in Medicine, and quitting Scotland in 1826, he visited Germany, France and Italy, and returned to England in 1830. His circumstances placing him beyond the necessity of engaging in medical practice, he took up his residence first at Hastings, then at South-

ampton, and finally in 1836 at Ryde in the Isle of Wight, where he established his head-quarters during the remainder of his life. In the last-named year he became a Fellow of the Linnean Society, and from this time forward he determined to make the Hampshire Flora, and especially that of the Isle of Wight, the principal object of his study. In the pursuit of this object many of us have had personal opportunities of witnessing and admiring the zeal, energy and enthusiasm with which he devoted himself to his favourite task. Of the botanical value of his researches into the flora of his native county some idea may be formed from the series of papers contributed by him to the 'Phytologist,' under the title of "Notes and occasional Observations on some of the rarer British Plants growing wild in Hampshire;" and there is good reason to hope that the 'Flora of Hampshire,' to which they were intended as the prelude, may, with some assistance from his surviving botanical friends, be speedily sent to the press. In 1842 he paid a visit of some weeks to the South and West of Ireland; in 1844 he embarked for the West Indies, and passed six months, chiefly in Trinidad and Jamaica; and in 1846 he made a tour of more than a year's duration in Canada and the United States of America, extending westwards as far as St. Louis on the Missouri, and southwards to New Orleans. His last journey was also one of considerable extent, as well as of difficulty and danger, and finally proved too much for his constitutional strength. In September 1850 he left England for Egypt, and ascended the Nile as far as Khartoum, at the junction of the White and Blue Niles, from whence he returned to Cairo, after an absence of seven months. In the neighbourhood of the latter city he made various excursions, some of them considerable, and then directed his course to Syria. After visiting Jerusalem and other parts of the Holy Land, he proceeded to Baalbec and Damascus, with which places he proposed to close his Eastern travels, and then to return immediately to England. But on his arrival at Damascus he was seized with a malignant typhus which carried him off on the 9th of October, in the past year, at the age of 51; and thus perished, in the prime of life, and far from his family and friends, a most zealous and enthusiastic naturalist, and a most amiable and excellent man.

John George Children, Esq., F.R.S.L. & E., F.S.A. & Hon. M.C.P.S., was the only son of a gentleman of considerable landed property, who was also a Bencher of the Middle Temple, but never practised at the Bar, and was born at Ferox Hall, in the town of Tunbridge, on the 18th of May 1777. He was educated first at the Grammar-school of Tunbridge, afterwards at Eton, and under a pri-

vate tutor at Cambridge, and subsequently again sent to Eton, from whence he returned to Cambridge, and was entered as a Fellow Commoner of Queen's College, his intended destination being the Church. Marrying, at the age of 21, Anna, the grand-daughter of Governor Holroyd, one of the survivors of the black-hole of Calcutta, his wife's ill-health and subsequent early death induced him to abandon his intended plan of life, and to visit first Portugal and afterwards Canada and the United States. On his return to Europe he became a Captain in the West Kent Militia, but was compelled by ill-health to quit the service in 1805, and attaching himself to scientific pursuits he became in 1807 a Fellow of the Royal Society. In 1808 or 1809 he made a tour in Spain, and visited the celebrated quicksilver mines of Almaden. Soon after his return he married a second time, but lost his wife in about eight months after his marriage. At this period he devoted himself earnestly to science, and constructed his two great voltaic batteries, of which he gave an account in two papers read to the Royal Society in 1808 and 1815. In the year 1816 the failure of the Tunbridge Bank, in which his father was a partner, having brought with it the loss of all his extensive property, Mr. Children was, through the kindness of Lord Camden, appointed an Assistant-Librarian of the British Museum, first in the Department of Antiquities, and subsequently in that of Natural History, in which latter capacity the Zoological Collections were placed under his especial charge. His father died in 1818, and in 1819 he married for the third time. In 1837 he was appointed to the Office of Keeper of Zoology in the British Museum, which he held until 1839, when the death of his wife, which had taken place a short time previously, added to his own enfeebled health, induced him to resign. On the election of the Duke of Sussex to the Presidency of the Royal Society in 1830, he succeeded Colonel Sabine as one of the Secretaries, and continued to hold that office until 1837. His election into the Linnean Society dates from 1807, and in 1834 the Duke of Somerset nominated him to be one of the Vice-Presidents. In 1833-4 he was one of the principal founders, and became the first President, of the Entomological Society. His collection of insects had at this period, by the purchase of that of Count Bilberg and by other important additions, become one of the most extensive in England, and was much consulted by entomologists, both native and foreign. From the time of his quitting the Museum he resided chiefly with his only child, a daughter by his first marriage, who had become the wife of the only surviving son of Mr. Alderman Atkins, at Halstead Place, near Sevenoaks in Kent; and for the

last five years of his life he attached himself ardently to the study of practical astronomy. He died at Halstead, after a very slight illness, on the 1st of January in the present year. His publications of a scientific nature were chiefly chemical, but some were also of a natural-history character. The principal of the latter are as follows:—"An Address delivered at the Anniversary Meeting of the Zoological Club of the Linnean Society, November 29, 1827;" "A short Abstract of Ochsenheimer and Treitschke's Characters of the genera of the *Lepidoptera* of Europe," 8vo, 1829; "A Sketch of the 'Systema Glossatorum' of Fabricius," 8vo, 1830; "An Address delivered at the Anniversary of the Entomological Society, January 26th, 1835;" Observations in the Zoological Journal "On the Chemical Composition of the Corneous Parts of Insects," appended to a translation of M. Odier's memoir on the same subject (vol. i. p. 101); and "On the Esquimaux Dog" (vol. iii. p. 54); "On specimens of the *Phytotoma Bloxhami*, Childr., collected by Mr. Cuming in Chili," in the 'Proceedings' of the Zoological Society, vol. ii. p. 3; "Catalogue of *Arachnida* and Insects," 8vo; "On the *Arachnida* and Insects of Arctic America," in Capt. Back's Arctic Expedition, App. p. 532; and "On Dr. Ehrenberg's Collections of dried *Infusoria* and other Microscopic Objects," in the 'Philosophical Magazine,' Ser. 3. vol. ix. p. 90.

Joseph Cox Cox, Esq., M.D.

David Elisha Davy, Esq., one of our oldest Fellows, having been elected into the Society on the 17th of December, 1793, was the son of a farmer at Rumburgh in Suffolk, who died in 1799, at the advanced age of 90. The younger brother of this gentleman, Eleazar Davy, Esq., of Yoxford, was sheriff of Suffolk in 1790, and from him the subject of this notice inherited, in 1802, the Grove at Yoxford and other considerable estates. He was educated in the neighbourhood of his uncle's residence, and became a Member of Pembroke College, Oxford, where he took the degree of B.A. as sixth senior Optime in the year 1790. After succeeding to his uncle's property he resided at the Grove, became Receiver of the County, and an active and useful magistrate. At a later period he retired to Ufford, in the neighbourhood of Woodbridge in the same county, where the latter years of his life were passed, and where he died on the 15th of August last, unmarried, at the age of 82. For nearly half a century he had been actively engaged in collecting materials for a History of the County of Suffolk, a project carried on in the first instance in conjunction with his friend and neighbour Mr. Henry Jermyn of Sibton; but the latter dying in 1820,

his MSS. were ten years afterwards, by the liberality of Mr. Hudson Gurney, placed in the British Museum. Each of the coadjutors had a duplicate copy of the other's work, and Mr. Davy continued to add to his collections till his death, although he had for many years relinquished all idea of publication. He became a constant correspondent of 'The Gentleman's Magazine' under the signature of D. A. Y., and communicated to the 'Topographer and Genealogist,' a work commenced in 1843, a series of notices of sepulchral monuments in the Parish Churches of Suffolk. He was a scholar and a gentleman, well acquainted with books and with general literature, and took great pains and equal pleasure in imparting the knowledge which he possessed.

The Right Hon. the Earl of Derby, K.G., Lord Lieutenant of the County of Lancaster, a Trustee of the British Museum, and for many years President of this Society, and of the Zoological Society, was born on the 21st of April 1775. He was educated first at Eton and afterwards at Trinity College, Cambridge, where he received the degree of M.A. in 1795. From 1796 to 1812, he represented the borough of Preston in Parliament, and in the latter year he became member for the county of Lancaster, which he continued to represent till 1832, when he was raised to the peerage by the title of Baron Stanley of Bickerstaffe. In 1834, on the death of his father, he succeeded to the Earldom of Derby. In both Houses of Parliament, during a period of more than half a century, he continued to be a strenuous and consistent Whig. He devoted himself early in life to the cultivation of zoology, and commenced the formation of a collection of stuffed birds and quadrupeds, which gradually became one of the most extensive private collections that has ever been formed. At a later period his menagerie at Knowsley, on the increase and maintenance of which he is supposed to have expended not less than £10,000 a year, was altogether unrivalled, especially as regarded ruminant animals and birds. He became a Fellow of the Linnean Society in 1807, and in 1828 he was elected President on the death of its first President Sir James Edward Smith, which office he resigned in 1834. He had in the mean time been elected President of the Zoological Society, and continued to fill that office till his death, although increasing deafness and an attack of paralysis had for many years incapacitated him for active exertion. Still his interest in his collections and his zeal for their increase continued unabated to the last; and collectors in various parts of Asia, Africa and America were constantly employed by him to add to the stores which he possessed. He died at Knowsley on the 30th of June last,

and his remains were privately interred at the chapel of Ormskirk. His museum of birds and quadrupeds was bequeathed to the town of Liverpool, and has been gratefully accepted by the Town Council. He requested that Her Majesty and the Zoological Society should each choose a species from his living collection, and in pursuance of this desire the Zoological Society has become possessed of a magnificent stock of four Elands, the only representatives of this noble antelope that have been seen in Europe. The remainder of his menagerie was in October last submitted to public auction at Knowsley, the catalogue occupying fifty 4to pages, and produced about £7000. Although possessed of extensive scientific knowledge of the subjects of his favourite pursuit, and ever ready to forward the publications of others, Lord Derby himself published little in connexion with zoology. Some anonymous observations on the birds collected in Abyssinia by Mr. Salt, appended to that gentleman's travels, a Note in our own 'Transactions' on the difference of species of the English and Irish Hares, and a few occasional contributions to the 'Proceedings' of the Zoological Society, constitute nearly the whole of his published contributions to zoological science; with the exception of a magnificent folio work entitled 'Gleanings from the Menagerie and Aviary at Knowsley Hall,' of which two Parts, containing 76 plates, printed only for private distribution, were issued in 1846 and 1850. The systematic text of this splendid work is entirely from the pen of Dr. Gray, who selected the subjects and superintended their publication; Lord Derby having himself supplied a series of interesting notes on the habits of the animals described and figured, as observed by him in his menagerie. The plates, executed chiefly by Mr. Lear and Mr. Waterhouse Hawkins, deservedly rank among the most perfect representations of animals that have ever been produced.

Henry Downes, Esq., Comm. R.N., Honorary Director of the United Service Institution, was a Midshipman on board the *Fisgard* at the taking of Curaçoa in 1807, and during the Walcheren Expedition in 1809; commanded one of her boats in the destruction of a privateer in the Baltic in 1810, and in the cutting out of a ship from Rostock in 1811; and in 1813 was wrecked in the *Dædalus* off Ceylon. He received his commission of Lieutenant in 1814; and was promoted to the rank of Commander in May 1829. In the same year, while in command of the *Black Joke* on the coast of Africa, he captured, after a gallant action, the Spanish slave-brig *Almirante* of fourteen guns. On his return to England he established himself at Notting Hill, where he passed the remainder of his life, and where he died on the 3rd of April in the present year, at the age of 62. He be-

came a Fellow of the Linnean Society in 1826, and being greatly attached to Natural History, was one of the most strenuous founders of the United Service Museum at Whitehall, to the success of which he contributed most efficaciously by his zealous services in the capacity of its Director.

Henry B. Fielding, Esq., was distinguished as the possessor of one of the most extensive collections of dried plants in England, remarkable also, it is stated, for the perfect order and arrangement in which it was kept. Its foundation may be said to have been the Prescottian Herbarium of which he became the purchaser, and which was particularly rich in plants of the Russian dominions both in Europe and Asia. He subscribed during the last twenty years to almost every collection of plants made by travelling botanists; and purchased largely also at various sales, and in particular at that of Mr. Lambert's herbarium, where he obtained a large portion of the Peruvian collections of Ruiz and Pavon, besides other important sets of plants. In 1844 he published, with the assistance of the late Mr. Gardner, who had for some time charge of his herbarium, a volume entitled 'Sertum Plantarum,' containing figures and descriptions of seventy-five species of new or rare plants from his herbarium, the drawings for which were executed in lithography by his accomplished lady. The whole of his herbarium, together with such books from his very fine botanical library as are wanting, have been bequeathed by him to the University of Oxford, under certain conditions; and there is every reason to hope that the heads of that University, seconded by the liberal exertions of Prof. Daubeny, will enable his intentions to be properly carried out. He became a Fellow of the Linnean Society in 1838, and died on the 21st of November, 1851.

Sir Charles Fergusson Forbes, M.D., K.C.H. & K.C., Fellow of the Royal College of Physicians, joined the Medical Staff of the Army in Portugal in 1798, and became Assistant Surgeon of the Royals in the following year. With this regiment he served during the campaign in Holland in 1799, at Ferrol in 1800, in Egypt in 1801, and subsequently at Malta and Gibraltar. In 1803 he proceeded to the West Indies, and was present at the capture of St. Lucia and Tobago. In 1808 he returned to Portugal, and continued to serve in the Peninsula until the termination of the war in 1814. He was subsequently knighted, and rose to the rank of Deputy Inspector General of Hospitals. His election into the Linnean Society dates from 1822, and he died at his house in Argyll-street on the 22nd of March in the present year, at the age of 73.

Sir George Smith Gibbes, M.D., F.R.S., Fellow of the Royal

College of Physicians, and a Magistrate for the County of Somerset, was son of the Rev. George Gibbes, D.D., Rector of Woodborough, Wilts. He was entered of Exeter College, Oxford, and graduated as B.A. in 1792, became Fellow of Magdalen College, and proceeded M.A. in 1795. In 1796 he took his degree of M.B., and in 1799 that of M.D., and for many years afterwards he practised in Bath, where he became Physician to the City Dispensary. He was appointed Physician Extraordinary to Queen Charlotte, and knighted by King George the Fourth in 1820. His election into the Linnean Society bears date on the 21st of May, 1793, and he consequently ranked second in seniority upon our list. In 1796 he also became a Fellow of the Royal Society, to which he had previously communicated two papers "On the Conversion of Animal Muscle into a substance much resembling Spermaceti," published in the 'Philosophical Transactions' for 1794 and 1795. His attention was at this time directed to mineralogy and geology: he published in the fifth volume of our 'Transactions' a short "Account of a Cavern discovered in the north-west side of the Mendip Hills in Somersetshire," in which was found a large collection of human bones loaded with a calcareous incrustation; and in 'Nicholson's Journal,' vol. ii. a notice of the "Discovery of Sulphate of Strontian, near Sodbury in Gloucestershire." His other publications consist of: "A Syllabus of a Course of Chemical Lectures," 8vo, Bath, 1799; "A Treatise on the Bath Waters," 8vo, Bath, 1800; "A Second Treatise on the Bath Waters," 8vo, Bath, 1803; and of miscellaneous papers in Tilloch's, and in various Medical Journals. Having relinquished his practice at Bath, he resided for many years past at Cheltenham. He was twice married, and died at Sidmouth on the 23rd of last June, at the age of 80.

Samuel Hailstone, Esq., was a younger brother of the late Rev. John Hailstone, formerly Woodwardian Professor of Geology in the University of Cambridge, of whom a biographical notice is given at p. 372 of the first volume of our 'Proceedings.' He became a Fellow of the Linnean Society in 1801, and died on the 26th of December last, at the age of 83. He published in the 'Magazine of Natural History,' vol. viii. p. 549, a paper "On a species of *Eurynome* supposed undescribed."

John Kidd, M.D., F.R.S. & G.S., Hon. M.C.P.S., Fellow of the College of Physicians, &c., was born in the parish of St. James, Westminster, and educated at St. Peter's College in that city, from whence at the age of 17 he was elected student of Christ Church, Oxford, in May 1793. In 1797 he took his degree of B.A.; in 1800 that of M.A.;

in 1801 that of M.B.; in 1803 he was appointed Professor of Chemistry; and in 1804 he proceeded M.D. On the resignation of Sir Christopher Pegge in 1808, he was unanimously elected Physician to the Radcliffe Infirmary; and succeeded him also in 1822 as Regius Professor of Medicine, to which office are annexed Tomline's Præ-lectorship of Anatomy and Aldrich's Professorship of Anatomy, together with the Mastership of Ewelme Hospital. In 1826 he resigned his active duties at the Infirmary, becoming its Honorary Physician; and in 1834 he succeeded Dr. Williams as Radcliffe Librarian. From this time he ceased to practise as a Physician, and devoted himself almost entirely to his duties as Librarian; and under his charge, following out the example set by his predecessor, the Radcliffe became celebrated as one of the most complete Natural-History libraries in existence. Dr. Kidd became a Fellow of this Society in 1835, but has no paper in our 'Transactions.' His publications are numerous and varied, the principal of them being the following:—

'Outlines of Mineralogy,' 2 vols. 8vo, Oxford, 1809.

'A Geological Essay on the imperfect Evidence in support of a Theory of the Earth deduced either from its general structure or from the changes produced on its surface by the operation of existing causes,' 8vo, Oxford, 1815.

'An Answer to a Charge against the English Universities contained in the Supplement to the Edinburgh Encyclopædia,' 8vo, Oxford, 1818.

'An Introductory Lecture to a Course on Comparative Anatomy illustrative of Paley's Natural Theology,' 8vo, Oxford, 1824.

'On the Adaptation of External Nature to the Physical Condition of Man,' 8vo, London, 1833—one of the Bridgewater Treatises.

'Observations on Medical Reform,' 8vo, London and Oxford, 1841.

'Further Observations on Medical Reform,' 8vo, 1842.

Besides these he published various papers in the 'Philosophical Transactions,' the 'Transactions of the Geological Society,' 'Nicholson's Magazine,' the 'Philosophical Magazine,' &c., among which the most important in a natural-history point of view is his "Anatomy of the Mole-Cricket," printed in vol. cxv. of the 'Philosophical Transactions.'

Dr. Kidd was a good scholar and a man of genius; his reading was extensive, and his conversation agreeable and instructive, free from pedantry or affectation. He was warm-hearted and benevolent, and a zealous friend. He has left a wife and three daughters: for some years he had declined general society, and he died at his

residence in St. Giles's, Oxford, on the 17th of September last, at the age of 76.

John Murray, Esq.

Patrick Neill, Esq., LL.D., F.R.S.E., Secretary of the Caledonian Horticultural Society, and of the Wernerian Society of Natural History, was head of the extensive printing firm of Neill and Company, and had for many years been a distinguished citizen of the town of Edinburgh. Gifted in early life with a taste for scientific pursuits, he attached himself more especially to the study of Botany and of Horticulture. He was not unmindful, however, of the claims of Zoology, but contributed greatly to promote the establishment of the Edinburgh Zoological Garden, and himself possessed numerous specimens of living animals, of the habits of some of which he has given interesting accounts. His first publication was a 'Tour through Orkney and Shetland,' 8vo, 1806, which gave rise at the time to much discussion, on account of its exposure of the wretched state of things then prevalent in those islands, and is believed to have contributed much to their subsequent improvement. His other separately published works are, 'An Account of the Basalts of Saxony, from the French of Daubuisson, with Notes,' 8vo, Edinb. 1814; and 'An Account of British Horticulture,' 4to, Edinb. 1817, since republished and carried through several editions under the title of 'The Flower, Fruit and Kitchen Garden.' This work had originally formed the Article "Horticulture" in the 'Edinburgh Encyclopædia'; and was followed by a "Journal of a Horticultural Tour through some parts of Flanders, Holland and the North of France, in the autumn of 1817, by a Deputation of the Caledonian Horticultural Society," Edinb. 8vo, 1823. The deputation consisted of Mr. Neill, Mr. John Hay, planner, of Edinburgh, and Mr. James MacDonald, chief-gardener at Dalkeith; and the journal of their joint observations, drawn up by Mr. Neill, gives a clear, lucid, practical and very interesting account of the state of horticulture in the district visited. He had then been for some years Secretary of the Caledonian Horticultural Society, of which he was one of the founders, and he continued to fill that office for the long period of forty years. His devotion to horticulture is further evinced by his having bequeathed to that Society a sum of 500*l.* for the purpose of founding a Medal to be awarded to distinguished Scottish cultivators, among whom he himself took a high rank, his garden at Canonmills, near Edinburgh, furnishing a striking proof of the zeal and success with which he applied himself to the practice of the art. His residence was long the well-known resort

of all whom natural-history pursuits led to visit the metropolis of Scotland, his doors being always hospitably open to strangers as well as residents, and his liberality leading him to take an active and generous interest in the struggles of rising merit. No one has probably contributed so much to improve the education and to promote the welfare of that race of practical gardeners, of whom Scotland may so justly boast. Until within a short time of his death he continued to take an active interest in his favourite pursuits, but he had for some years past felt the infirmities of age creeping upon him, and an attack of paralysis, under which he suffered for some months, gradually brought on his death, which took place on the 5th of September last, in the 75th year of his age. He became a Fellow of the Linnean Society in 1813; and was some years since elected by the University of Edinburgh to the Honorary Degree of LL.D. He died unmarried, and after providing for his relations has bequeathed considerable legacies to various literary and scientific institutions in Edinburgh. Among his numerous memoirs on subjects of natural history the following deserve especial mention: "An Account of a Fin-Whale," and "A List of the Fishes found in the Frith of Forth and in Rivers and Lakes near Edinburgh," both in the 6th vol. of the Wernerian Society's Transactions; "Proofs that the Beaver was formerly a native of Scotland, including an Account of some Fossil Remains of that Animal found in Perthshire and Berwickshire," in the 1st vol. of the 'Edinburgh Philosophical Journal'; "An Account of the Ayrshire Rose," in the 2nd volume of the same periodical; and Observations "On Planting Fruit-trees on a North Border," in the 1st volume of the Transactions of the Caledonian Horticultural Society.

The Rev. Jelinger Symons, M.A., was derived from an ancient Norman family, originally settled in Cornwall, and born at Low Layton, in the county of Essex, in the year 1778. He graduated at St. John's College, Cambridge, in 1797, and soon afterwards took holy orders, first officiating as Curate to his father, then Rector of Whitburn, in the county of Durham. In 1805 he married, and took the curacy of West Ilsley, in the county of Bucks; and was afterwards presented by the Dean and Canons of Windsor to the endowed vicarage of Monkland, Hereford, of which county he became an active magistrate. In 1821, his health requiring change of air, he visited Boulogne, and officiated as Chaplain to the British residents. Having been presented by Lord Chancellor Brougham in 1833 to the rectory of Radnage, Bucks, he made that village his place of

residence during the remainder of his life. He became a Fellow of the Linnean Society in 1798, and published in the same year a useful Manual of British Plants, entitled 'Synopsis Plantarum insulis Britannicis indigenarum,' Lat. & Engl., 8vo, London, 1798. This was his only natural-history publication: his other works consist entirely of occasional sermons, preached in the course of half a century, during which he was actively engaged in the exercise of his ministerial functions. He died in London on the 20th of May, 1851, and was buried at Radnage on the 25th of the same month, his funeral being attended by the entire body of his parishioners, by whom he was greatly beloved.

In our FOREIGN LIST we have to lament the loss of three distinguished Members:—

Charles Frederick von Ledebour was descended from an ancient Pomeranian family, and was born on the 8th of July, 1785, at Stralsund, where his father, who died a few weeks before his birth, had been stationed as Swedish Judge-Advocate. In his fifteenth year he entered the University of Greifswald, where, under the paternal instruction of the celebrated physiologist Rudolphi, his juridical studies soon gave place to mathematics and natural history, towards which the bent of his mind was naturally directed. After completing his studies at the University, he repaired to Stockholm to undergo the public examination in mathematics and practical geometry, which was necessary to qualify him as an Engineer Officer, and succeeded in obtaining a commission. But while in Sweden, the acquaintance which he formed with Thunberg and Swartz, and a journey to the northern mountains on the Norwegian frontier, determined him to relinquish the military career; and on his return to Greifswald, on the recommendation of Rudolphi, he became a candidate for the post which the latter was about to vacate. On the third day after his arrival he presented himself for medical examination; wrote his inaugural 'Dissertatio Botanica, sistens Plantarum Domingensium Decadem;' and became Demonstrator of Botany and Director of the Botanic Garden at Greifswald at the early age of twenty years. In 1811, being appointed Professor of Natural History in the University of Dorpat, he passed some time in Berlin, where the conversation of Willdenow and Pallas stimulated him to the formation of extensive plans for the elucidation of the natural history of the vast domains which constitute the Russian empire. Crossing the scene of war on the frontiers of Prussia, not without danger, he began in earnest his career as a teacher, an observer and an author. He

made the botany of the Russian territories the great object of his study during the remainder of his life; and from the Garden at Dorpat which he greatly improved, in conjunction with that of St. Petersburg, the rarer forms of Caucasian and Siberian vegetation have been distributed throughout the rest of Europe. In 1826 he undertook a scientific mission to the Altai, and a winter journey of five weeks brought him to Barnaul, whence on the approach of spring he extended his researches into the mountains as far as the frontiers of China, while his pupil Charles Anthony Meyer examined the Kirghisian Deserts to the westward, and Von Bunge, who has since succeeded him in the Chair at Dorpat, visited the eastern parts of the Altai. The botanical results of this important journey were given to the world in two separate publications; first, the 'Flora Altaica,' 4 vols. 8vo, Berlin, 1829-1833, the joint production of Ledebour, Meyer and Von Bunge; and secondly, 'Icones Plantarum novarum vel imperfectè cognitarum, Floram Rossicam, imprimis Altaicam, illustrantes,' 5 vols. fol., Riga, 1829-1834. These works are justly described as forming an epoch in the descriptive, systematic and geographical botany of the Russian empire; and were accompanied by an account of his 'Reise durch das Altai-Gebirge,' Berlin, 1829, 2 vols. 8vo, which is full of valuable information on geography, geognosy, botany, ethnography and statistics. In 1836 he became Professor Emeritus and quitted Dorpat for a milder climate, which he sought first at Odessa, afterwards at Heidelberg, and finally during the last eight years of his life at Munich. In this retirement he commenced and carried to a conclusion, only a few days before his death, the last and greatest of his works, his 'Flora Rossica, sive Enumeratio Plantarum in totius Imperii Rossici provinciis Europæis, Asiaticis et Americanis, hucusque observatarum,' Stuttgart, 1842-1851. In this, as in his previous works, he adopted the Linnean system of classification, and showed in working out the details great accuracy of observation, a high degree of precision in his characters and descriptions, and much critical research. He died at Munich on the 4th of July last, in consequence of long-continued disease of the heart. His election into the Linnean Society dates from 1845.

Of the personal history of *Jules César de Savigny*, but few particulars have been obtained. A member of the Scientific Commission which accompanied the French army into Egypt, he attached himself more particularly to the study of the invertebrated animals, and especially distinguished himself by his memoirs on *Annelida* and *Ascidia*, published along with numerous others on almost

every department of zoology, in the great work entitled 'Description de l'Égypte.' Nearly the whole of the zoological plates of that work were drawn under his direction, and the memoirs and explanations which were intended to accompany them were far advanced in preparation, when severe illness, brought on by intense application, incapacitated him from putting the finishing touch to his labours, and rendered it necessary, in the year 1825, to obtain the assistance of his pupil M. Victor Audouin, to put in order such of his MSS. as were sufficiently complete for publication, and to give summary explanations and indications of the subjects figured on the remaining plates. From this time forward M. Savigny ceased to publish, blindness depriving him of the power of observation, and hypochondriasis casting a gloomy shadow over the remainder of his existence. Of his separate publications the most remarkable are a learned and very elaborate 'Histoire naturelle et mythologique de l'Ibis,' 8vo, Paris, 1805, and a series of 'Mémoires sur les Animaux sans Vertèbres,' 2 vols. 8vo, Paris, 1816, containing his "Théorie des Organes de la Bouche des Crustacés et des Insectes," his "Recherches anatomiques sur les Ascidies composées et sur les Ascidies simples," and his "Système de la Classe des Ascidies." In the first of these memoirs he led the way to that more just appreciation of the nature and origin of the appendicular organs of *Insects* and *Crustacea*, which has since been universally adopted, and which his successors in Comparative Anatomy have so widely generalized and extended. In the two last he gave a complete anatomical and systematic account of a class of animals till then very imperfectly understood, and which, notwithstanding his researches and those of many later anatomists, are still the subject of much doubt and controversial discussion. He was elected a Foreign Member of the Linnean Society in 1822, and a Member of the Academy of Sciences of the Institute of France in 1821; and he died on the 5th of October, 1851.

Joachim Frederic Schouw was the son of a wine-merchant in Copenhagen, and born in that capital in the year 1789. His attachment to botany was developed at an early period, and at the age of thirteen or fourteen he attended the lectures of the celebrated Vahl. Subsequently he became a student in the Faculty of Laws, and passed a brilliant examination. In 1816, while holding a subordinate office in the Danish Chancery, he wrote his inaugural Dissertation for the degree of Doctor, 'De Sedibus Plantarum Originariis,' 8vo, Havn. 1816. From 1817 to 1820, and in 1829 and 1830, he made repeated journeys, partly at the public expense, through Germany, France and Italy, which last he again visited in 1839 and 1840, on

this last occasion with a view to the recovery of his health. In 1821 he was appointed Professor of Botany in the University of Copenhagen, and it is in his relation to that science that we have chiefly to consider him. To systematic botany he does not appear to have paid much attention. Neither did he meddle with the internal structure of plants, their anatomy and physiology. But to the study of the geographical, physical, and we may add also, the economical relations of plants, he devoted himself with an ardour and success that have scarcely been surpassed. Making the well-known essay of Humboldt the starting-point of his own investigations, he published a series of works on this interesting branch of botanical science, of which the principal, independently of the inaugural dissertation above mentioned, are the following: the titles of the German translations of those which were originally published in Danish are given, as better known in this country than the originals. 'Grundzüge einer Allgemeinen Pflanzen-Geographie,' 8vo, Berlin, 1823, together with a 'Pflanzengeographischer Atlas,' fol., *ibid.*, 1824; 'Schilderungen der Witterungszustände Dänemarks,' a prize essay published in 1826; 'Über die Unveränderlichkeit der Climate;' 'Über den Mittelstand des Barometers über dem Meere;' 'Specimen Geographiæ Physiçæ Comparatæ,' 4to, Havn. 1828; 'Tableau du Climat et de la Végétation de l'Italie,' 4to, Copenhagen, 1839; together with many classical essays, instructive monographs, and interesting sketches which appeared in various journals. Like his great countryman Oersted, he took peculiar pleasure in making scientific inquiries accessible and intelligible to the world at large, and possessed a rare talent for popularizing scientific details. As specimens of this talent may be quoted his 'Europa, eine leichtfassliche Naturschilderung,' 8vo, Kopenh. 1833; his 'Naturschilderungen,' of which two collections appeared in 1839 and 1845; and many smaller essays. About 1831 he commenced taking an active part in politics, and gradually became one of the leaders of the moderate opposition in the Provincial States. In this position he conducted himself with so much prudence, honour and good sense as to gain the respect of all parties, and to induce the King himself, Frederic VI., in the year 1834, to name him the Royal Deputy of the University of Copenhagen. The states both of Zealand and Jutland chose him as their almost permanent President, and the evident sincerity of his convictions, the perspicuity of his language, the quiet mildness of his deportment and his engaging manners, secured him the esteem even of his opponents. His last published work is a selection from his 'Schilderungen,' with numerous additions, published at Leipzig

in 1851, under the title of 'Die Erde, die Pflanzen und der Mensch,' to which is prefixed a pleasing portrait of its amiable author, and a biographical sketch from which this notice is chiefly taken. He died on the 28th of April in the present year, in the 64th year of his age. His election as a Foreign Member of the Linnean Society dates from 1843.

The Secretary also announced that ten Fellows and three Foreign Members had been elected since the last Anniversary.

At the election which subsequently took place, Robert Brown, Esq., was re-elected President; William Yarrell, Esq., Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the Council in the room of others going out, viz.: Charles Daubeny, M.D., William Henry Fitton, M.D., George Robert Gray, Esq., John Reeves, Esq., and James Francis Stephens, Esq.

June 1st.

R. Brown, Esq., President, in the Chair.

John Braxted Hicks, M.D., was elected a Fellow.

Read a paper "On two new genera of *Fungi*." By the Rev. M. J. Berkeley, F.L.S.

After some preliminary observations on the gratification attendant on the satisfactory determination of the synonyms of the earlier writers, and on the advantages to be derived from an attentive study of their works, particularly (as regards *Fungi*) those of Micheli, Schmidel, Müller and Battarra, Mr. Berkeley proceeded to call the attention of the Society to two subjects, the one figured by Battarra and the other by Bulliard. The figure of Battarra is contained in his "*Fungorum Agri Ariminensis Historia*," t. 40, and represents a *Phallus* which some later writers have referred to *Phallus caninus*, Huds., although at first sight it bears but a remote resemblance to that species. Several specimens of it were found, according to Battarra, in the neighbourhood of Rome, and he describes them as having the volva dirty white, coriaceous, and filled with a mucilaginous substance, as in the other species of *Phallus*. From this arose a club-shaped cellular receptacle, hollow within, the upper part being even and solid within (meaning probably that it was imperforate), and covered with a crust which was red when the fungus

was young, but when it had arrived at maturity the top was green with a zone of red beneath it, the lower portion of the stem being dirty white sprinkled with reddish brown superficial specks: when the fungus was past maturity, the upper portion passed into a fœtid fluid. It would seem that Battarra did not see the fungus when fresh, and that his figure was taken from a dried specimen; but it is very difficult to conceive how a fungus tapering to a point, as exhibited in Sowerby's figure of *P. caninus*, could by any mode of drying assume the broadly clavate form exhibited by Battarra's figure. A fungus, however, has been recently found in S. Carolina by H. W. Ravenel, Esq., which exhibits the peculiar form of that of Battarra, and when forwarded to Mr. Berkeley by the Rev. M. A. Curtis was noticed as differing greatly in structure from the other species of *Phallus* in its not showing the slightest distinction between the stem and hymenium. At a later period specimens of the same species were found by Mr. Ravenel exhibiting the same form as that of *P. caninus*, but with the ample hymenium more clearly confluent with the stem, which differs but slightly from it in appearance and structure, and always perforated at the apex, while the loose cellular pale stem of *P. caninus* is at the first glance distinct from the short and more minutely cellular head. No doubt whatever rests in the mind of Mr. Ravenel as to the identity of the clavate and fusiform individuals of his plant; and as these two forms occur in a species analogous to *P. caninus*, though not identical with it, Mr. Berkeley is of opinion that we may conclude, with tolerable certainty, that the figure of Battarra does indeed represent a peculiar state of the well-known species. With regard to the plant of S. Carolina, Mr. Berkeley points out the distinctions between it and *P. caninus*, and thinks that they completely justify the formation of a new genus for its reception, unless such genera as *Dictyophora*, *Mutinus*, *Dictyophallus*, &c. are to be rejected, as mere members of the genus *Phallus*. He therefore proposes to characterize it as follows:—

CORYNITES, *Berkel. & Curt.*

Uterus rotundatus, e membranâ duplici gelatinâ distentâ compositus, lobato-rumpens. *Receptaculum* cum stipite clongato celluloso-cribroso omninò continuum, obtusum, perforatum, massâ sporiferâ primùm sinuato-cellulosâ tenaci mox verò diffuente tectum. *Sporæ* minutæ. —Fungi terrestres, oblongi, subfusiformes, autumnales. Genus a Mutino, Fries, differt receptaculo minùs discreto, apice perforato.

C. RAVENELII, n. sp.

Hab. in sabulosis graminosis, juxta fl. Santee Carolinæ Australis, autumnuo.—*Curtis*, no. 2573, 3037. *Ravenel*, no. 844.

Mr. Berkeley describes the egg as globose, $\frac{3}{4}$ of an inch in diameter, the volva bursting in two or three lobes applied to the stem; the stem $1\frac{1}{2}$ –2 inches high, 4–5 lines thick, bright red, coarsely cribose, below attenuated, above confluent with the receptacle, which is sometimes broadly clavate, sometimes conical, but always more or less obtuse, pervious at the apex, sometimes half as long as the stem; the mass of spores dark olive, soon washed off; the odour heavy and nauseous, but only perceptible when the hymenium is brought near to the nose.

The second subject of Mr. Berkeley's paper relates to a group of Fungi of which *Sphærocarpus capsulifer*, Bulliard, is the type, and which appear to have been for the most part neglected by authors, the accounts of them by French botanists (by whom alone they have been noticed) being more or less complete compilations from Bulliard. Externally the fungi in question, with one exception, have the appearance of species of the genus *Physarum*, the peridium being single and smooth, and the spores mixed with flocci; the latter are broad and lamellæform in parts, but vary greatly in breadth, and intermixed with spores as in other *Myxogasteres*, but these spores grow in little aciniform masses instead of being single as in other allied *Fungi*, with the exception of *Enerthema*, *Reticularia* and *Ptychogaster*, in the former of which (figured by Mr. Bowman in the 'Linnean Transactions') as well as in the present instance, Mr. Berkeley has ascertained that they are produced within a vesicle, as in *Hymenogaster vulgaris*, Tul., thus confirming at once Mr. Bowman's curious genus, and M. Tulasne's observation of a similar anomaly in a different group of fungi; while in the two other genera they form little radiating fascicles. Mr. Berkeley states that the credit of calling attention to Bulliard's figure, and ascertaining the structure, is entirely due to Dr. Badham, and he therefore dedicates the genus to him, in the hope that its characters are so well founded as to ensure permanence.

BADHAMIA, Berkeley.

Peridium simplex, extus nudum, v. rarissimè subtomentosum, apice demùm lacerato-apertum; *flocci* laxè reticulati, parietibus affixi, hic illic expansi in laminam sæpè triangularem peridio similem; *sporæ* globosæ, v. subangulares, primùm sacco communi inclusæ, demùm liberatæ, conglobato-adnatæ.—Fungi *minores*, *fragilissimi*, *muscos* v. *corticem colentes*, *Physarum ut plurimùm referentes*.

1. *B. hyalina* = *Physarum hyalinum*, *Auct.*
2. *B. utricularis* = *Physarum utriculare*, *Auct.*

3. *B. capsulifer*, peridiis sessilibus v. breviter membranaceo-pedicellatis obovatis congestis e nigro-cæsiis albidis, floccis candidis.

Sphærocarpus capsulifer, *Bull.* t. 470. f. 2.

Trichia capsulifera, *Dec. Fl. Franç.* vol. ii. p. 254 (1815).

Physarum capsuliferum, *Chev. Par.* vol. i. p. 339 (1826)?; *Duby, Bot. Gall.* p. 861 (1830).

Hab. ad muscos, in Galliâ.

A sequentibus differt stipite spurio, peridiis magis obovatis, floccisque albidis. *B. utriculari* verosimiliter propior.

4. *BADHAMIA NITENS*, peridiis sessilibus depressis congestis nitidè flavis, floccis flavis, sporis extùs fortiter echinulatis.

Hab. ad ramos quercinos emortuos; apud East Bergholt, in Com. Suffolk, Febr. 21, 1851, *Rev. Dr. Badham.*

5. *BADHAMIA PALLIDA*, peridiis sessilibus depressis sublentiformibus hic illic congestis sparsisque pallido-luteis, floccis flavis, sporis majoribus granulatis; vesiculâ centrali magnâ.

Hab. ad ramos quercinos emortuos; apud East Bergholt, in Com. Suffolk, Mart. 1, 1851, *Rev. Dr. Badham.*

6. *BADHAMIA FULVELLA*, peridiis gregariis sessilibus globosis nigris tomento subtili fulvo vestitis, floccis albidis.

Hab. ad lignum emortuum; apud East Bergholt, in Com. Suffolk, *Rev. Dr. Badham.*

Habitus *Didymii* potiùs quàm *Physari.*

The paper was accompanied by coloured drawings, and magnified representations of the details.

Read also a memoir "On *Acradenia*, a new genus of *Diosmeæ*." By Richard Kippist, Esq., Libr. L.S.

The new genus described was one of a highly interesting collection formed in the neighbourhood of Macquarrie Harbour, Van Diemen's Land, by Mr. Joseph Milligan, and by him, through the late lamented Mr. Bicheno, presented to the Society. It belongs to the natural order *Diosmeæ*, tribe *Boroniæ*, and in habit most nearly approaches *Zieria*, to the larger-leaved species of which it bears at first sight considerable resemblance. From this genus, however, as well as from *Melicope*, *Boronia*, and *Cyanothamnus*, from *Eriostemon*, *Crowea*, and *Philotheca*, and from *Geleznovia*, Turcz., it differs in various characters which are more particularly indicated; and it is distinguished from them all by the structure of its ovaries, which adhere closely together and are everywhere clothed with a dense tomentose covering; except that each bears, at its upper external angle, a naked sessile tubercle or gland, large enough to be readily observed

with the naked eye, a character which Mr. Kippist has been unable to discover in any closely allied genus, and which has suggested the generic name. He is unable to speak positively as to the precise nature of these glandular bodies, or to say whether any exudation proceeds from them: when examined under the microscope they appear to be perforated by a tube, widening below, and communicating with the internal cavity of the carpel; and from their exact correspondence in position, they are probably analogous to the cornute appendages which crown the ovaries of some species of *Phebalium*, in which genus they are occasionally developed into subulate or nearly cylindrical horns.

ACRADENIA, Kipp.

Calyx 5-partitus. *Petala* 5, hypogyna, calyce multò longiora, æstivatione imbricata, ovato-elliptica, undique velutina. *Stamina* 10, hypogyna, petalis sublongiora, alterna paulò breviora: *filamenta* libera, subulata, glabra; *antheræ* introrsæ, glabræ. biloculares, rimâ longitudinali dehiscentes, apice inappendiculatæ. *Ovaria* 5, gynophoro disciformi margine sinuato insidentia, 1-locularia, villosissima; singula apice glandulâ majusculâ sessili instructa. *Ocula* in loculis gemina, suturæ ventrali collateraliter inserta, pendula. *Styli* in unicum glabrum coaliti. *Stigma* subcapitellatum. *Capsula* 5- (vel abortu 1-3-) cocca; *cocci* basi subcohærentes, sepalis persistentibus pluries longiores, subquadrati, paulo compressi, basi rotundati, apice abrupte truncati et angulo externo brevè cornuti, coriacei vel sublignosi, dorso carinati. transversim rugosi, extus glabrinsculi, intus sulcati. glabri. *endocarpio* haud secedente. *Semina*?—Frutex *Tasmanicus*, ramosissimus; foliis oppositis, extipulatis, petiolatis, 3-foliatis, foliolis coriaceis, lanceolatis, serratis, suprâ tuberculatis: pedunculis terminalibus, trichotomè cymosis, multifloris; floribus albis.

ACRADENIA FRANKLINIÆ, Kipp.

Zieria Frankliniæ, Milligan, MSS.

Hab. ad margines sylvæ densæ prope Portum "Macquarie" dictum Insulæ "Van Diemen," ubi floribus expansis legit Dom. Jos. Milligan mense Decembri 1846, et iterùm Martii 1847.

The close resemblance to *Zieria* in habit had originally suggested to Mr. Kippist the specific name of "*Zierioides*," but Mr. Brown having kindly communicated to him a specimen gathered by Mr. Milligan on the Franklin River in April 1842, with a ticket attached, from which it appears that Mr. Milligan had proposed to name the plant "*Zieria Frankliniæ*" (after Lady Franklin), he has adopted with much pleasure that specific name. On the same ticket Mr. Milligan describes the plant as handsome and fragrant; but this, as he at that time saw no flowers, Mr. Kippist presumes can only be

intended to apply to the leaves, which, as in the majority of the *Diosmeæ*, are copiously furnished with pellucid dots, reservoirs of essential oil, and exhaling probably the peculiar odour which characterizes the family.

The plant having recently flowered at Kew, he was enabled by the kindness of Sir Wm. Hooker to examine the flowers in a living state, but he regrets to hear that it is not likely at present to ripen its fruit at Kew, where Mr. Smith states that it was first introduced in 1845 in a case sent by Dr. M'William from Norfolk Island; a locality, however, in which it is scarcely possible that it should be indigenous.

The same collection from which the *Acradenia* was obtained, included a number of highly interesting plants, quite new to the Society's herbarium. Among the most striking were several alpine *Umbelliferae*, principally from Mt. Sorrel, of very singular habit, one or two of which have been recently figured by Sir Wm. Hooker in his 'Icones,' from specimens forwarded by Mr. Milligan or his fellow-labourer Mr. Gunn: others appear to be still undescribed. Dr. Meisner found among them a few new *Proteaceæ*, and a most remarkable dichotomous *Pimelea*, with densely silky imbricated leaves, which he proposes to call after its discoverer. It contained, moreover, a number of fine *Epacrideæ*; among them a splendid species of *Dracophyllum* (*D. Milligani*, Hook.), remarkable as being the first instance of the occurrence of that genus in Van Diemen's Land, and a new genus of *Hamadoraceæ*, with large handsome flowers and equitant leaves, recently described by Sir Wm. Hooker under the name of *Hewardia tasmanica*.

Read further "Descriptions of two new Swan River *Papilionaceæ*." By Thomas Moore, Esq., F.L.S.

The characters of these species, which have recently flowered for the first time in English gardens, are as follows:—

GASTROLOBIUM PYRAMIDALE, ramulis foliis stipulis pedunculis bracteis calycibusque densè tomentosis, stipulis longis setaceis recurvis, foliis petiolatis 3-nis ovali-obtusis v. rotundatis mucronatis suprâ demùm glabris, racemis axillaribus densè capitatis, pedunculis foliis paullò brevioribus, bracteis trifidis: superioribus obovatis mucronatis, calyce campanulato; dentibus superioribus lateralibusque obliquis, pedicellis calyce brevioribus, ovario subsessili villosa.

Hab. ad fl. Cygnorum N. Hollandiæ, *Drummond*, ser. 5. no. 54.

CHOROZEMA NERVOSUM, ramulis pubescentibus, foliis latè cordatis rigidè cuspidatis crassè marginatis integris utrinque conspicuè venosis glabris

undulatis subcarinatis, racemis paucifloris axillaribus terminalibusve pedicellis supra medium bibracteolatis calyce brevioribus.

Hab. ad fl. Cygnorum N. Hollandiæ, *Drummond*, ser. 5. no. 23.

Both plants were obtained by Mr. Moore from the Nursery of Messrs. Henderson in the Edgware-road, where they had been raised from Mr. Drummond's seeds.

June 15th.

R. Brown, Esq., President, in the Chair.

The Rev. Edward Armitage, M.A., and Francis Polkingham Pascoe, Esq., were elected Fellows.

Read the commencement of a memoir "On the Development of Ferns from their Spores." By Arthur Henfrey, Esq., F.R.S., F.L.S., &c.

November 2.

R. Brown, Esq., President, in the Chair.

Read a continuation of Mr. Henfrey's memoir "On the Development of Ferns from their Spores."

November 16.

N. Wallich, Esq., M.D., Vice-President, in the Chair.

Frederick John Earl of Ripon, the Rev. Edward Tagart, and Berthold Seeman, Esq., were elected Fellows of the Society.

Read the conclusion of Mr. Henfrey's memoir "On the Development of Ferns from their Spores."

The author commences his paper by referring to the remarkable discoveries published by Count Leszczy-Suminski in 1848, and the

observations to which they have subsequently led on the part of others; which appear to necessitate important changes in our general views of the reproduction of plants. He finds, however, that the results of some of these later observations differ in many respects not only from those of Suminski, but also among themselves; and that opinions are divided both as to the actuality of the most important fact of all, viz. the process of impregnation, and as to the period and circumstances of its occurrence. Under these circumstances he has thought he would be performing a useful task in subjecting the question to minute investigation, in the course of which he has carefully traced the development entirely through its course from the spore to the young leafy plant, applying every available means to clear up the anatomical conditions in each stage of the progress. The drawings which accompany the memoir were nearly all made by means of the camera lucida eye-piece, so that they represent preparations actually seen.

The subject is treated of under three heads; the first section containing the author's own observations; the second, a critical examination of those of preceding authors; and the third, a few remarks on the general bearing of the results upon vegetable physiology.

Under the first head, Mr. Henfrey describes first the prothallium, and its mode of growth, enlargement and decay; secondly, the antheridia, with their sperm-cells and spermatozoids; thirdly, the archegonia, with their papillæ and embryo-sacs; and fourthly, he gives his own view of the development of the embryo. On all these points he enters into much detail, tracing the several stages of the process with great minuteness. In his criticism of previous observations, he passes in review the facts and opinions stated by Nägeli, Suminski, Wigand, Thuret, Hofmeister, Schacht, Mettenius, Von Mercklin, and Hofmeister again; and indicates the points in which they severally differ from each other, and also those in which he himself either coincides with or differs from each of them. The memoir is so completely one of detail, that under these two principal divisions it would be difficult to give a sufficiently clear abstract without running to too great a length; and this is the less necessary as the memoir itself will immediately appear in full in the Society's 'Transactions.'

Under the head of "Development of the embryo" the author gives the following statement of his opinion on the question of impregnation, and the mode in which it is effected:—"My opinion with regard to the fertilization is, that the operation is effected by the contact of one or more *spermatozoids* with the mucilaginous

filament contained in or hanging from the mouth of the canal of the *archegonium*. I have seen the *spermatozoids* swimming in numbers around the mouths of *archegonia*, but never detected one inside, and I do not see any good reason for supposing such a process necessary. The pollen-tube of flowering plants only comes in contact with the outside of the embryo-sac, and the influence is sometimes communicated through a long suspensor; and there does not seem to be any sufficient objection to the supposition, that the contact of the *spermatozoid* with the filament of mucilage which lies in the canal of the *archegonium*, suffices to convey the necessary stimulus. I imagine this stimulus resides in the mucilaginous fluid in which the *spermatozoid* is bathed in the *sperm-cell*, and which, adhering to this, is conveyed to the mucilage (protoplasm) of the *germinal vesicle*, just as the contents of the pollen-grain become combined with the protoplasm of the germinal vesicle in flowering plants. The nature of the process is clearly a problem beyond the reach of science, but it seems to me a necessary induction from the facts in the Phanerogamia, that the phænomena result there from the material union of two fluids, and I hence conclude that this is the case here. The comparatively few cases of successful impregnation among these *prothallia*, so many of which prove sterile, may perhaps be accounted for by the peculiar conjunction of circumstances required to bring a sufficient amount of the fertilizing fluid, by means of the *spermatozoids*, to the *germinal vesicle*, at the precise epoch required.”

His general “conclusions” are as follows:—“In summing up all these statements it becomes evident that the balance of evidence is in favour of the existence of sexual organs, and of a process of impregnation, giving rise to a new individual, as asserted by Suminski, although under conditions somewhat different from those described by that author. Only two of the observers who have repeated his investigations throw doubt upon these points, namely Wigand and Schacht; the statements of the former as to matters of fact are far from sufficient to bear out the mass of argument he has built upon them against the existence of sexes; in fact, his observations were so imperfect that he described the two parts of the *archegonium*, the *papilla* and the enlarged *embryo-sac*, as distinct structures; while he never traced the origin of the new plant at all. His observations may therefore be safely passed over. Schacht’s are more complete, but he again only *argues* against the probability of a sexual conjunction, with the preconceived notion that this must be analogous to what he erroneously believes to be the conditions in

the Phanerogamia; while his observations furnish facts which greatly support the probability of an impregnation by the *spermatozoids*; the difficulties he suggests being of little weight in comparison with those of accounting for the existence of all the peculiar structures by any other hypothesis. The opinions of all the rest are in favour of the impregnation (Thuret does not treat of the *archegonia*), and the differences between them, except in the case of Suminski, are unimportant in a physiological point of view, merely presenting questions of anatomical and morphological interest. And since Suminski's description of the mode of origin of the embryo would be altogether at variance with what exists, not only in other plants, but also in animals, and is opposed to the observations of all the rest of us (except the doubtful support given by Von Mercklin), I cannot but repeat my belief that he was led from the facts by his imagination being preoccupied by Schleiden's doctrine of the impregnation of the Phanerogamia."

December 7.

R. Brown, Esq., President, in the Chair.

The By-Law proposed by the Council on the 2nd of November to be added at the end of Chapter X. as follows:—

“Sect. X. The Society shall not, and may not, make any Dividend, Gift, Division, or Bonus in Money, unto or between any of its Members,”

having been hung up in the common meeting-room of the Society, and read by the President, or Vice-President in the Chair, at the two last successive General Meetings of the Society, was put to the ballot, and confirmed by the Fellows at large in the terms of the Charter.

Read, “The Flora of South Australia displayed in its fundamental features and comparatively.” By Dr. Ferdinand Müller of Adelaide, in a Letter to R. Kippist, Esq., Libr. L.S., translated and communicated by Mr. Kippist.

December 21.

R. Brown, Esq., President, in the Chair.

Read, "The Vegetation of the District surrounding Lake Torrens, sketched by Dr. Ferdinand Müller of Adelaide," in a Letter to R. Kippist, Esq., Libr. L.S., translated and communicated by Mr. Kippist.

January 18, 1853.

R. Brown, Esq., President, in the Chair.

The Rev. Churchill Babington, M.A., and Joshua Clarke, Esq., were elected Fellows of the Society.

Read a paper "On the Habits and Structure of the Great Bustard (*Otis tarda*, L.)" By William Yarrell, Esq., V.P. and Treas. L.S.

The particulars relating to the habits of the Bustard are derived from the communications of several friends, who have had opportunities of observing it both in England and elsewhere. The first notice is from C. A. Nicholson, Esq., of Balrath Kells, in the county of Meath, and furnishes remarks on the habits of the bird as observed by him in the neighbourhood of Seville, where it appears to be extremely abundant, the males beginning to arrive in the cultivated country at the beginning of February in flocks varying (according to Mr. Nicholson's observations) from seven to fifty-three; the old birds always associating together, and those of a year old, which are much smaller, never mixing with them: the young birds have neither beard nor pouch. The females do not arrive till the beginning of April, and come singly or at most in pairs; the flocks of males then break up and are met with in parties of three or four, or even singly, spreading their tails on a fine day like Turkey-cocks, drooping their wings and expanding their pouches. The sexes appear to live quite separate. In May the cocks entirely disappear from the cultivated lands, retiring to the extensive grass marshes on the banks of the Guadalquivir, and leaving the hens behind them. The young are hatched in the corn-plains about Seville, and are able to take care of themselves when the corn is cut in July, after which the young birds and hens follow the cocks to the marshes. The birds are very difficult to shoot: the heaviest shot by Mr. Nicholson weighed 28 pounds;

and the largest measured 7 feet 3 inches from tip to tip of wing. Those of a year old weigh from 8 to 10 pounds, and are much the best eating. Their stomachs were found crammed with barley, both leaves and ears, with the leaves of a large-leaved green weed and with a kind of beetle. When flushed they generally fly for two or more miles, and sometimes at least 100 yards high. They never try to run, and Mr. Nicholson cannot imagine greyhounds being able to catch bustards, as they are reported to have done.

Mr. John Wolley, jun., states that he had never seen the Great Bustard, or received its eggs, from the neighbourhood of Tangier. While ascending the Guadalquivir, about the month of September, he saw several flocks of four or five birds each on the level plains which extend along the banks of that river, walking apparently in file, some with their heads down. They did not appear to be timid, or very cautious; but once, as the boat came suddenly round a corner, several of them rose together, springing hastily to the height of 40 or 50 feet, and then turning suddenly and somewhat clumsily, after a few more rapid strokes, sailed along with the arched form of wings so general in game birds.

Mr. Yarrell's next notice is derived from a letter in the possession of John Britton, Esq., giving an account of two bustards seen on Salisbury Plain in the summer of 1801, within a fortnight of each other, both of which attacked mounted horsemen, and one of which was captured and kept for some time by Mr. J. Bartley of Tilstead, by whom it was eventually sold to Lord Temple. The letter gives numerous details of the habits of this bird from the information of Mr. Bartley.

J. H. Gurney, Esq., of Norwich, states in a letter to Mr. Yarrell that, as far as he can learn, the last bustard killed in Norfolk was a female, which was shot at Lexham, near Swaffham, towards the end of the year 1838. The small flock of which this was one had for several years consisted of females only, the eggs of which were frequently picked up, having been dropped about at random in consequence of the absence of male birds, the latter having become extinct at an earlier date. Fredk. J. Nash, Esq., of Bishop's Stortford, has several times informed Mr. Yarrell that, when taking the field as a young sportsman, he once saw nine flights of bustards in one day not far from Thetford in Norfolk. And Gilbert White of Selborne mentions in his Diary, under date of November 17th, 1782, that being at a lone farm-house between Whorwell and Winchester, the carter told him that about twelve years before, he had seen a flock of eighteen bustards at one time on that farm. Three instances only

of the appearance of the bustard in England have been noticed by Mr. Yarrell since the publication of the second edition of his 'History of British Birds;' one, a female, recorded by G. R. Waterhouse, Esq., of the British Museum, as occurring to him in August 1849 on Salisbury Plain; a second, also a female, shot at Lydd in Romney Marsh in January 1850, and now in the possession of Dr. Plomley, F.L.S.; and the third shot on the 31st of December, 1851, in Devonshire, and now in the possession of J. G. Newton, Esq., of Millaton Bridestow.

Mr. Yarrell proceeds to state that he had long wished to have an opportunity of examining the body of a male bustard for the purpose of inspecting the gular pouch described by Daines Barrington in his 'Miscellanies,' 1781, and by Edwards in his 'Gleanings of Natural History,' 1811, and thence copied both by Bewick and himself; but no opportunity for so doing occurred until recently. About four years ago the Zoological Society obtained from Germany six or seven young bustards, and one of these (a male) died within a year. The body was examined by Mr. Mitchell and himself, and no gular pouch was found, but this was then attributed to the youth of the bird. In December last another male of this flock, believed to be four years old, died at the Zoological Gardens, and was also examined by Mr. Yarrell. The neck was carefully dissected; but there was no opening under the tongue, and he entirely failed in various attempts to distend any part of the membranes either by fluid or by air. Thus disappointed in his expectation of finding what had been so minutely described, Mr. Yarrell turned to the translation of the anatomical descriptions of the animals dissected by the Royal Academy of Sciences at Paris at the end of the seventeenth century, and found the results of the dissection of six male bustards there given to correspond entirely with his own observations. He found also that Cuvier in his '*Leçons d'Anatomie Comparée*,' refers to no peculiarity in the neck of the male bustard. Professor Owen also entirely confirmed the fact of the absence of any gular pouch by his own dissection of a full-grown bustard made with the view of obtaining a preparation of that supposed structure for the Museum of the College of Surgeons. Mr. Yarrell is therefore disposed to consider that there must have been some mistake on the part of the writers quoted as to the species of bird in which that pouch was observed.

February 1.

R. Brown, Esq., President, in the Chair.

Daniel Oliver, jun., Esq., and William Thomson, Esq., were elected Fellows.

Read a paper "On Venation as a generic character in Ferns; with Observations on the genera *Hewardia*, J. Smith, and *Cionidium*, Moore." By Thomas Moore, Esq., F.L.S., Curator of the Botanic Garden, Chelsea.

The object proposed by the author is to inquire—1st, into the general importance of modifications of the vascular structure of the fronds in distinguishing the genera of Ferns; and 2ndly, into their relative value in the cases instanced. He begins by referring to the numerous authors by whom the venation has been turned to account in the formation of genera or subgenera, and in particular to the observation of Mr. Brown, that "for subdivision, the most obvious as well as the most advantageous source of character seems to be the modifications of the vascular structure, or the various ramifications of the bundles of vessels or veins of the frond, combined with the relation of the sori to their trunks or branches." He notices an instance in which Sir William Hooker has given generic importance to this character of venation alone, viz. in *Dictyoxiphium*; while in *Schizoloma* he regards the venation as only of subgeneric value; and he treats it as a mere question of words, to be decided by convenience, whether or not this character should be generically employed. In the case for instance in reference to which Mr. Brown's remarks were made, *Polypodium (Dipteris) Horsfieldii*, it seems to him, as a matter of convenience, a much simpler and more easily comprehensible idea, to regard *Dipteris* as a group of ferns with round naked sori, dichotomous primary veins and reticulated venules, than to have to recognize in *Polypodium* (a genus of ferns having round naked sori) an included group called *Dipteris*, in which the primary veins are dichotomous and the secondary reticulated. In most cases, indeed, he regards subgenera as at the best but cumbrous contrivances.

Looking at the question of venation, as illustrated in the great and universally adopted natural divisions of flowering plants, he thinks its generic importance in ferns rests on better grounds than convenience alone. In the case of flowering plants the presence of complete floral organs affords the necessary diversity for generic

distinction; but as an equivalent to these we have in ferns nothing more than certain naked or covered aggregations of spore-cases, which in the great bulk of the species scarcely afford any differential characters, or such only as are microscopic, and therefore not to be resorted to until all more obvious features are exhausted. But peculiarities in the venation of ferns are for the most part associated with peculiarities of habit; and since it appears quite justifiable to employ other characters than those derived from the fructification in distinguishing generically such groups as the ferns, in which the fructification affords comparatively so little variety, what is there so constant and unvarying, and at the same time affording such diversities, as the peculiarities in the development of the vascular structure? Experience, moreover, attests this character of venation as one to be relied on with perfect confidence, because (with very insignificant exceptions) whatever modification of vascular structure is met with in a particular species, that and no other is found in that species. The author concludes, therefore, that without lowering the importance of the fructification of ferns in distinguishing generic groups, the modifications of venation are properly as well as conveniently admitted to share in the same office.

Passing to the question, whether a reticulated venation is in itself a sufficient generic distinction among the ferns, he determines it in the affirmative, inasmuch as a genus being in his view an arbitrary group, all that is really required as a generic character is a constant difference from established genera in the structure of some important organ or system of organs. Now the vascular system must be regarded as of the highest importance in the vegetable œconomy even in reference to propagation, it being not at all infrequent to meet with extraordinary means of development in connexion with it, viz. adventitious buds; and in ferns particularly those points of the veins which serve in normal cases as the receptacles to which the sori are attached, in other cases become viviparous and develop gemmæ from which new plants are produced. He believes, moreover, that characters derived from this system of vessels, when taken in connexion with the fructification, though sometimes forming groups of considerable extent, and occasionally separating species having some external similarity, nevertheless in no case bring together obviously ill-assorted species, but rather associate those of obvious similarity and affinity.

For these reasons he is not prepared to follow Sir W. Hooker in setting aside the genus *Hewardia* of Mr. John Smith. He regards the difference as broad and important between the accidental anasto-

mosing of contiguous venules which occurs in some species of *Adiantum*, and a constant and complete reticulation, such as exists in the genus *Hewardia*; and he concludes that that genus should be retained. This conclusion he finds unexpectedly confirmed in Fée's 'Genera Filicum,' just received in this country, where the same view is taken of the species of *Hewardia* as that which he had previously adopted, and an additional species (*H. serrata*) mentioned of which he had no previous knowledge.

The species enumerated by the author are arranged as follows:—

* Sori continui; venæ primariæ costiformes.

1. *Hewardia adiantoides*, J. Smith = *Adiantum Hewardia*, Kunze.
2. *H. dolosa*, Fée = *Ad. dolosum*, Kunze.

** Sori interrupti; venæ uniformes.

3. *H. Le Prieurei*, Fée = *Ad. Le Prieurei*, Hook.
4. *H. serrata*, Fée.

Mr. Moore regards *H. Wilsoni*, Fée (*Adiantum*, Hook.), as a true *Adiantum*; as also Sir W. Hooker's variety γ . of *Ad. lucidum*. In both these the dichotomous veins occasionally anastomose; but there is nothing like complete reticulation, and the union, when it does occur, is evidently accidental.

If the name *Hewardia* be retained, as the author proposes, for the genus of ferns to which it was first applied, he suggests that of *Isophysis* for the Melanthaceous genus, subsequently so called by Sir William Hooker in his 'Icones Plantarum,' t. 858, the species retaining the name of *Tasmanica*.

The same rule induces the author, in the second case referred to, to separate from the genus *Deparia*, Hook., a species having a truly and constantly reticulated venation, that of *Deparia* being uniformly free. The species in question is *Deparia Moorii* from New Caledonia, named by Sir Wm. Hooker after Mr. C. Moore, the Director of the Sydney Botanic Garden, by whom it was discovered; and the following are its generic characters:—

CIONIDIUM, *T. Moore in Gard. Comp.* (nomen tantum).

CHAR. GEN. Venæ reticulatæ. Sori semi-globosi, extra-marginales, in venularum apicibus excurrentibus pedicellati; capsulis pedicellatis. *Indusia* stipitata, subcylathiformia.—Frondes bipinnatæ; soris ex utraq[ue] pinnularum pinnatifidarum margine prominulis.

Cionidium Moorii, T. Moore, l. c.

Deparia Moorii, Hook. in *Journ. of Bot.* iv. p. 54 t. 3.

Hab. in Novâ Caledoniâ, D. C. Moore (1851).

Read also the commencement of a paper "On the Island and Flora of Hong Kong." By Dr. H. F. Hance. Communicated by B. Seeman, Esq., F.L.S.

February 15.

R. Brown, Esq., President, in the Chair.

Lewis Powell, Esq., M.D., was elected a Fellow.

Mr. Yarrell, V.P. and Treas. L.S., exhibited a specimen of the Sooty Tern (*Sterna fuliginosa*, Lath.), a species new to Britain and even to Europe, which was killed in October last at Burton-on-Trent, was preserved for, and belongs to the collection of H. W. Desvœux, Esq.

Read the conclusion of Dr. Hance's paper "On the Island and Flora of Hong Kong."

Read also an "Additional Note" to Mr. Newport's memoir on *Ichneumon Atropos*, Curt., in reference to the changes which take place in the alimentary canal after the parasite has ceased to feed, and while assuming its imago state. These changes, which are very considerable both as regards form and condition, are minutely described; and every part of the canal is shown to be supplied with tracheæ, the trunks of which, one in each segment, passing transversely inwards, divide into branches, which, again subdivided, penetrate into and ramify through the structure. These, like all other tracheæ, are formed, as described by Sprengel, of three tissues, an external *membranous* and an internal *mucous*, enclosing between them a strong spiral fibre. The nature and origin of the external tissue have been shown by Mr. Newport in previous memoirs; but he has since found that the ramifications of the tracheæ which penetrate the structure of the canal, or of any other organ, become denuded of this external covering, and then seem to be formed only of two tissues, the spiral and the mucous, if indeed there be not also, as he has some reason to think, an extremely delicate serous, or basement membrane, closely adherent to and uniting the coils of fibrous tissue on its external surface. The *ultimate divisions* of the tracheæ are always distributed separately, and *do not anastomose*, ending, as noticed by Mr. Bowerbank, in extremely minute, filiform, blind extremities; and this Mr. Newport finds to be their condition

in all structures, in the nervous and tegumentary, equally as in the glandular and muscular. These facts, the author observes, may perhaps assist us to understand the nature of the injection of the tracheæ by M. Blanchard, and also the mode of nutrition in insects; the ultimate branches of tracheæ in the tissues of the alimentary canal operating, possibly, as absorbent structures, and inducing the chylific fluid elaborated around them to flow, in its transit outwards, along the channels formed by their loose peritoneal covering into the regular circulatory currents. Further, they may assist to explain the mode of coloration of the tracheæ in the experiments of MM. Alessandrini and Bassi, and of M. Blanchard, and also in others, yet unpublished, made by himself on the larvæ of *Clissocampa Neustria*, in July 1837.

March 1.

R. Brown, Esq., President, in the Chair.

The Meeting having been specially summoned for the Election of a Member of Council in the place of James Francis Stephens, Esq., deceased, Thomas Bell, Esq., was declared to be elected in his room.

Read the commencement of a paper entitled "Notes on the Vegetation of Buenos Ayres and the neighbouring Districts." By Charles James Fox Bunbury, Esq., F.R.S, F.L.S., &c.

March 15.

R. Brown, Esq., President, in the Chair.

John Van Voorst, Esq., was elected a Fellow.

Read a continuation of Mr. Bunbury's paper "On the Vegetation of Buenos Ayres," &c.

April 5.

R. Brown, Esq., President, in the Chair.

Charles Alexander Law, Esq., was elected a Fellow.

Read a "Note on the Nature of Fasciated Stems." By the Rev. William Hincks, F.L.S., Professor of Natural History in Queen's College, Cork.

The author lays it down as an indubitable principle, that what we call monstrosities or anomalies, either in the animal or vegetable kingdom, are always susceptible of explanation from the operation, under unusual circumstances, of causes or principles the ordinary operation of which produces the normal structure of the species. Hence they are always worth studying until a satisfactory explanation of their nature has been arrived at, and even when that is accomplished they have still an interest as illustrations of principles which we apply in the explanation of normal structures, or as proofs of the truth of particular views in respect to the origin or relations of parts in certain tribes. In accordance with this view of the importance of such investigations he proceeds to the consideration of the nature of fasciated stems, which, in concurrence with the view taken by Linnæus in his '*Philosophia Botanica*,' he is disposed to regard as formed by a group of coherent stems. According to this view the real peculiarity would consist in the number and remarkable arrangement of the buds, the coherence of stems brought together in such a relative position being, as shown by innumerable examples, a matter of course. Having regard to the crowded or unusually placed buds which are found in the anomaly called plica, tracing this cohesion upwards from the not uncommon adherence of two stems, and observing what must necessarily happen from numerous branches occurring together, it seems to him that the fascia is by no means difficult of comprehension. The striæ which it almost invariably presents exhibit the traces of the lines of junction; and the curved or spiral contraction, which is so often met with, is perhaps accounted for by the growth in connexion with each other of internodes of unequal length. He would not, however, affirm that every stem which is called fasciate is composite in its nature; for that term has been extended to cases of riband-like expansion, which, although dependent also on excess of nourishment, are distortions of a single stem.

Mr. Hincks then refers to the objections taken to the theory of

Linnæus by several recent physiologists, and most clearly and explicitly stated by M. Moquin Tandon in his 'Tératologie Végétale' under the following heads:—1. "We find plants with a single stem fasciated (as *Androsace maxima*), and nothing announces to us that we have in this case several individuals united together." 2. "On certain fasciated stems we may remark that the branches are of the same number and the same arrangement as in the normal condition." 3. "Two branches accidentally united in the direction of their length form a body of which the transverse section presents a figure more or less resembling a figure of 8, if the coherence is recent or slight, and an elliptic or rounded figure if it is of long standing or very intimate: traces of two medullary canals are almost always found. In a fasciated stem the section gives an elongated figure in which we commonly observe only one compressed canal." 4. "To obtain a fasciated stem by coherence a great number of united branches would be required; but though an accidental union of two branches or of three may be admitted, it is very difficult for it to occur at the same time among four, five, or six. It is very difficult to suppose that these branches should all meet longitudinally, and that the union, instead of taking place around the central axis, should be entirely in one direction." 5. "If fasciated stems were the result of many combined branches, we ought to find cases in which the union is incomplete, and to be able to observe on their surface such a distribution of leaves or buds as would announce the fusion of many partial spirals or verticils."

Setting aside the anomalies before alluded to, and guarding against the assumption that mere adherence explains an appearance which chiefly depends upon a peculiar position of buds and the production of numerous branches in a certain relation to each other, Mr. Hincks regards these arguments as not possessing any great weight. In regard to the 1st he remarks, that herbaceous plants which have usually but a single stem, not unfrequently produce several, which often remain distinct, but their union into a sort of fasciated stem is by no means uncommon. In proof of this he showed specimens of *Primula vulgaris* and *Hieracium aureum*, exhibiting the union of two stems so produced, and of *Ranunculus bulbosus* showing still greater complexity in the stem, while the principal flower appeared to be made up of two or three combined. The 2nd objection may appear in certain cases to be just, but the author is of opinion that it is hazardous to conjecture that we have no more leaves present in a fasciated stem than we should have in the same space in an ordinary one, and he referred to specimens on

the table as distinctly proving that an increased number of leaves and buds is a general character of fasciated stems. M. Moquin Tandon himself has, indeed, referred to an instance in *Bupleurum falcatum* where the leaves had been whorled, doubtless, Mr. Hincks observes, from those belonging to two or more stems being collected together. The 3rd argument he regards as very deceptive, for the nature of the transverse section presented by coherent stems must depend not only on the intimacy of their union, but also on the internal structure of the stems themselves. When two flowers adhere without much pressure, they exhibit uniting circles somewhat resembling a figure of 8, but when more completely combined they have one circumference of a much-elongated figure, and something similar is to be expected in herbaceous stems. Even the elongated pith of a transversely cut woody fasciated stem only marks the intimate union of several branches; and the author has noticed instances of the union of two and only two stems when the internal appearance was the same as in other fasciations. The 4th objection is derived from the improbability of the lateral union of many stems; but in addition to the common examples of the union of two stems, the author appealed to a distinct case of a union of four flower-stems of *Scrophularia aquatica* so complete that a composite flower was formed containing all the parts of the four component flowers, and produced a fasciated stem of *Ranunculus bulbosus*, where the union of several stems terminated in a flower having at least double the usual number of parts, as indisputable evidence of the fact. He also laid before the Meeting examples of numerous branches laterally arranged as if ready to combine, in immediate connexion with fasciated stems, which, according to his view, are made up of similar branches already combined. To the 5th and last objection he answers that cases in which the adherence is incomplete, and on which the marks of fusion of several stems are to be perceived, are in fact frequently met with, and may be appealed to as strong direct evidence in favour of the Linnean theory. A striking example is given in DeCandolle's 'Organographie Végétale' (pl. 3. f. 1) in a stem of *Spartium junceum* having several branches only imperfectly fasciated; and similar specimens of *Aucuba Japonica* and *Cotoneaster microphylla* were exhibited, together with a fasciated *Ash*, in which the traces of numerous stems were observable upon the surface.

The author stated his conclusion to be, "that the fasciated stem is best explained from the principle of adherence, where, from superabundant nourishment, especially if accompanied by some check or injury, numerous buds have been produced in close proximity; and

that the supposition of a leaf-like expansion of the elements of a single stem is insufficient to explain the usual appearances, and is founded on a false analogy between fasciated and certain other anomalous stems."

The specimens exhibited were from a collection formed by the author and now in the Museum of Queen's College, Cork. They consisted of—1, an intimate adherence of two stems of *Bunium flexuosum*; 2, an entire adherence of two stems with their heads of flowers of *Hieracium aureum*, and of two or more stems of *Primula veris*; 3, a fasciated stem of *Ranunculus bulbosus*, with the terminal flower formed by the union of two, and the stem showing other signs of composition; 4, a fasciated stem of *Cheiranthus Cheiri*, apparently consisting of at least three united branches; 5, a fasciated stem of *Veronica maritima*; 6, two stems of the same plant, in which the buds which usually produce individual flowers have produced secondary stems themselves flower-bearing, so as to transform a simple into a compound spike; 7, a fasciated stem of *Aucuba Japonica*, seeming to prove the composite nature of such stems; 8, a fasciated stem of *Cotoneaster microphylla*, in which the composite structure is peculiarly evident; 9, a fasciated stem of *Fraxinus excelsior* showing a crowd of buds and of small branches in a linear series at the extremity of fasciated portions, and also showing the curved contraction of the fasciated branches from weaker branches being connected with a stronger one. The author also referred to a remarkable fasciculation of *Asparagus officinalis* in the same collection, the upper portion of which is spirally twisted, and the crowded branches from which seem to prove the presence of several stems; and to some fine specimens of fasciations from the Society's collection which were placed upon the table.

April 19.

R. Brown, Esq., President, in the Chair.

Alexander Gibson, Esq., was elected a Fellow.

Mr. Westwood, F.L.S., communicated a notice of the discovery in England of a new genus and species of Amphipodous *Crustacea*, the *Niphargus stygius* of Schiödte, an animal hitherto only found in the caverns of Adelsberg, celebrated as the locality of the *Proteus*

anguinus. The Crustacean in question has been found in great numbers in a well near Maidenhead, the water of which was in consequence rendered unfit for use. Mr. Westwood took occasion to remind the Members of the opinion entertained by some naturalists of the existence of a distinct subterranean fauna of which the *Proteus* was an example; the members of which fauna hitherto discovered were remarkable for their general want of colour, and for their being destitute of eyes, two physiological conditions dependent on the dark and gloomy places where they have hitherto been found.

Mr. Kirby, in his 'Bridgewater Treatise,' was one of those writers who contended that such animals formed no part of the fauna now in existence on the surface of the earth, but belonged to a distinct subterranean race of animals. M. Schiödte, in a remarkable memoir recently published in the Transactions of the Danish Academy (which Dr. Wallich has kindly translated for the Entomological Society of London, in whose memoirs the translation has appeared), has described a number of singular animals belonging to the class of *Annulosa*, exhibiting all the characteristics of such a fauna, being destitute of sight and also almost or quite colourless. Amongst them are the Crustacean in question, a species of Spider and false Scorpion, a species of the family *Poduridæ*, and several *Coleoptera*, all of which were found in the caverns of Adelsberg in Carniola. Mr. Westwood also noticed that animals very closely related to those described by Schiödte had been found in the Great Mammoth Cave in Kentucky, including also a blind species of Cray-fish, and one or more species of fishes destitute of eyes, at least wanting the transparent external cornea, although the optic nerve was present, which would probably allow a certain sensibility to the presence of light; and M. Schmidt had noticed that two newly discovered species of Beetles belonging to one of Schiödte's singular genera had, although destitute of all external rudiments of eyes, exhibited a sensibility to light by retreating under stones and towards the darker parts of the cavern when brought towards its entrance. A remarkable new genus of Shrimps had also been recently described by Professor Bell in his work on British *Crustacea*, dredged at a very great depth of the ocean, of which the eyes, although present, were destitute of the usual hexagonal facets.

Read a paper "On the Ocelli in the genus *Anthophorabia*, Newp." By George Newport, Esq., F.R.S., F.L.S., &c.

The author remarked that since the publication of his observations on these insects in the 'Transactions' of the Society, his attention

had again been directed to the peculiarities of the organs of vision in the male sex. He had already shown that these individuals possess only ocelli at the sides of the head as well as on the vertex, but that these structures exist at precisely the same parts of the head as the ocelli and the compound eyes in the female, and consequently that there can be no doubt of their homology. These appearances, however, having led some to question the correctness of this, it became necessary, in order to judge aright of their nature, to consider what are the essential conditions of a structure which is specially destined *for the appreciation of light*. This consists, as already pointed out in *Fishes*, of a follicle or pit in the tegument of the head, coated with dark pigment, and receiving the distal termination of a particular cerebral nerve, conditions which are precisely those of the ocelli, both of the sides of the head and of the vertex, in *Anthophorabia*. The various modifications of the eye in insects, with regard to the form of the cornea, the depth of the chamber, and the presence of the choroid, and of the lens, with reference to the extent of field, and the focal distance, of vision, were pointed out, and the degree in which they exist in *Anthophorabia* mentioned, as coinciding with the peculiar habits of the insect. The structures in the male were thus shown, by the presence of cornea, chamber, choroid, and nerve, to be most indisputably organs of sight. The author referred also to the binary origin of the nerve of the middle ocellus of the vertex, as formerly pointed out by him in his paper on *Pteronarcys*; to the origin of ocelli in the same way as other dermal tubercles; and to the imperfect eye-spots in the *Scorpionida* being supplied with nervous filaments from the same optic nerve which supplies the recognised organs of vision in those animals.

May 3.

R. Brown, Esq., President, in the Chair.

William Clarke, Esq., was elected a Fellow; and Professor Von Schlechtendal and Monsr. Louis René Tulasne, Foreign Members.

Read the conclusion of a memoir "On the Vegetation of Buenos Ayres and the neighbouring districts." By Charles James Fox Bunbury, Esq., F.R.S., F.L.S., &c.

Mr. Bunbury commences his memoir by an indication of the sources from which his notes are principally derived, consisting chiefly of very extensive collections made by the late Mr. Fox (formerly British Minister at Buenos Ayres, and afterwards at Rio de Janeiro) in the neighbourhood of Buenos Ayres, Monte Video, Maldonado, and other localities on the northern shore of the Rio de la Plata, and along the lower part of the River Uruguay, aided by a residence of about a month at Buenos Ayres in the beginning of 1834, during which he had himself the opportunity of becoming acquainted with the most prominent features and general aspect of the vegetation. The principal published works which he has consulted are M. Auguste de St. Hilaire's 'Report of his Travels in Southern Brasil' (in the ninth volume of the 'Mémoires du Muséum d'Histoire Naturelle'), and the papers by Sir William Hooker and Dr. Walker-Arnott "On the Plants of Extratropical South America," in the 'Botanical Miscellany' and 'Journal of Botany;' and he also acknowledges his obligations to Sir William Hooker for very important assistance in naming the specimens contained in Mr. Fox's collections.

The region of which he proposes to treat is defined as lying on both banks of the Rio de la Plata, and on the lower part of the courses of the two great rivers by whose junction it is formed; and consequently comprises those parts of the republics of Buenos Ayres and the Banda Oriental which lie nearest to the Plata, between the parallels of 33° and 35° S. lat. The collections were chiefly formed in the neighbourhood of the coasts and of the rivers. Mr. Fox also made large collections in the southernmost part of Brasil; on the vegetation of which Mr. Bunbury proposes occasionally to remark, as forming a connecting link, botanically as well as geographically, between the Buenos-Ayrean districts and the tropical parts of the same continent. Geologically the Rio de la Plata (which as far up as Buenos Ayres is between twenty and thirty miles wide) forms a strongly marked boundary, separating two widely extended and very dissimilar formations. All its northern shore is composed of crystalline rocks (granite and gneiss, and their various modifications), which range from thence to the northward uninterruptedly through many degrees of latitude, constituting the whole coast of Brasil, even it is said as far as Bahia. On the south of the great river nothing is seen but tertiary formations of a very late date; first, the mud and marl of the Pampas, and further south the gravel and shingle of Patagonia. The line of demarcation between these two formations is absolute; but notwithstanding this remarkable differ-

ence in the structure of its banks, the Plata does not form a botanical boundary. There are indeed several species of plants which are confined to one side or the other, and some families (principally tropical) which do not cross it; yet the leading characteristics of the vegetation, both as to its general physiognomy and its prevailing forms, are the same on both sides. The whole country, therefore, from the frontier of Brasil southward, as far as the Pampas vegetation extends (or to the border of Patagonia), may be considered as one botanical province, which, for the sake of convenience, Mr. Bunbury provisionally calls the *Argentine* region, from the name of the great river.

The botanical characteristics of this region are well-marked; its most striking peculiarity consists in the almost entire absence of trees, and the scarcity even of shrubs except along the banks of the principal rivers. Every one who has come from Rio de Janeiro to Monte Video and Buenos Ayres has been struck by the contrast between the gigantic vegetation of Brasil and the bare, treeless, almost barren character of the shores of the Plata, where the cultivated Poplars, and the flower-stalks of the *Agave*, with here and there a solitary Ombù tree (*Phytolacca dioica*), are the only objects that relieve the nakedness of the country. It is not that the vegetable covering of the soil is really scanty; but the vast majority of the plants which compose it are herbaceous, of low growth, and for the most part not very conspicuous. This treeless character has been forcibly described, and its possible causes most ably discussed, by Mr. Darwin in his 'Journal.' The immediate banks of the Uruguay and Paraná, however, and the islands in those rivers, appear to be wooded, although not with trees of great height or size. As compared with Brasil, the vegetation of the Argentine region is further distinguished (as might be expected) by the diminished numbers of tropical families, and also by something of a more European physiognomy. The resemblance in this particular appears, however, to Mr. Bunbury to be not so great as has been represented, being in a great measure due to the abundance of naturalized European plants; and excluding these, to consist rather in a certain general similarity of character than in a real botanical analogy. Schouw's estimate, that out of 109 genera which belong to Buenos Ayres, 70 appear in Europe, and St. Hilaire's statement, that of 500 species collected by him in the Banda Oriental, only 15 belonged to families completely strangers to Europe, are doubtless accurate so far as they go; but the vegetation of these countries is really more different from the European than such comparisons would seem to

imply. For, in the first place, many families and genera, which are strikingly characteristic of the Argentine region, are but scantily represented in Europe. Such, in particular, are the families of *Solanææ*, *Verbenacææ*, *Amaranthacææ*, and perhaps *Malvacææ*. Of the genus *Solanum*, for instance, many more species grow wild within a short walk of Buenos Ayres than in the whole of Europe. The genus *Verbena*, again, so insignificant in Europe, plays a conspicuous part in the Argentine vegetation by the number of its species, the profusion in which they grow, and their general brilliancy and beauty. Secondly, although the genera altogether wanting in Europe may not form numerically a very large proportion of the Argentine Flora, yet several of them are very conspicuous, and play an important part in that Flora by the number of species or of individuals: such are *Pontederia*, *Gomphrena*, *Teleianthera*, *Jussiaea*, *Nicotiana*, *Petunia*, *Nierembergia*, and others. Thirdly, several families which most abound in Europe are nearly wanting, or but very feebly represented (if we exclude naturalized plants) on the shores of the Plata: such are *Cruciferææ*, *Caryophylleææ*, *Umbelliferææ* (excepting *Eryngium*), *Boragineææ*, *Dipsacææ*, *Cichoracææ* and *Cynarææ*. In the collections in his possession from Buenos Ayres and the Banda Oriental, Mr. Bunbury finds 14 families and 102 genera which are not European. The families are *Commelynacææ*, *Pontederacææ*, *Bromeliacææ*, *Marantacææ*, *Calycerææ*, *Bignoniacææ*, *Passiflorææ*, *Loasææ*, *Begoniacææ*, *Buttneriacææ*, *Malpighiacææ*, *Sapindacææ*, *Tropæoleææ* and *Melastomacææ*. The genera (adopting Endlicher's 'Genera Plantarum' as the guide) are *Paspalum*, *Stenotaphrum*, *Cenchrus*, *Aristida*, *Chascolytrum*, *Pappophorum*, *Eustachys*, *Eleusine*, *Androtrichum*, *Commelyna*, *Hydrocleis*, *Pontederia*, *Herreria*, *Udora*, *Sisyrinchium*, *Cypella*, *Alstræmeria*, *Tillandsia*, *Oncidium*, *Canna*, *Spathicarpa*, *Roubieva*, *Gomphrena*, *Teleianthera*, *Pupalia*, *Iresine*, *Acicarpha*, *Boopis*, *Vernonia*, *Stevia*, *Baccharis*, *Pterocaulon*, *Happappus*, *Flaveria*, *Porophyllum*, *Leighia*, *Verbesina*, *Achyrocline*, *Trixis*, *Mitracarpum*, *Cephalanthus*, *Asclepias*, *Gomphocarpus*, *Oxyptalum*, *Arauja*, *Philibertia*, *Schistogyne*, *Lantana*, *Calonyction*, *Nicotiana*, *Nierembergia*, *Petunia*, *Jaborosa*, *Himeranthus*, *Cestrum*, *Buddlea*, *Scoparia*, *Herpestes*, *Dicliptera*, *Bignonia*, *Argemone*, *Passiflora*, *Blumenbachia*, *Begonia*?, *Pavonia*, *Sida*, *Abutilon*, *Buttneria*, *Stigmaphyllum*, *Heteropterys*, *Paullinia*, *Croton*, *Phyllanthus*, *Schinus*, *Chymocarpus*, *Jussiaea*, *Heimia*, *Cuphea*, *Eugenia*, *Chætogastra*, *Mimosa*, *Desmanthus*, *Inga*, *Calliandra*, *Acacia*, *Parkinsonia*, *Cassia*, *Poinciana*? (perhaps introduced), *Crotalaria*, *Indigofera*, *Tephrosia*, *Daubentonia*, *Desmodium*, *Æschynomene*, *Clitoria*, *Camptosema*, *Cana-*

valia, *Galactia*, *Vigna*, *Erythrina* ? (perhaps introduced), *Rhynchosia*, *Machærium*. These lists are sufficient to show how materially the Argentine Flora differs from that of Europe; but what chiefly contributes to give it at first sight a European character is the great number and extraordinary prevalence of naturalized European plants, which have spread so rapidly as to cover the soil to a great extent, and actually to predominate over the native growth. The fallow fields about Buenos Ayres are blue with *Echium violaceum*; the banks are covered with the common Fennel; the ditch-sides and waste grounds are overrun with *Chenopodium album*, *Sonchus oleraceus* and *Xanthium spinosum*; *Trifolium repens* and *Medicago denticulata* form much of the herbage near the river-side; and among the most common grasses are *Lolium perenne*, *L. multiflorum*, *Hordeum murinum* and *H. pratense*. And these intrusive strangers are not confined to the cultivated lands or to the neighbourhood of the city; the "thistles" and "clover," which clothe the Pampas of Buenos Ayres for leagues and leagues together, are *Carduus Marianus*, *Cynara Cardunculus* and *Medicago denticulata*, all of European origin. It is, as Mr. Darwin remarks, a parallel case to that of the horse and ox, which have, within the last three centuries, spread themselves in such countless numbers over the same countries. Mr. Bunbury regards this wide diffusion of naturalized plants as adverse to the views of those who consider the natural distribution of species as determined solely by favourable local circumstances; the circumstances in the present instance being evidently highly favourable to the plants in question, which however did not exist in these countries until introduced by the indirect agency of man.

The social character, so eminently conspicuous in many of the naturalized plants, is observable also, though in a less degree, in several of the indigenous plants of the Pampas of Buenos Ayres, the most remarkable cases observed being *Verbena erinoides*, *V. chamædryfolia*, *Mitracarpum Sellovianum*, and a dwarf *Solanum*, besides a few grasses. This social growth of some particular plants, and the consequent uniformity of vegetation, has, Mr. Bunbury thinks, been before noticed as characteristic of extensive plains. Tropical forms of vegetation occur chiefly on the banks and islands of the principal rivers. They are principally woody climbers, such as *Passiflora cærulea*, *Stigmaphyllon littorale*, two or three species of *Paullinia*, a *Cardiospermum* and a *Bignonia*; or *Leguminosæ* of a tropical character, species of *Mimosa*, *Inga*, *Calliandra* and *Cassia*. One solitary species of *Melastomaceæ* (an *Arthrostemma*) reaches to the north

bank of the Plata, but does not cross it. One *Macharium* grows in the islands of the Uruguay near its mouth. A few monocotyledonous genera, which have their head-quarters within the tropics, appear for the last time on the banks of the Plata; such are *Canna*, *Oncidium* and *Tillandsia*. Palms, it would appear from Mr. Darwin's statements, occur here and there as far as 35° S. lat., which seems to be likewise their southern limit in Chile.

The southern limit of the Argentine vegetation seems to be determined mainly by soil, the northern by climate alone. Where the calcareous mud and marl of the Pampas are succeeded by the arid gravel or shingle of Patagonia, that is to say about the Rio Colorado, in 40° S. lat., Mr. Darwin notices the change in the vegetable covering of the soil, accompanying this change in its mineral nature. The herbaceous vegetation, which clothes the surface of the Pampas pretty uniformly, is succeeded by low, scraggy, thorny shrubs and dry meagre grasses, so thinly scattered over the shingly plains of Patagonia, that their aspect is strikingly barren and miserable. That this change of soil should be attended with so great a change in the vegetation, while that (more striking in a geological view) which takes place when we cross the Plata seems to have very little influence on it, is easily accounted for by the different relation of these soils to moisture. The loose shingly soil of Patagonia is so singularly dry, as to be fitted only for those plants which can bear an extraordinary degree of drought; while the clay and marl of the Pampas, and the decomposing granite of the north side of the Plata, are both sufficiently favourable to the retention of moisture, and consequently to the growth of an abundant herbage.

To the northward the Argentine region appears to melt as it were insensibly into that of Southern Brasil. About Porto Alegre, in S. lat. 30° , and consequently little more than 4° north of Buenos Ayres, the botany has a thorough Brazilian character, notwithstanding the absence of great forests. The numerous ferns of Rio Grande are almost all common to that district and to Rio de Janeiro. Not a few tropical phænogamous species also extend as far as Porto Alegre, while others range still further south to Monte Video. On the other hand, the comparatively small number of *Melastomaceæ*, and the abundance of herbaceous and half-shrubby *Verbeneæ* in Rio Grande, indicate the approach to the Argentine region. The considerable difference between the vegetation of Porto Alegre and of the northern shore of the Plata, Mr. Bunbury conceives to be due to climate alone; and the fact mentioned by M. Auguste de St. Hilaire, that the cultivation of mandioca and sugar extends as far south as

Porto Alegre, and no further, seems to point it out as the southernmost limit of the seasons of tropical Brasil.

For a comparison of the Flora of Chile with that of the Argentine region, Mr. Bunbury regrets that he has not sufficient materials. Meyen indeed states, that Chile, and the countries on the eastern side of the Andes in corresponding latitudes, cannot be considered as separate botanical regions; yet the information which he himself gives as to the Chilian Flora, seems to show that its general physiognomy is very different from the Argentine. The accounts of many travellers show the climate and soil of Chile to be much more dry; and the Chilian Flora appears to be as strikingly characterized by dry shrubs with coriaceous and glossy leaves, as that of the Plata by the prevalence of herbaceous forms. In the abundance of Myrtles, indeed, and of shrubby and arborescent *Compositæ*, the vegetation of Chile may be compared rather with that of Southern Brasil. At the same time the valuable catalogues drawn up by Sir William Hooker and Dr. Walker-Arnott show that many remarkable genera, and not a few species, are common to both sides of South America.

The Argentine Flora has little or no general analogy to that of the parts of North America lying in corresponding latitudes on the other side of the Equator. Yet there are some striking, though insulated, points of resemblance. A species of *Cephalanthus* grows on the shores of the Plata; *Æschynomene ciliata*, Vog., is excessively like the North American *Æ. hispida*; there is also a *Pontederia*, extremely near to *P. cordata*, if not a mere variety; and a *Sisyrinchium*, much resembling *S. Bermudianum*.

The Flora of the shores of the Plata offers an extraordinary difference from that of the Cape of Good Hope, lying within the same parallels of latitude, and with nearly the same mean temperature. The many points of analogy, and the general physiognomical resemblance between the vegetation of the Cape and that of New South Wales, have been repeatedly noticed; but between the botany of the Cape and that of La Plata we find scarcely anything but contrasts. The general physiognomy is different; in the Cape Flora there is a great predominance of dry, hard, small-leaved shrubs; and almost all the characteristic families and genera of the one are wanting or insignificant in the other. Almost the only points in the Argentine Flora which strongly remind us of South Africa, are several species of *Oxalis*, and some gay-flowered *Irideæ* and *Amaryllideæ*. The *Cactææ* of La Plata are represented at the Cape by succulent Euphorbias; and the herbaceous and half-shrubby *Malvaceæ* by the *Hermanniacææ*. The Flora of Buenos Ayres is also much less peculiar

in its character than that of the Cape. The Argentine region is recognised at once by its Flora as a province of South America ; while the botany of the Cape has little resemblance to that of the rest of Africa. The number of endemic genera in the Argentine region is comparatively very inconsiderable, at the Cape remarkably large ; the peculiar genera of the former almost always consist of a single, or of very few species, while several of the peculiar Cape genera are very rich in species ; and the number of species common to the shores of the Plata and the tropical parts of the same continent is considerable, while very few indeed are common to the Cape and tropical Africa. Local circumstances may account for some of these differences. The Cape, as a botanical region, is almost cut off from the rest of Africa by the great deserts to the north of the Orange River ; but no barrier of this sort exists on the eastern side of South America, where (excepting perhaps the case of Patagonia) the limits of the range of plants seem to be fixed by climate alone. Naturalized European plants too have not spread far beyond the neighbourhood of Cape Town, nor do they appear in any remarkable quantity, or at all vie with (much less supersede) the original natives of the soil. This difference does not at all depend on the extent of cultivation in the two regions ; the climate, from its greater moisture on the banks of the Plata, may be more favourable to such plants than that of the Cape, but the chief cause of the difference is probably to be found in the soil.

Mr. Brown has indicated a few points of resemblance between the botany of Australia and that of the temperate parts of South America, but all of these belong to Chile ; and Mr. Bunbury is not aware of any plant on the eastern side of the continent, within the latitudes in question, that can at all remind us of the Australian Flora. *Proteaceæ*, which are sparingly scattered in Fuegia, Chile, Peru, Guiana and tropical Brasil, appear to be entirely absent.

The author then proceeds to remark upon some of the families contained in Mr. Fox's collections, and on the range of particular species. Under the head of

Filices he contrasts the abundance of species found at Porto Alegre and the neighbourhood (fifty-four in number, and nearly all natives of tropical Brasil) with the poverty of Buenos Ayres, only one fern from the south side of the Plata (a *Blechnum* ?, which seems to agree with the description of *Bl. auriculatum*, Cav.) being contained in the collections. This poverty Mr. Bunbury attributes to the absence of shade and the want of variety of surface, in accordance with which he notices the absence of Ferns, as observed by Martens

and Galeotti, from the bare table-land of Mexico, and their great scarcity on the open campos of the interior of Brasil.

Gramineæ.—Mr. Bunbury finds the *Poaceæ* (according to the division established by Mr. Brown) to be rather more numerous in the Argentine region than the *Paniceæ*; but he does not regard the collection as affording a fair representative of the vegetation as regards this family. Besides some European grasses which have become naturalized, there are some apparently indigenous species which have a very wide range. Such are *Cynodon Dactylon*, apparently a native of all the warmer parts of the world in both hemispheres; *Setaria glauca*, equally cosmopolite; *Setaria Italica*, of which he has specimens also from Louisiana, and which is stated to be a native of Europe, India and New Holland; *Eleusine Indica*, having a vast range in the tropical and subtropical zones; *Polypogon Monspeliensis*, which he has himself seen at the Cape of Good Hope and at Buenos Ayres, as well as in the South of Europe; *Stenotaphrum glabrum*, common to the Cape, Louisiana, tropical Brasil, and the northern shore of the Plata; and to these may be added the beautiful *Eustachys petraea*, if the Cape plant be really the same with the South American.

Eriocauloneæ.—The only species in the collection of this family (so extremely numerous in tropical South America) is *Eriocaulon (Papalanthus) caulescens*, found at Porto Alegre, and also met with in Minas Geraes and in Guiana.

Alismaceæ.—A fine species of *Sagittaria* (probably *S. Montevidensis*, Kunth) is plentiful at Buenos Ayres. It comes very near *S. sagittifolia*, though much larger in the leaves and flowers; but the downy filaments and yellow anthers appear to furnish the most certain distinctive characters.

Compositæ.—Schouw has characterized the countries near the Plata as the “Kingdom of Arborescent *Compositæ*,” a title scarcely applicable, these plants, like most others of the region in question, having for the most part an herbaceous character. As in South America generally, they appear to be the most numerous family; almost all belong to the *Corymbiferaæ*, and *Cichoraceæ* and *Cynareæ* hardly occur except in a naturalized state. *Labiatifloræ*, so characteristic of the western side of South America and of the Andes, are few and inconspicuous; even the genus *Mutisia* does not extend into La Plata. The shores of the river are characterized by many herbaceous *Heliantheæ*; and the genera *Vernonia*, *Baccharis*, and *Eupatorium* (so characteristic of tropical Brasil) extend into this region, but no longer in such amazing numbers. *Helichryseæ*, so prodigiously

numerous at the Cape, are comparatively scarce, but the universal genus *Senecio* abounds. Several of the *Compositæ* are tropical species, and some (but these evidently naturalized) are common to both hemispheres.

Asclepiadææ are as numerous in Rio Grande and in the Argentine region as in South America generally, although by no means rivalling the Cape of Good Hope. *Gomphocarpus fruticosus*, gathered at Monte Video, appears undistinguishable from the Cape plant, but may have been accidentally introduced. With this exception, and that of the genus *Cynanchum*, all the *Asclepiadææ* belong to strictly American forms, of which *Oxypetalum* predominates.

Umbelliferæ.—The plants of this family in La Plata and Rio Grande chiefly belong to the genus *Eryngium*, and especially to the section with long, narrow, linear or sword-shaped, parallel-veined leaves (or phyllodia), which are often fringed with bristles or with bristle-like teeth. In Mr. Fox's collections are nine species, of which five belong to this section. One of these (*E. aquaticum*?) is a conspicuous ornament of the marsh-ditches near Buenos Ayres; and another (seemingly *E. Pristis*) extends from the tropical regions of Brasil as far as 30° S. This part of South America seems to be destitute of those curious *Mulineæ*, which are so characteristic of *Fuegia*, the Chilian Andes and the Falkland Islands; but several European *Umbelliferæ* have become naturalized, and among them the common Fennel, which covers the banks of earth between the cultivated fields in immense profusion, and forms a distinctive feature in the scenery. Mr. Darwin observed the range of the Fennel in the south to be limited by the Rio Salado, rather less than 100 miles south of Buenos Ayres.

Malpighiaceæ.—Only two species are found on the south side of the Plata, viz. *Stigmaphyllum littorale* and *Heteropterys glabra*. In Rio Grande, Mr. Fox collected nine *Malpighiaceæ*, of which one is a *Galphimia*, and the rest belong to *Banisteria*, *Stigmaphyllum* and *Heteropterys*.

Tropæoleæ.—The only plant of this family (the head-quarters of which are evidently on the western side of the continent) found on the eastern side of temperate South America is *Tropæolum pentaphyllum*, abundant in the hedges about Buenos Ayres.

Enotherææ, Endl.—Some species of *Jussiaea* are plentiful on the marshy shores of the Plata, and Mr. Bunbury possesses three species of *Enothera* from Buenos Ayres; but *Epilobium* and *Fuchsia* are wanting in the Argentine region.

Melastomaceæ.—One species only, as before mentioned, extends as

far south as the Plata, but does not cross the river; and Mr. Bunbury is aware of only nine species from the southern extremity of Brasil.

Leguminosæ by no means form so important a part of the vegetation of the Argentine region as in tropical Brazil, the South of Europe, or Australia. Those of the region in question belong, with few exceptions, to genera widely diffused, such as *Crotalaria*, *Lupinus*, *Tephrosia*, *Indigofera*, *Desmodium*, *Æschynomene*, *Lathyrus*, *Cliptoria*, *Cassia*, *Mimosa*, *Inga*, and *Acacia*. The observation already made as to the small number of peculiar forms in the Argentine Flora when compared with that of the Cape, and with corresponding latitudes in Australia, is particularly exemplified in this important family. It will be observed also, that all the genera above enumerated (except two, or perhaps three) have their head-quarters within the tropics, and only straggle, as it were, into cooler latitudes; and one is almost tempted to say, that the vegetation of this region is a mere modification, a reduced or dwindled form of the Brazilian, instead of a separate and strongly marked Flora, like that of the Cape. At the Cape *Loteæ* predominate remarkably; in the region of the Plata *Hedysarææ* and *Phaseoleæ* are at least equally numerous. *Cesalpiniææ* and *Mimoseææ* are more numerous on the banks of the Plata than in the same latitudes in South Africa, where south of the Orange River Dr. Burchell knows of only two species of *Acacia*, although these are so abundant (one of them in particular) as to give a distinctive character to the scenery. Mr. Fox's collections from Buenos Ayres and Uruguay include five species of *Mimosa*, one of *Desmanthus*, two of *Calliandra*, and five of *Acacia*; yet none of these are so abundant as to form characteristic features of the country. There are several species of *Cassia* natives of Buenos Ayres; but the magnificent *Poinciana Gilliesii*, although well established on the banks of the Plata, is said not to be indigenous. *Daubentonia punicea* was found by Mr. Fox to grow wild sparingly on the bank of the Plata below Buenos Ayres, and in great abundance and beauty on the banks of the Uruguay near its mouth; and Mr. Bunbury thinks it quite possible that Cavanilles, who only saw it in a Botanic Garden, may have been misinformed as to its native country, which he states to be "New Spain," although it is also possible that it may be common to both. Several European species are naturalized at Buenos Ayres, such as *Medicago sativa*, *M. denticulata*, *Trifolium repens*, and *Melilotus parviflora*. *Indigofera Anil*, apparently general throughout the hotter parts of America, was observed by Mr. Fox to be common all through South Brasil and the Banda Oriental, but not to occur south of the

Rio de la Plata. *Æschynomene ciliata* ranges at least from Guiana to Buenos Ayres, and, as Mr. Bentham observes, is scarcely distinguishable from the North American *Æ. hispida*, which is found as far north as Philadelphia; and another *Æschynomene* from Buenos Ayres seems to agree with *Æ. conferta* from British Guiana.

Anniversary Meeting.

May 24.

Robert Brown, Esq., President, in the Chair.

This day, the Anniversary of the birth of Linnæus, and that appointed by the Charter for the Election of Council and Officers, the President opened the business of the Meeting, and the Secretary read the following notices of Members who had died since the last Anniversary.

John Marten Cripps, Esq., F.S.A., was a Member of Jesus College Cambridge, and graduated M.A. *per litteras Regias* in 1803, in which year he also became a Fellow of the Linnean Society. He inherited considerable property from his uncle John Marten, of Stantons; but before settling as a country gentleman upon his estate he travelled, accompanied by Dr. E. D. Clarke as his tutor, and partly also by Dr. Otter, the late Bishop of Chichester, through Russia, Tartary, Turkey, Greece, Egypt, Palestine, and the North of Europe, making considerable collections both antiquarian and botanical. A relation of these well-known travels, published by Dr. Clarke, passed through several editions. In the Preface Dr. Clarke speaks warmly of "his friend, the cause and companion of his travels," and states that "the plants collected during the route were the result of their mutual labour; but the whole of the Meteorological Statement in the Appendix, together with the Account given of Relays and Distances, are due to his [Mr. Cripps's] patient observation and industry." The most important part of these collections was, however, the herbarium of Pallas, purchased by Mr. Cripps during his residence with the Professor, and afterwards transferred to the late Mr. Lambert, at whose sale the greater part of it was obtained for the collection of the British Museum. On their return Mr. Cripps and

Dr. Clarke married in 1806 two sisters, the daughters of Sir William Beaumaris Rush, of Wimbledon; and the former fixed his residence for some time at Lewes, where he formed an extensive museum, a large part of which he subsequently presented to the University of Cambridge and other public institutions. Having built Novington Lodge on the Stantons estate, he settled there during the remainder of his life, devoting himself chiefly to rural pursuits, and especially to practical horticulture. He introduced from Russia the Kohl-rabi, now so extensively cultivated for the use of dairy-farms; and we are also indebted to him for several important additions to the varieties of apples and other fruits. He was an active Magistrate while his health allowed him to perform the duties of that office, but for several years past he had been an invalid and was confined within doors: he died at Novington on the 3rd of January in the present year, at the age of 73.

Philip Derbishire, M.D., was for many years a Medical practitioner in the metropolis, but subsequently retired to Boulogne. He became a Fellow of the Linnean Society in 1806, and died at Boulogne, on the 15th of February in the present year, in the 84th year of his age.

The Rev. Edward Duke, M.A., F.S.A., was the representative of an ancient family, originally settled in Devonshire, but whose seat was in the year 1578, by the purchase of the estate and manor of Lake, transferred to the county of Wilts. Mr. Duke was born in the year 1779, and after taking the usual degrees at Oxford, received holy orders in 1802. For a short period he occupied himself with the duties of his clerical profession, first at Turkdean, and afterwards at Salisbury; but after his succession to the family property in 1805, he appears to have devoted himself chiefly to antiquarian researches, many of which were carried on conjointly with his friend Sir Richard Colt Hoare. For some years he was a frequent contributor to the pages of the 'Gentleman's Magazine' on subjects chiefly relating to the antiquities of the county of Wilts; and he also published several volumes connected with this his favourite pursuit. He was long one of the most active Magistrates of his county, and Chairman of one of its Courts of Quarter Sessions, being possessed of a considerable amount of legal knowledge; and was also familiar with the best works in the various branches of natural history. His library was valuable and extensive, and for many years he was at much pains and expense in collecting every Wiltshire author that he could obtain. He married in 1813 the daughter of Henry Hinxman, Esq., of Ivy Church near Salisbury; and died

on the 28th of August at his seat of Lake House, at the age of 73. His election into the Linnean Society dates from the year 1810.

The Rev. Henry Hasted, M.A., was born on the 17th of September 1771, at Bury St. Edmunds, in the county of Suffolk, where his father was an Apothecary. He was educated at King Edward's Grammar School in that town, and afterwards at Christ's College Cambridge, where he took his Bachelor's degree as sixth wrangler in 1793, and his Master's degree in 1796. He became a Fellow of his College, and was believed to be on the eve of being elected Master, when he was appointed by the Corporation of his native town to the preachingship of St. Mary's in the year 1802. In 1812 he was presented to the Rectory of Braiseworth by Sir Edw. Kerrison, and in 1814 to that of Horringer or Horningsheath by the Marquis of Bristol. In 1842, in consequence of the continued debility caused by a paralytic attack, he resigned the preachingship of St. Mary's; but he continued to hold both his Rectories until his death, which took place at Bury St. Edmunds on the 26th of November last, in the 82nd year of his age. In 1807 he married the only daughter of Dr. Ord of Fornham, by whom he had a son and a daughter, who survive him. Mr. Hasted filled a large place in the circle of his native district. Gifted with considerable intellectual faculties, which he had diligently cultivated, and endowed with great activity of mind, and a capacity for continued mental exertion, he laboured incessantly in promoting the best interests of the town of Bury and its neighbourhood. To his zeal and influence the Suffolk County Hospital mainly owes its existence; and numerous Societies for the promotion of religious and educational objects found in him an active patron and promoter. He was an attractive and impressive preacher, and when fifteen years before his death a paralytic stroke deprived him of the use of his right hand, he set himself to learn to write with his left, and continued thus not only to write his sermons, but also to keep up an extensive correspondence. His attainments were considerable in different departments of philosophy, especially in mathematics, in botany, and in other branches of natural history; and his disposition was cheerful, hospitable and benevolent. On his resignation of the lectureship of St. Mary's a service of plate was purchased for him by a subscription of 250*l.*; and it has been resolved to perpetuate his memory by a public subscription for the endowment of a new ward to the Bury Hospital, and by erecting tablets in each church of the town to record that endowment. He became a Fellow of the Linnean Society in 1810, and of the Royal Society in 1812.

Charles Morgan Lemann, M.D., was born in London in 1806, and received the first rudiments of education from Mr. Atkins at Langley Broom. He was afterwards in 1819 sent to Yverdun in Switzerland, where he passed three years under the care of Pestalozzi, and on his return to England was entered at Dr. Mayn's school at Epsom, and subsequently pursued his studies under a private tutor, till he was qualified to enter Trinity College Cambridge, where in 1828 he took the degree of M.B., and in 1833 that of Doctor of Medicine. He pursued his medical studies in London 1828, Paris 1828, and Edinburgh 1832; in 1831 he obtained Dr. Grant's Gold Medal for Comparative Anatomy at University College, London. In 1831 he became a Fellow of the Linnean Society, and he was admitted a Fellow of the College of Physicians in London in 1836. Dr. Lemann never steadily pursued the practice of his profession. His health was never strong, and he accompanied his father to Madeira, where he passed two years (1837-38), and subsequently the winter of 1840-41 at Gibraltar. He also twice visited Italy in 1834-35 as a physician to Lord Warwick's family. During these excursions his early taste for botany was confirmed, and he devoted the remainder of his life to this absorbing and delightful science. He made large collections in Madeira and Teneriffe and the South of Spain, and from his liberal subscriptions to botanical collectors and the contributions of his friends, he formed a very extensive and valuable herbarium, comprising a nearly complete Flora of Madeira and the Canaries; besides being very rich in the plants of Spain and the South of Europe, North America, Brazil and Guiana, the Cape and Australia, and miscellaneous collections from all parts of the world. The great bulk of this fine herbarium, amounting (it is believed) to 30,000 species, with a portion of his botanical library, has been presented in compliance with his wishes, by his brother, Mr. Frederick Lemann, to the University of Cambridge, which has made the requisite arrangements for its preservation, having been so fortunate as to secure the invaluable services of Mr. Bentham to superintend the primary inspection of it. Few men, not professedly botanists, ever had a more intimate knowledge of plants than Dr. Lemann, and his readiness in communicating what he knew will long be remembered by a large circle of friends. But his modesty and diffidence prevented him from ever communicating this knowledge through the press. It was the exclusive occupation of the later years of his life to study the rich materials he had collected, and to communicate to those around him the facts he had ascertained; nor was there any kind of service which

he could render to others that he did not cheerfully devote his time to make at once prompt and efficient. To those who knew him intimately he was endeared by the singular modesty and purity of his mind. His gentle and unobtrusive life, passed amid his books and plants and the society of a few friends, had induced a degree of fastidiousness, which, often expressed in the quiet humour for which he was distinguished, gave a charm to his society that will not easily be met with again, for the gentleness and innocence of his nature were ever as observable in his sentiments as in his actions. In the year 1850 he occasionally complained of impaired vision, and of feebleness in his limbs, but it was hoped that these symptoms would disappear as they had done some years previously, after his last return from Madeira. But in 1851 he was exposed to great fatigue and anxiety in attending the last illness of his father, whose death was rapidly followed by an alarming aggravation of his own condition. He gradually lost the use of his limbs, and died on the 26th of August 1852, at Bath, from a chronic disease at the base of the brain, in his 47th year.

Gideon Algernon Mantell, LL.D., F.R.S., F.G.S., F.S.A. &c., was born in the town of Lewes, where his father carried on a considerable business as a shoemaker, and received his education first at a dame-school, and afterwards at the establishment of Mr. Button in that town. He was subsequently sent to a school in Wiltshire conducted by a clergyman; on leaving which he was articled to Mr. James Moore, a surgeon and apothecary, resident in his native town, with whom, after obtaining his licence to practise as an apothecary, he entered into partnership. He continued in Lewes until the year 1835, when he removed to Brighton, and some years afterwards to Clapham in the neighbourhood of London; and finally settled in Chester Square, continuing in all these places to practise his profession, and to devote a large portion of his time to geological and antiquarian pursuits. His taste for natural history first displayed itself while he was at the school of Dr. Button, and was more strongly developed after his commencing practice at Lewes; in the neighbourhood of which he was enabled first to investigate the Chalk and afterwards the Tilgate formations, being greatly encouraged by the late Mr. Davies Gilbert, and largely assisted by the zeal and knowledge of Mr. Stewart Warren Lee. For many years he devoted himself to the prosecution of these researches: his first publication was an article in the 'Sussex Journal' for 1813, "On the Organic Remains discovered in the environs of Lewes;" and his earliest contribution to a Scientific Society was a paper read on the 7th

of June 1814, and published in the eleventh volume of our 'Transactions' under the title of "Description of a Fossil *Alcyonium* from the Chalk Strata near Lewes." In 1822 he published by subscription his earliest separate work, 'The Fossils of the South Downs, or Illustrations of the Geology of Sussex,' which was followed, in 1827, by his 'Illustrations of the Geology of Sussex, containing a General View of the Geological relations of the South-Eastern part of England, with Figures and Descriptions of the Fossils of Tilgate Forest.' Among these fossils were some of the most remarkable reptilian forms that have hitherto been discovered; and the singular perseverance with which Dr. Mantell succeeded in dissecting them as it were from the matrix in which they were imbedded; the sagacity with which he combined their scattered elements; and the anatomical knowledge displayed in his appreciation of their structure and relations, place him far above the rank of ordinary discoverers and collectors of fossil remains. The extensive collection which he formed during the progress of these researches was, in 1835, removed by him to Brighton, where, as well as at Lewes, it was an object of great attraction: and a few years afterwards he disposed of it to the British Museum for 500*l.* Still, however, he continued to collect valuable and remarkable specimens: and among his latest contributions to palæontology may be particularly mentioned his "Notice of the Remains of the *Dinornis* [of Prof. Owen] and other Birds, and of Fossils and Rock specimens, recently collected by Mr. Walter Mantell in the Middle Island of New Zealand," published in the sixth volume of the 'Journal of the Geological Society;' together with his "Notice of the Discovery by Mr. Walter Mantell, in the Middle Island of New Zealand, of the *Notornis Mantelli*, a bird of the *Reff* family allied to *Brochippoteryx*, and hitherto unknown to naturalists except in a Fossil State," in the 4th volume of the 'Transactions of the Zoological Society.' To the 'Philosophical Transactions,' to the publications of the Geological Society, to various scientific periodicals, and to many topographical works connected with the district which he had chiefly investigated, he was a frequent contributor; no fewer than sixty-seven works and papers being enumerated under his name in the 3rd volume of the 'Bibliographia Zoologica et Geologica,' published by the Ray Society in 1852. Of the separate works contained in this enumeration, besides those already mentioned, the most important are—'The Wonders of Geology,' first published in 1835, which has gone through six editions, and been translated into German; 'The Medals of Creation, or First Lessons in Geology and the Study

of Fossil Organic Remains,' 1844, also translated into German; 'Thoughts on Animalcules,' 1846 & 1851; 'Geological Excursions round the Isle of Wight and along the adjacent Coast of Dorsetshire,' 1847; 'Thoughts on a Pebble, or a First Lesson in Geology,' of which the eighth edition was printed in 1849; and 'Petrifactions and their Teachings, or a Handbook to the Gallery of Organic Remains in the British Museum,' 1851, forming one of the volumes of Bohn's 'Scientific Library.' The fluent style, the felicitous illustrations, and the unquestionable skill and knowledge of their author, rendered many of these works highly popular; and the same causes, combined with a natural eloquence and an enthusiastic character, made him no less successful as a lecturer, in which capacity he frequently presented himself to the public. For many years before his death his energy of mind was accompanied by an amount of bodily suffering, under which nothing but very great fortitude could have supported him. This was the consequence of an accident resulting in a severe spinal affection, under the painful effects of which he lectured at the Clapham Athenæum only a few hours previous to his decease, which was immediately occasioned by his having prescribed for himself a larger dose of opium to relieve his sufferings than his debilitated frame could bear, and took place at his residence in Chester Square on the 10th of November last, at the age of 62. He became a Fellow of the Linnean Society in 1813, and of the Royal Society in 1825.

Mr. Donald Munro was a native of Scotland, and in early life employed in the garden of Mr. George Don, at Forfar. At a subsequent period he became Head Gardener to the Horticultural Society, in which capacity he spent many years of his life. He became a Fellow of the Linnean Society in 1821, and died on the 9th of April in the present year.

Jonathan Pereira, M.D., F.R.S., and one of the Physicians of the London Hospital, was born in the parish of Shoreditch, on the 22nd of May 1804, and articled at the age of fifteen to Mr. Latham, an apothecary in the City Road. In 1821 he became a pupil at the General Dispensary in Aldersgate Street; and in the following year he entered to the surgical practice of St. Bartholomew's Hospital. Having procured his licence from the Apothecaries' Company in March 1823, when he was under nineteen years of age, he was in the same month elected Apothecary to the Aldersgate Dispensary; and in 1825 he obtained his Diploma from the Royal College of Surgeons. In the interval he had formed a class for private medical instruction, and published several small works for students, such as

'A Translation of the Pharmacopœia of the College of Physicians, explaining the Chemical Decompositions;' 'A Selection of Prescriptions, illustrating the terms used by Physicians in prescribing;' 'Selecta e Præscriptis;' and 'A General Table of Atomic Numbers, with an Introduction to the Atomic Theory.' In the year 1825, when only two-and-twenty, he succeeded Dr. Clutterbuck as Lecturer on Chemistry at the Aldersgate Dispensary; and began soon afterwards to collect materials for his 'Materia Medica,' on which subject after a short time he also gave lectures at the Dispensary. In 1832 he married, resigned his appointment in favour of his brother, and commenced practice as a Surgeon in Aldersgate Street. He was elected in the following year to the Chair of Chemistry in the London Hospital; and for six years afterwards he lectured both there and at the New Medical School in Aldersgate Street on Chemistry, Botany and Materia Medica. His lectures on the latter subject were published by his friend Dr. Cummin in the 'Medical Gazette,' and were translated into German and republished in India. In 1839-40 appeared his 'Elements of Materia Medica,' in two parts, of which a second edition, enlarged and improved, was published in 1842. His acknowledged eminence in this department procured for him in 1839 the appointment of Examiner in Materia Medica in the University of London. In 1840 he obtained from Erlangen the degree of M.D., and immediately afterwards became a Licentiate of the College of Physicians; and in 1841 he was elected Assistant Physician of the London Hospital. On the establishment of the Pharmaceutical Society in 1842, he gave two short courses of lectures at its rooms, and was appointed its first Professor. In the year 1843 he published 'A Treatise on Food and Diet,' and his practice as a physician rapidly increasing he gradually withdrew from his various lectureships, finally relinquishing his Professorship of Materia Medica at the London Hospital in 1850, though he still continued to deliver a winter course at the Pharmaceutical Society. In 1845 he was elected a Fellow of the College of Physicians; and in 1851 became full Physician at the London Hospital. Of his 'Elements of Materia Medica and Therapeutics,' a new and greatly enlarged edition, the publication of which was commenced in 1849, was in progress at the time of his death. About six weeks before this took place, while referring to a specimen in the Museum of the College of Surgeons, he fell and ruptured one of the extensor muscles of his thigh. By this accident, although it rendered him incapable of moving without assistance, his health appeared but little affected; but on the night of the 20th of January, on being lifted into bed, he

exclaimed, "I have ruptured a vessel of the heart," and died in about half an hour. As a writer on *Materia Medica* Dr. Pereira stands pre-eminent; of a large and powerful frame, and apparently endowed with an iron constitution, he laboured for many years at the rate of sixteen hours a day, and was most successful in his several capacities, as a writer, a lecturer, and a medical practitioner. He became a Fellow of the Linnean Society in 1828 and of the Royal Society in 1838; and died at his residence in Finsbury Square, in the 49th year of his age. He was buried at Kensal Green, in the presence of a numerous concourse of his friends and pupils.

James Francis Stephens, Esq., was born at Shoreham in the county of Sussex on the 16th of September 1792, and died in Foxley Road, Kennington, on the 21st of last December, in the 61st year of his age. His occupation, as a clerk in the Admiralty at Somerset House, confined him to London; but his leisure hours during his whole life were zealously devoted to natural history, and especially to entomology. His cabinet of British insects, a large portion of which was collected by his own hands, was the most extensive and the most complete that has ever been formed, and has been transferred since his death to the British Museum. In the earlier part of his life he edited some of the volumes, principally the *Birds*, of Dr. Shaw's 'General Zoology,' and he gave, in the 'Transactions of the Cambridge Philosophical Society,' "A Description of *Chiasognathus Grantii*," a remarkably fine and singular beetle from the western side of South America; but with these exceptions his published works relate entirely to British Entomology. The more important of them are 'Illustrations of British Entomology,' *Mandibulata*, vols. 1-5, 1828-32; *Haustellata*, vols. 1-4, 1828-34; 'A Systematic Catalogue of British Insects,' 8vo, Lond. 1829; 'The Nomenclature of British Insects,' 12mo, Lond. 1829, and 8vo, Lond. 1833; 'A Manual of British *Coleoptera*,' 12mo, Lond. 1839; and 'A List of the British Lepidopterous Insects in the Collection of the British Museum,' 12mo, Lond. 1850. He became a Fellow of the Linnean Society in 1815, and was elected President of the Entomological Society in 1837. His "Address on the Fourth Anniversary" of that Society was printed in 1838. In the formation of his cabinet of insects, he made frequent visits to all those localities within a moderate distance of the metropolis where the rarer species are to be found; and he also purchased largely from collectors and at sales. In this way he added to his collection a great part of Marsham's cabinet of *Coleoptera* and of Haworth's *Le-*

pidoptera; and acquired the means of fixing the nomenclature of numerous doubtful species by comparison with the authentic specimens of those authors. His collection was opened once in every week to all students, who were thus enabled not only to name their specimens by actual comparison with the best authorities, but to avail themselves of his extensive information, which he was always ready to communicate in the most liberal manner. His works on British insects will long continue to be regarded as essential to the entomological student, and are remarkable for the conscientious minuteness of their elaboration.

Thomas Thomson, M.D., F.R.S. Lond. and Edinb., Regius Professor of Chemistry in the University of Glasgow, and President of the Glasgow Philosophical Society, was born at Crieff on the 12th of April 1773. He was first educated at the parish school of Crieff; but in 1785 was sent to the borough school of Stirling, where he continued for two years and acquired a thoroughly classical education. In 1787 he obtained a bursary at St. Andrew's, which entitled him to board and lodging in the University for three years. In 1790 he became tutor in the family of Mr. Kerr of Blackshields; and in 1795 (having abandoned his original destination for the church) he proceeded to Edinburgh for the purpose of studying medicine, and took up his residence with his elder brother, the Rev. James Thomson, D.D., then one of the editors of the 'Encyclopædia Britannica.' The lectures of Dr. Black, which he attended in the session of 1795-6, first awoke his latent taste for chemistry; he contributed the article "Sea" to the 'Encyclopædia,' and in November 1796 he succeeded his brother in the editorship to the 'Supplement' to the third edition of that work; which post he continued to occupy till 1800, and contributed various articles, forming as it were the outlines of his subsequent 'System of Chemistry.' About this period he also commenced lecturing on chemistry. In 1799 Dr. Thomson took his degree: he continued to lecture in Edinburgh till 1811, and during that time opened a laboratory for pupils which is believed to have been the first of its kind in Britain. His 'System of Chemistry,' in 4 vols. 8vo, was published at Edinburgh in 1802; and so great was its success that no fewer than six large editions were called for in less than twenty years. In 1812 he published his 'History of the Royal Society,' an important work, containing a brief but clear abstract of the history and progress not only of the Society itself, but also of every department of science, as connected with it. In the autumn of the same year he made a tour in Sweden, and in the

following year published an account of his 'Travels' in that country. In 1813 he removed to London and commenced the publication of a scientific periodical under the title of the 'Annals of Philosophy;' but having been appointed Lecturer on Chemistry in the University of Glasgow in the year 1817, and this office being converted in the next year into a Regius Professorship, he found it necessary to quit London, and after a time to resign the editorship to his friend Mr. Richard Phillips, from whose hands it subsequently passed into those of Mr. Richard Taylor and is now incorporated with the 'Philosophical Magazine.' He married in 1816 Miss Agnes Colquhoun, daughter of a distiller near Stirling; and has left a son (also a valued Fellow of our Society) and a daughter married to her cousin Dr. Robert Dundas Thomson, who for the last twelve years assisted his uncle in the duties of his chair. Dr. Thomson was elected a Fellow of the Royal Society in 1811 and of the Linnean Society in 1812; and died at Kilmun, in the county of Argyle, on the 2nd of July last, in the 80th year of his age. It would be out of place in this Society to enter into any detail of his numerous and valuable contributions to the science of chemistry, which he enriched not only by the production of a series of standard works, remarkable for the amount of conscientious labour which they involved, but also by many important discoveries and inventions which were entirely his own. But it is right to mention, as more particularly connected with natural history, his 'Outlines of Mineralogy, Geology, and Mineral Analysis,' published in 1836; with a view to which he had formed a fine mineralogical collection, which remains as a substantial monument of his taste and of his devotion to science.

Frederick Thomas Wintle, M.D., was for six-and-twenty years resident Physician to the Warneford Asylum for poor lunatics, in the neighbourhood of Oxford. His constant ill-health prevented his appearing much before the world as a man of science; but he contributed to the 'Lancet' several memoirs on subjects connected with his profession. He became a Fellow of the Linnean Society in 1831; and died at the age of 50, on the 14th of February in the present year, at Cheltenham, whither he had gone for change of air and relaxation from the cares of his office.

In our Foreign List we have to lament the loss of

The Baron Leopold von Buch, Chamberlain of the King of Prussia, and one of the most distinguished geologists of the age, who was a native of Prussia and born on the 25th of April 1773. He received his

mineralogical education in the Mining Academy at Freyberg, under the illustrious Professor Werner; and distinguished himself very early by indefatigable industry, great acuteness, and an enthusiastic love of natural history. His first separate work was published at Leipzig in 1794, under the title of 'Beobachtungen über den Kreutzstein,' and was followed by a 'Versuch einer Mineralogischen Beschreibung von Landeck,' 4to, Berl. 1797, which was regarded on its first appearance as the best mineralogical geography that had appeared in Germany, and was translated both into French and English. His next work, entitled 'Geognostische Beobachtungen auf Reisen in Deutschland und Italien,' was published between the years 1802 and 1809; and his 'Reise durch Norwegen und Lappland,' in 1810. In these two works he established his claim to be regarded as belonging to the highest rank of observers, not merely by his numerous and important geognostic descriptions of the strata of the different tracts of country which he visited and personally examined, but also by his remarks on their geographical distribution, and on that of the more important vegetable forms of the same regions as connected with locality and climate. In 1825 he published his 'Physikalische Beschreibung der Canarischen Inseln,' which was some years afterwards translated into French, and contains, in addition to his geological and physical observations on the surface of the earth and on the constitution and temperature of the atmosphere, the first published notice of the Flora of those islands, which he had laid before the Academy of Sciences at Berlin in 1816. Botany indeed always formed a favourite branch of his studies; and one of his last communications to the Academy, read on the 20th of November 1851 and on the 19th of January 1852, was "On the Nerves of Leaves and their Distribution." He cultivated, in fact, in a much higher degree than most geologists, such a knowledge of plants and animals as might assist him in identifying and determining the fossil species on which geological investigations so greatly depend. This is particularly evinced by his Monographs of several important fossil genera, such as *Terebratula*, *Ammonites*, &c. The list of his contributions to zoological and geological science, contained in the 'Bibliographia Zoologiæ et Geologiæ' of the Ray Society, contains seventy-eight distinct articles, and is by no means a complete enumeration of his works. For many years it had been his custom to pass his winters in Berlin, and to devote the finer season to distant journeys in prosecution of his researches; and the simplicity, truth and honesty of his character had endeared him to the large circle of

scientific fellow-labourers with whom these journeys had brought him into frequent contact. A few days only before his death (on the 26th of February) he had passed the evening among a body of scientific friends, and manifested his usual vivacity; on the morrow he was attacked by a fever and died on the 4th of March, having nearly completed his 80th year. He was a Member of the Academy of Sciences of Berlin and of the Institute of France, as well as of numerous scientific societies throughout the world; and was elected a Foreign Member of the Linnean Society in 1827 and of the Royal Society in 1828.

Achille Richard, Doctor of Medicine of the University of Paris, Member of the Academy of Sciences of the Institute of France, and Professor of Botany to the Faculty of Medicine of Paris, was born in that city on the 27th of April 1794. The son of a botanist of high scientific eminence (distinguished in early life for his long and laborious travels, and afterwards no less remarkable for the probity of his character than for the minute analysis of his botanical observations), he naturally attached himself to the same pursuits and became the *suppléant* of his father in his lectures at the Faculty of Science. He commenced his botanical career in 1819 by the publication of his '*Nouveaux Elémens de Botanique et de Physiologie Végétale*,' a work which speedily became extremely popular, passed through many editions, and was translated into English by the late Mr. MacGillivray in 1831. This was followed in 1823 by his '*Botanique Médicale, ou Histoire Naturelle et Médicale des Alimens, des Poisons et des Médicamens tirés du Règne Végétal*,' 2 vols. 8vo, and by numerous articles in the '*Dictionnaire de Médecine*;' the '*Dictionnaire Classique d'Histoire Naturelle*;' the '*Bulletin des Sciences*;' the '*Annales des Sciences Naturelles*,' and other serial and periodical works. His earliest systematic memoir was a Monograph of the genus *Hydrocotyle*, published at Brussels in 1819; and the most important of his subsequent contributions to this department are his Monograph of the *Orchideæ* of the Isles of France and Bourbon, in the 4th volume of the '*Mémoires de la Société d'Histoire Naturelle de Paris*,' and of the family of *Rubiaceæ* in the 5th volume of the same Transactions; his contributions to the '*Floræ Senegambiciæ Tentamen*' of Guillemain and Perrottet; his '*Flora Novæ Zelandiæ*,' forming part of the Voyage of the *Astrolabe*; and his '*Tentamen Floræ Abyssiniciæ*,' 2 vols., Paris 1847. He was a man of amiable disposition and agreeable manners, and contributed greatly to the diffusion of sound botanical knowledge among the

pupils of the Medical School of Paris, where his lectures were exceedingly popular. He was elected a Foreign Member of the Linnean Society in 1843; and died in the month of October last, in the 59th year of his age.

Among our *Associates*, we have become aware of only one death, that of

Mr. William Gardiner, an humble but laborious and enthusiastic collector of British plants; in which capacity he was well known to many members of the Society. He had published a 'Flora of Forfarshire' and several useful collections of dried specimens, chiefly of the plants of the Highlands; and was engaged in preparing a fourth edition of the first series of his 'Mosses,' at the time of his death, which took place at Dundee, on the 21st of June last year. He was elected an Associate of the Linnean Society in 1849.

The Secretary also announced that fifteen Fellows and two Foreign Members had been elected since the last Anniversary.

At the election which subsequently took place, Thomas Bell, Esq., was elected President; William Yarrell, Esq., was re-elected Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the Council in the room of others going out: Francis Boott, M.D.; William John Burchell, D.C.L.; William Spence, Esq.; Francis Walker, Esq., and Robert Wight, M.D.

Among the presents announced was a Portrait of Linnæus, copied by Prof. Pasch from the original by Roslin, in the possession of the Royal Academy of Sciences at Stockholm, for Archbishop Troil, by him presented to Sir Joseph Banks, and now presented to the Society by Robert Brown, Esq., President; for which the special thanks of the Society were directed to be given.

It was moved by Dr. Wallich, seconded by Dr. Boott, and unanimously resolved:—

That the most grateful and cordial thanks of the Society be offered to Mr. Brown for the admirable manner in which, for more than three years, he has conducted the business of the Society as its President; together with the great and sincere regret of the Members that advancing years and the infirmities attending on them should have induced him to relinquish an office, in which it would have been their earnest desire long to have availed themselves of his invaluable services.

Mr. Borrer, jun., F.L.S., exhibited specimens of a rare British bird, the continental White Wagtail (*Motacilla alba*), killed at Lancing in Sussex in April 1853.

Mr. Newman, F.L.S., exhibited specimens of two species of Ferns found in Scotland, and not hitherto noticed as belonging to the British Flora, one of which (the *Polypodium rhaticum* of the Flore Française, but not of Linnæus) he believes to be *Polypodium alpestre* of Hoppe, the other he considers to be new.

June 7.

Thomas Bell, Esq., President, in the Chair.

The Rev. Thomas Hugo, M.A., was elected a Fellow.

The President nominated Robert Brown, Esq., William Yarrell, Esq., Nathaniel Wallich, Esq., M.D., and William Spence, Esq., to be Vice-Presidents for the ensuing year.

Mr. Yarrell, V.P.L.S., exhibited a specimen of the Dusky Petrel (*Puffinus obscurus* of modern authors). This bird, new to the British Islands, flew on board a small sloop, off the Island of Valentia, on the south coast of Ireland, on the evening of the 11th of May last. The species having been frequently confounded with the Manx Petrel (*Puffinus Anglorum*), from their close resemblance in plumage, a specimen of the Manx Petrel, together with the eggs of both, was also exhibited for comparison.

Mr. Westwood, F.L.S., exhibited a volume of letters addressed to Philip Miller by Linnæus and various other naturalists and others, the property of Mr. Edward Layton of Watford; the more interesting of which, he stated, will shortly be published in facsimile. The volume contained, among others, letters from Dr. Richard Richardson, Charles Alston, Boerhaave, De Jussieu, Gronovius, Du Hamel du Monceau, George Clifford, Linnæus, De Zieten, Lord Petre, Hebenstreit, Van Royen, Guettard, Richard, Wachendorff, Garden, John Bartram, Stephen Hales, Marsigli, Öder, Forskåhl, Schmidel, Pinard, Dr. John Hope, Sibthorp, Vandelli, and Dr. Tobias Smollet.

Mr. Hogg, F.L.S., exhibited specimens of an umbellate variety of the common Primrose (*Primula vulgaris*, var. β . of Smith's 'English Flora'), gathered in Thorp Wood, near Stockton-upon-Tees, on the 12th of May in the present year.

Read some Notes "On the Artificial Breeding of Salmon and Trout, with Remarks on the Modes of Fecundating their Ova." By John Hogg, Esq., M.A., F.R.S., F.L.S. &c.

After referring to his notice of the artificial breeding of Salmon, as practised by Mr. Isaac Fisher, read before the Society on the 4th of May last, and of which an abstract is given in the 'Proceedings,' p. 178, Mr. Hogg gave an account of some further experiments by the same gentleman in the River Swale, made with considerable success, during the past winter and spring. A letter on this subject from Mr. Fisher appeared in the York Herald, dated May 3rd, 1853, from which we learn that ova, placed by him on the 25th of December last in a wooden box with gravel at the bottom, and through which the stream was continuously flowing, had nearly all produced young salmon by about the middle of April. Some experiments made about the same time by the late Earl of Tyrconnell failed of success from want of attention to the *locale*. Attempts were also made by Henry Coxe, Esq., of Scruton Hall, and Major Wade of Hanxwell Hall, to breed artificially from *Trout*, in which the latter gentleman had succeeded. After pressing the subject on the attention of all who may have the opportunity of making experiments, Mr. Fisher concludes his letter by a caution against what he considers an incorrect statement, taken from the Perth Courier, in which it is said that Dr. Robertson of Dunkeld, "conceiving that the ova of the female were impregnated previous to their development, within the body of the fish," had taken "a number of live female trout from the spawning-bed, and having extracted the roe, deposited them in a perforated zinc box, containing also some gravel," which was "upon the 14th of October last placed in a running stream, and on examining the box [in April], several of the ova were found to be hatched." On this latter experiment Mr. Hogg observed, that the result could only be accounted for by one of the two following methods. Either the ova of the female trout had in some way received the influence of the fecundating principle of the male trout, previous to Dr. Robertson's depositing them in his perforated zinc box; or, the perforated zinc box, which contained the ova as expressed from the females, was placed in the running stream within the fecundating influence of the males. The former

solution he founds on the mode of spawning described by Mr. Ellis in his 'Natural History of the Salmon,' from which it would appear that the male and female fishes having jointly made a furrow in the gravel, place themselves one on each side of it, and throwing themselves on their sides "again come together, and rubbing against each other, both shed their spawn into the furrow at the same time. 'This process is not completed at once; it requires from eight to twelve days for them to lay all their spawn.'" Mr. Hogg argues from this description, that it is possible that the female trout from which Dr. Robertson took the ova might have gone through this process with the male, and might have thus received the fecundating influence, just before she was caught; but on this solution he does not rely. He thinks it more probable that in the running stream in which the perforated zinc box was placed, there were some male trouts which had deposited their milt near the box, and that some of the milt might have been carried with the stream through the holes of the box, and have so fecundated the ova within it. In conclusion, he suggested, that as doubts still exist as to the processes which the male and female salmon and trouts naturally adopt at the spawning season, experiments on the subject might readily be undertaken, by confining them, at the proper seasons, in large glass cases or tanks, covered over with a coarse wire gauze, such as those which have recently been constructed in the Water-vivary of the Zoological Gardens, as a name for which he suggests the word *Hydrozogrium*, compounded of ὕδωρ, *aqua*, and ζωγρεῖον, *vivarium*. A stream of fresh water, regulated by pipes, could easily be supplied in all districts where the Salmon-tribe abounds.

Read also "Notes on the Dipterous parasites which attack the common Earwig and the Emperor Moth." By George Newport, Esq., F.R.S., F.L.S. &c.

After remarking that it is well known to naturalists that many Dipterous insects of the family *Tachinariæ* infest the *Lepidoptera*, *Hymenoptera* and *Coleoptera*, Mr. Newport stated that he has recently found one of the *Dermaptera*, also the common Earwig, to be subject to the attacks of a species of the same family. He has obtained this parasite, both in its larva and pupa state, from earwigs collected in the autumn in the neighbourhood of London. The earwig is attacked during its larva, or in the earlier period of its pupa state, when the covering of its body is soft and easily perforated. The fly then attaches a single egg to some part of its surface, and the young parasite hatched from this penetrates into the abdomen of its victim, and there con-

tinues to feed until it is full-grown; which is not until some days, and sometimes even weeks, after the earwig has assumed the *imago* state. The larva then escapes by forcing itself between the segments of the earwig's body, and the victim, already rendered sterile, soon dies. The larva at first moves about very quickly, but soon becomes quiet and changes to the pupa condition, usually within a couple of hours. When this state is assumed during the summer, or in the early part of the autumn, the fly is produced in about a fortnight or three weeks, according to the temperature of the season; but when the earwig's body is not left until late in the autumn the pupa remains through the winter in the earth, and the fly makes its appearance in the spring; and this also is the case when the larva remains in the earwig's body during winter, and assumes its pupa condition in the spring or early part of summer.

The body of the *larva* is about three-tenths of an inch in length, is soft, white, and tapers anteriorly to a very small but distinct head, which is furnished with a pair of retractile hooks. The body is formed of twelve distinct segments, including the head, and posteriorly has two projecting, corneous, black, tubular breathing organs. The *pupa* is oval, smooth, and of a dark brown colour, and retains the breathing organs of the larva projecting obliquely outwards on either side, at its posterior extremity. The *imago* fly appears to be referable to the genus *Metopia* of *Meigen*, and the author proposes to designate it *Metopia Forficulæ*, and to distinguish it as follows:—

Genus METOPIA, Meig.

METOPIA FORFICULÆ, cinerea, oculis testaceis, antennis nigris, corpore pedibusque pilis longis nigris vestitis; thoracis pilis lineas 6 longitudinales efformantibus, scutello alarum basi femoribusque ferrugineis.

Muscâ domesticâ aliquantò minor; Forficulas prope Londinum infestat.

The author also exhibited specimens of another parasite of the same family, *Exorista larvarum*, which he had bred from pupæ of the Emperor Moth, *Saturnia Pavonia minor*. This species is constantly seen in the early part of summer, in the hot sunshine, on hawthorn hedges, when the larvæ of Pavonia are feeding. It appears to be the common parasite of the Emperor Moth, in one cocoon of which were the dead pupa of the moth, together with ten living pupæ of the fly. In other cocoons there were nine, seven, six, four, three, and two respectively, and in one instance only a single parasite. The pupa of the moth, in each instance, had been perforated by the parasites, which thus appear to effect their escape into the cocoon,

in the larva state, and then into pupæ; as is the case with the Hymenopterous larva of *Ophion luteum* which infests the puss moth. The pupa of this parasite on *Pavonia* differs from that of the Earwig in its surface retaining distinct roughened annular indications of the twelve segments of the body of the larva, and also in the breathing organs being marked by three slight protuberances on each side, at the posterior extremity, above the anus.

The author also described and exhibited two remarkable cocoons of the Emperor Moth. One of these had two perfect outlets, but in other respects was a single cocoon, and had contained only one pupa from which the moth had been developed. The other was a large flattened cocoon, which, examined externally, appeared but as a single structure, but when opened was found to have been the joint production of *two larvæ*. It was divided internally, by a septum, into two chambers, to which, however, this double cocoon had but one outlet. One of the larvæ had died before changing to a pupa. The other had changed and had afterwards produced the moth, but which had been unable to liberate itself from the cocoon, owing to the obstacle opposed to its egress by the septum. It had become impacted, and had died in the cocoon in its attempts to escape through the outlet.

June 21.

Thomas Bell, Esq., President, in the Chair.

John Samuel Gaskoin, Esq., the Rev. Francis Thomas Macdougall, M.A., and S. James A. Salter, Esq., were elected Fellows.

Berthold Seeman, Esq., F.L.S., laid before the Meeting a communication which he had received from Prof. Nees von Esenbeck, President of the Imperial Leopoldino-Caroline Academy of Naturalists, congratulating the Linnean Society, in the name of the Academy, on its choice of Prof. Bell as President.

Read the following Extract of a Letter from T. S. Ralph, Esq., A.L.S., to Richard Kippist, Esq., Libr. L.S., dated Jan. 4th, 1853;

Brig Marmion, on her passage (from New Zealand) to Port Phillip.

“I shall be rather anxious to hear how the Wellington people have gone on since my departure, for on the evening of Saturday last (1st of January, 1853), while off—some fifty miles west of—Cape Egmont, at 8:30 p.m., we, on board the brig, experienced a horrible shock of an earthquake, which caused the vessel to shudder and shake, just as if she had grounded on a shingle spit; and indeed, so loud was the sound under us, and so great the agitation, that I took it at the time to be a case of wreck with us, and knowing the sea was running rather high, hardly expected to reach the deck before she might begin to break. The shock lasted about twenty seconds, during which I had only time to secure my watch and compass and seek the deck, when the whole was explained. I had the satisfaction of experiencing some eight others of diminished energy during the succeeding forty minutes, the last of which I measured, and found it did not exceed seventeen seconds. It was about equal in duration to the first, which of course I could not ascertain very accurately, except by reference to the time occupied by any succeeding ones.”

Read also a “Sketch of the Vegetation around Wellington, New Zealand.” By T. S. Ralph, Esq., A.L.S.

This sketch was prepared by Mr. Ralph, during his voyage above alluded to from Wellington to Port Phillip, from his notes made upon the spot. He describes the town of Wellington as situated at the southern extremity of a large port, of about 9 miles in length and varying in breadth from 4 to 6 miles, surrounded by hills which are in many places covered to their summit with trees and shrubs. These hills, being composed almost entirely of a claystone rock, present a marked feature of roundness and abruptness without sharpness, and precipitous declivities full of chaunels and gullies from top to bottom. Wellington itself is built on two flats, with an intervening beach-line of houses to connect them, so that the town possesses but a small space of level land, which some ten years since is said to have been covered with dense bush, in which the settlers had no difficulty in losing themselves. But all the hills in the vicinity of the shore have had their timber felled, and the ground has since become covered with an undergrowth, chiefly composed of *Leptospermum scoparium* and *L. ericoides* (together known by the name of *Manukà*), *Friesia racemosa* (*Aristotelia serrata* of Dr. J. Hooker's Fl. Nov. Zel.), *Myoporum laetum*, and in some places *Myrtus bullata*. A few of the deep gullies at the back of the first ridge are uncleared,

and contain besides some Arborescent Ferns ; but the hills in the rear of the town retain, especially on their upper parts, their older clothing of bush, consisting chiefly of some trees, such as *Fuchsia excorticata*, *Knightia excelsa*, *Eleocarpus Hinau*, two or three species of *Coprosma*, *Geniostoma ligustrifolium*, *Drimys axillaris*, *Pittosporum tenuifolium*, *Brachyglottis repanda*, and a few specimens of *Br. rotundifolia*. These are, in the denser parts of the bush, accompanied by *Piper excelsum*, *Ripogonum parviflorum* (or Supple-Jack), climbing species of *Metrosideros*, and *Dicksonia squarrosa* and *Cyathea dealbata*, which are the commonest species of Tree-ferns. *Cyathea Medullaris* Mr. Ralph found but once in this locality ; and of *C. dealbata* he mentions having found a single specimen with a trifurcate stem, about 12 or 14 feet in height, and each of its divisions rising close to each other to a height of 4 feet. Smaller ferns, such as *Hymenophyllum demissum* and *H. dilatatum*, accompany these ; *Trichomanes reniforme* is occasionally met with in extensive patches ; and *Polypodium Billardieri* is by far the commonest of climbing ferns. During the winter season (generally from May to September) the gullies, being furnished with a steady supply of water, produce numerous Cryptogamic plants, which Mr. Ralph states that he has closely observed, but of which he can at present give only a brief notice. Of most of these he expects to be able to obtain the fructification, by subjecting them to a period of confinement in Ward's cases, in which with a less moist, but more regularly charged atmosphere, they seem well disposed to fruit. He has thus succeeded in fruiting *Jungermannia hymenophylloides* ; and suggests this mode of cultivation to those who are desirous of obtaining fruiting specimens of Mosses, *Jungermannia*, &c. Of *Fungi* Mr. Ralph has collected about thirty species, while the list given in M. Raoul's work includes only eleven or twelve. He particularly notices *Ileodictyon cibarium*, which makes its appearance in June and July soon after heavy falls of rain, and a brick-red *Polyporus* (*P. sanguineus* of the ' Voyage au Pole Sud ' ?) as abundant in some places. He is inclined to think that in many instances mere varieties have been described as species. Thus he thinks that the two so-called new species of *Parsonsia* described in M. Raoul's ' Choix des Plantes ' are only varieties of *P. heterophylla* ; he has been unable to distinguish the two supposed species of *Drimys* ; and in other instances he believes the differences to depend mainly upon the climate, temperate enough in sheltered situations, but severe in places exposed to the cold south-easterly gales either of winter or summer. Among the microscopic *Fungi*, Mr. Ralph particularly mentions a species of *Trichia* ; the common

Æcidium Senecionis which accompanies the *Senecio vulgaris*, and appears to him to extend to a species of *Epilobium*; and *Perisporium vulgare*? attacking *Aristotelia* in winter. Of *Aristotelia* he observes that although it is said to be exstipulate, he has met with several specimens in which the stipulæ were largely developed. Of introduced plants, the common water-cress grows by cart-loads in and about the streams for several miles round Wellington; and *Mimulus luteus* is also spreading itself along the streams and over the swampy places behind the town. He adds that he is very desirous of introducing some of the British plants which would probably thrive, such as *Stellaria Holostea* and *Antirrhinum Cymbalaria*; and states that he brought out with him from England *Vallisneria spiralis*, of which he has specimens intended for the Botanic Garden at Melbourne, from whence it may perhaps make its way to Sydney and Hobart Town. Mr. Ralph concludes his sketch by mentioning a species of *Nitella* (*N. translucens*?) found in a rapid stream about five-and-twenty miles from Wellington.

Read also a Letter from John McClelland, Esq., F.L.S., to R. Brown, Esq., V.P.L.S., dated Calcutta, 15th of January, 1853, and accompanying a large packet of notes and sketches by the late William Griffith, Esq., F.L.S., on the development of the Ovulum in *Santalum*, *Osyris*, *Loranthus* and *Viscum*, as well as in several other genera belonging to different families of plants. These papers having been carefully examined, and compared with Mr. Griffith's memoirs published in the 'Linnean Transactions,' it was found that the bulk of them consisted of the materials from which he had constructed his memoir "On *Santalum*, *Osyris*, *Loranthus* and *Viscum*," printed in the nineteenth volume of the Society's 'Transactions.' In that paper he has given from these materials, in greater or less detail, all that he himself considered necessary to the elucidation of his subject; and it does not appear (as might indeed be expected) that anything could be advantageously added to what he himself communicated to the Society. There are, however, some notes on the genus *Modeccopsis*, of which the characters only have appeared in our 'Proceedings' (vol. i. p. 171), and which in some of the sketches is named *Dactylium vagum*; on another plant presumed by Mr. Griffith to belong to *Santalaceæ*; and on various Cucurbitaceous plants, affording some new and unpublished facts on the development of their several ovula, which it was thought desirable to lay before the Society, as supplementary to Mr. Griffith's communications on that important subject.

A summary of these observations, however, could scarcely be made intelligible without the accompanying sketches, which are more or less imperfect; and both appear to have been made rather as memoranda for the author than with any view to publication.

November 1.

Thomas Bell, Esq., President, in the Chair.

Cuthbert Collingwood, Esq., M.A., was elected a Fellow.

Mr. James Yates, F.L.S., offered some observations on the inflorescence of *Cycas revoluta* and *Macrozamia spiralis*, illustrated by specimens.

CYCAS REVOLUTA.

Prof. Miquel of Amsterdam, to whom we now look for the best systematic arrangement and description of Cycads, remarks, that male specimens are rarer in Europe than female. "Specimina culta," says he, "omnia ferè feminea. Masculinum in Horto Petropolitano exstat, ubi bis floruit (Otto u. Dietr. Gartenz. vii. 1839, p. 24)." See his 'Monographia Cycadearum,' 1842, folio, p. 24, and his "Genera et Species Cycadearum viventium" in the 'Linnæa' for 1843, p. 683. This observation is certainly true in regard to Great Britain. Since the first example of the female at Farnham, described by Sir J. E. Smith in the 'Linnean Transactions,' vol. vi., not less than six other plants have borne fruit, and some of them two or three times, viz. at Chatsworth, Ravensworth Castle, Laurel-Mount and Knowsley near Liverpool, Kew, and Landerdale House, Highgate. The plant last alluded to (Mr. J. Yates's) flowered in 1845, and subsequently produced four magnificent crowns of leaves, the finest of them consisting of fifty-three leaves. In October 1852, the first appearance of another cone was indicated by scales, covered with their soft yellow tomentum; but it remained long doubtful whether this would turn out to be another crown of leaves, or a head of fruit-bearing fronds. In April last the question was determined, as the peculiar palmate fronds were clearly seen, and were closely folded over one another, having the form of a somewhat flattened

spheroid and the size of a moderately large melon. In May these fronds or *spadices* increased rapidly and vigorously. They expanded and remained open three days, so that the young drupes, also covered with down and nearly the size and form of horse-beans, were easily discernible. They then closed again, and the whole spheroid became as compact and solid as before. It was conjectured that this temporary disclosure of the drupes, supposing it to be the habit of the plant, might be a provision for their fecundation, admitting of the access of the pollen. The fronds, which are crimson shaded by their thin covering of yellow down, are now spread in all directions and have attained their full development, except that the drupes, perhaps in consequence of the cold, wet, and dull season, fall without having come to perfection. It is also to be observed, that these fronds, about 110 in number, are closely set and spirally arranged upon a very short axis. The distance between them and the fronds of 1845 is about 8 inches or 20 centimetres, showing an elongation of the trunk of 1 inch for each year.

Miquel mentions only one *male* plant, viz. that at St. Petersburg; and in this country it cannot be ascertained that more than two males have produced cones, to wit, those in the Botanic Garden at Sheffield, and that belonging to Henry Ricketts, Esq., at the Grove, Brislington, near Bristol. The Sheffield plant has now flowered thrice. Its first cone, produced in England, is preserved in the Museum at York; its second belongs to the Royal Botanic Society in the Regent's Park; its third appeared this year, and, that it might be suitably displayed, the whole plant was transported to York last summer and was there publicly exhibited. It is now taken back to Sheffield. It appears that this male was purchased by the late Earl of Derby, formerly President of the Linnean Society, about A.D. 1825, together with the female already noticed, which is a noble specimen, still preserved at Knowsley, and which bore fruit in 1850. The Brislington specimen has been in the possession of its present owner about half a century, and may be between fifty and sixty years old. In 1847 it raised a cone or spike 58 c. (*i. e.* 23 in.) long, which is agreeable to the ordinary size and form of this production; and now it has raised a second, but with a remarkable anomaly in its development. This is not half the length of its predecessor, and, instead of being drawn to a point, is curtailed and terminates abruptly in a tuft of barren scales, resembling those, which, as intimated above, always precede the rise either of a crown of leaves or of a fruit-bearing cone. A check in the development of the cone appears to have been sustained, preventing the further

prolongation of its axis, and at the same time causing its scales to be no longer dilated and antheriferous.

MACROZAMIA SPIRALIS.

Mr. Yates next exhibited a small, but perfect specimen of the cone of a male plant, which he lately imported from Sydney. This is probably the first time that a *Macrozamia* has produced a cone in this country. Together with the recent cone Mr. Yates showed also two old specimens, which had been sent with the living plant by W. S. MacLeay, Esq., F.L.S., and which that gentleman obtained near his own residence at Elizabeth Bay. One of these two specimens is very remarkable in consequence of being double. At the top of a peduncle of the usual size and appearance are fixed two equal, parallel and perfect male cones. Mr. Yates showed, that some approach to this double formation is occasionally found in the genus *Encephalartus*, inasmuch as the axis of the cone is sometimes bifid near the summit.

It was also remarked, that the peduncle of *Macrozamia* bears leafy appendages, and that these have not been found in any other recent genus, but are very conspicuous on the peduncles of the fossil *Zamites gigas*, which is found in the Oolitic strata near Whitby.

Read some "Observations on the parasitic habits of *Rhinanthus Crista-galli*, and its injurious effects on the growth of Barley." By Joshua Clarke, Esq., F.L.S. &c.

These observations were made during the last summer in the parish of Debden, in the county of Essex. The field contained four acres of barley, the soil a stiffish clay; the *Rhinanthus* was growing in patches at different parts of the field, some of which were much larger than others, and occupying at least half the surface, by which about two acres of the barley were completely destroyed, and the remaining part of the crop very much injured, both in quantity and quality. The farm consisted of 170 acres, principally clay soil, such as is usually called heavy land; thirty acres of it were of barley, about ten of which were destroyed by this plant. This loss, combined with other causes, induced the occupier to give it up.

In regard to the mode by which the *Rhinanthus* effects the injury, Mr. Clarke states that the fibres of the roots attach themselves to the fibres of the barley, on which they form small round tubers, or what perhaps may be more properly called spongioles, which embrace the fibres so effectually, that they suck the juices of the plant so as to starve it, and in most instances ultimately

destroy it; these spongiolæ are formed of cellular tissue. A correct knowledge of the habits and natural history of a plant may lead to its eradication, but in this instance it is a matter of considerable difficulty, the ordinary method of destroying weeds by a summer fallow being of no avail, as the *Rhinanthus* does not grow in clean earth. Mr. Clarke has for some years been trying to raise it from seed in clean earth, but has never succeeded. The other method of destroying weeds by green crops in rows is equally unsuccessful, as it does not grow among green crops. As it is annual, it certainly should be pulled up before it seeds; and as it grows on a clay soil, and to no great extent except in a wet season, the land should be effectually drained.

Read also a Note addressed to the Secretary "On the Reproduction of Lost Parts in Earthworms." By George Newport, Esq., F.R.S., F.L.S. &c.

The author exhibited three specimens of Earthworms, which have had parts of their bodies reproduced,—an occurrence which was formerly proved, by the experiments of Bonnet and Spallanzani, to take place in these animals. One of the specimens exhibited was still living, the others were preserved in spirit. In each of them more than one-third of the posterior division of the body had been restored. The new parts in all were much smaller in diameter, and the segments much shorter than in the original anterior portion of the body. Although the reputation of Bonnet and Spallanzani requires no defence, the author thought it might be interesting to the Fellows to examine these specimens, since the fact of reproduction in Earthworms and other Annelids has recently been denied. In a "Report on the British *Annelida*," by Dr. F. Williams, published in the Report of the British Association for the Advancement of Science for the year 1851, that gentleman, after mentioning the experiments of Bonnet and Spallanzani, as quoted by Prof. Owen, makes the following statement:—"On the authority of hundreds of observations, laboriously repeated at every season of the year, the author of this report can declare, with deliberate firmness, that there is not one word of truth in the above statement" (Rep. Brit. Assoc., 1851, p. 247). Dr. Williams, Mr. Newport added, must have been singularly unfortunate in his observations, since it is no uncommon thing, at this season of the year, to find Earthworms which have had a large portion of the body restored; as is easily seen by the much lighter colour, more delicate texture and smaller dimensions of the new parts, as compared with the original parts of the animal.

November 15.

Thomas Bell, Esq., President, in the Chair.

Read a Notice "On *Hodgsonia*, Hook. fil. et Thoms., a new and remarkable genus of *Cucurbitaceæ*." By Dr. J. D. Hooker, F.R.S., F.L.S. &c., and Dr. Thomas Thomson, F.L.S. &c.

HODGSONIA.

CHAR. GEN.—FL. MAS. *Calycis* tubus elongatus, post anthesin deciduus, 5-gonus, angulis dentibusve incrassatis recurvis. *Petala* 5, flavida, gamopetala, calycis limbo adnata, obovato-cuneata, patentia, apice truncata, fimbriato-lobata; lobis longissimis tortis, pendulis. *Stamina* 5, triadelpa. *Antheræ* monadelphæ, extrorsæ; loculis linearibus contortis.

FL. FEM. *Calyx* basi ovario sphærico adhærens, supernè longè tubulosus, mari omninò similis, intùs disco spongioso. *Corolla* maris. *Ovarium* 1-loculare. *Placentæ* 3, parietales, basin versus utrinque 2-ovulatæ; *ovulis* ascendentibus, anatropis. *Stylus* elongatus, tubum calycis æquans. *Stigma* 3-lobum, lobis supernè emarginatis. *Bacca* depresso-globosa, magna, obscurè 5-sulcata, pulpâ induratâ demùm siccâ repleta. *Semina* per paria in nuces 6 arcuè accreta, altero minore plerumque effæto. *Testa* lignosa, basi fissa (rimâ elongatâ), profundè longitudinaliter reticulatim sulcata; epidermide vasculari in sulcos penetrante tecta. *Endopleurum* crassissimum, suberosum. *Embryo* exalbuminosus; cotyledones magni, plani; plumula lobata.

Frutex altè scandens. Caulis ramosus, sulcatus, succo aqueo copioso scatens, vasis magnis aëre repletis percursus. Folia alterna, sempervirentia, coriacea, 3-5-palmatiloba. Flores magni, extùs rufobrunnei puberuli, intùs pallidè straminei villosi; masculi spicati basi bracteati; fœminei axillares solitarii (v. ex cl. Roxburgh) in racemum brevem dispositi. Petioli elongati, basi versus axillam gemmâ? corneâ conicâ stipulæformi suffulti. Cirrhi laterales, 2-3-fidi.

HODGSONIA HETEROCLITA, Hook. fil. et Thoms.

Trichosanthes heteroclita, Roxb. Fl. Ind. iii. p. 705; Wall. Cat. no. 6684!

T. grandiflora, Wall. Cat. no. 6685! non Blume.

An T. hexasperma v. T. macrocarpa, Blume, Bijdr. p. 935?

Hab. in sylvis densis montium inferiorum Sikkim Himalayæ (ad 5500 ped. ascendens); Assam; Mont. Khasia, Silhet, Chittagong, Penang, Java?

—v. v. n.

A very remarkable plant, one of the handsomest and most curious of the whole natural family, with the inflorescence and flower of

Trichosanthes, but in fruit widely different from any of the extensive Natural Order to which it belongs. It has been extremely well described by Roxburgh as a species of *Trichosanthes*, and was cultivated many years ago in the Calcutta Botanic Garden, where it is now lost. A figure of the female flower is also in the Museum of the India House. *Root* branching. *Stem* climbing for 80 to 100 feet, festooning lofty trees. Wood of very remarkable structure. The almost axillary conical bodies, referred to buds, but generally described as stipules, are most remarkable and deserve careful study. *Flowers*, very handsome, appear in May, and the fruit ripens in autumn and winter; female flowers are rare, and from being solitary, are less conspicuous than the males. *Ovarium* covered with small warts that project through the dense, almost velvety, rusty pubescence, 1-celled with three parietal placentæ, that project into the axis, and clearly show the normal structure of Cucurbitaceous fruits to have a parietal placentation; cavity of the ovarium filled with watery pulp, that hardens as the fruit advances to maturity and becomes of the consistency of a hard turnip, full of watery fluid that escapes in large drops when the fruit is pierced. *Ovules* suberect, in pairs, each pair collateral and at right angles to the radius of the ovary; of these the ovule next the axis ripens, and that next the circumference of the ovary becomes accrete to the outer one and seldom ripens. This position and œconomy of the ovules is quite unique in the order. *Flowers* about 4 inches long; the limb 3 inches in diameter, inodorous; fringes of the petals 5–6 inches long. *Calyx* with several deep brown polished tubercles or warts towards each angle or tooth. Tube of the calyx lined with a thickened disc, which surrounds the style and is in contact with it; it lines the staminal tube of the male flower. Berry 6–10 inches across, of a fine deep red-brown colour, covered with a very short tomentum; pulp whitish. *Seeds* erect, very large, each double, resembling a 2-celled nut, covered with an adherent vascular pulpy coat, which penetrates deep fissures in the free face of the larger seed. *Testa* hard, somewhat porous; the free surface of the larger seed deeply grooved in anastomosing channels; outer surface rather corky or spongy, inner hard, smooth, polished. The testa is slit longitudinally down its base towards the hilum for one half or one inch in the larger seed, and has a smaller corresponding slit on the smaller nut. A compressed prolongation of the endopleurum (which is very soft, thick and corky) projects a little through this fissure, and the radicle points towards it. *Embryo* flat, of the form of the seed, occupying a narrow slit in the centre of the endopleurum, nearly as broad as the

cavity of the testa, surrounded by a delicate membrane. *Cotyledons* plain, white, very oily; radicle small, conical; plumule 2-lobed, lobes notched. The seeds are eaten by the natives of Sikkim, who call the fruit Kat'hior pot. An original specimen is in Sir William Hooker's herbarium, from Buchanan Hamilton, labelled as from Penang, with the MS. name of "*Trichosanthes Theba.*" Roxburgh's trivial name of *heteroclita* has been retained, for though it was intended by its illustrious author to imply that the plant varies from its congeners of the genus *Trichosanthes*, it will apply sufficiently well in future for a plant which is heteroclite in respect of the natural family (*Cucurbitaceæ*), to which it undoubtedly belongs. Blume's descriptions are quite insufficient to determine whether it belongs to his *M. macrocarpa* or *hexasperma*, or either. These plants are no doubt congeners of *Hodgsonia*, and considering that the *H. heteroclita* ranges from the level of the sea at Penang, lat. 6° north to alt. 6000 feet in Sikkim, lat 27° north, the probabilities are great that it is also found in Java. The leaves vary from 2-lobed to 5-lobed, usually the latter, and the lobes are much acuminate, rarely blunt, coarsely serrated towards the tips or quite entire.

The genus is named in honour of B. H. Hodgson, Esq., F.L.S., Resident at Dajiling, where the plant was discovered, and whose scientific services in the Himalaya justly merit the honour of so splendid a plant.

Read also "Notes on *Potamogeton flabellatus*, Bab., a new British species." By Charles Cardale Babington, Esq., M.A., F.R.S., F.L.S. &c.

December 6.

Thomas Bell, Esq., President, in the Chair.

Read a "Notice of several species of Bats, captured in England during the present autumn." By G. B. Buckton, Esq., F.L.S. &c.

The species referred to are *Vespertilio serotinus*, Daub., *V. Daubentonii* var. *emarginatus*, and the typical *V. Daubentonii*. Of *V. serotinus* three specimens were obtained in August last at Chartham, about three miles from Canterbury, and captured in rather a singular

manner. On returning late from a fishing expedition, the author was interested in watching several large bats hawking for beetles and the white moth (*Porthesia chrysoorrhæa*), which was then plentiful. The idea occurred to him of roughly imitating the last insect by drawing a shred of white paper through the top ring of his rod and vibrating it; and this manœuvre, under the thick trees, had the effect of a decoy, and in a few minutes he switched down two specimens almost unhurt. On another evening he procured a third individual, and might easily have obtained more, as it appeared to be the common bat of the neighbourhood; although Mr. Jenyns, to whom the specimens were submitted, states that he has seen but two other English specimens, which (as appears from Mr. Bell's 'British Quadrupeds') were taken in the neighbourhood of London. Mr. W. Borrer has, however, found it not of unfrequent occurrence in the chalk excavations in Dover Cliff. When handled, these bats uttered a shrill chatter, and showed their teeth, with a strong disposition to bite. Their flight is graceful but somewhat heavy, and appeared to be limited to about an hour after sunset. They seem to affect the vicinity of high trees and shady places.

Vespertilio Daubentonii var. *emarginatus* was knocked down while flitting in company with another, over the water, under some willows on the banks of the river Stour; and three specimens of *V. Daubentonii* were obtained from the church-tower of Christchurch, Hants, where they may be found in plenty. Mr. Buckton describes the differences between *V. emarginatus* and *V. Daubentonii* as follows. *V. emarginatus* is nearly an inch larger in expanse of wings and half an inch longer from the nose to the tail*. The ears are somewhat narrower and more deeply notched; the thumb is stouter, and with reference to the size of the bat not so long. The fur is more of an ash-gray, and the flying membrane and fur of the under side more cool in colour. It appears to have much of the habit of *V. mystacinus*. On falling into the water it swam well to the bank, notwithstanding some current in the stream. Mr. Couch, in a paper published in the 'Zoologist,' has recorded the occurrence of *V. emarginatus* in

* The actual measurements are as follows:—

	<i>V. emarginatus.</i>		<i>V. Daubentonii.</i>
	inches.		inches.
Expanse.....	10 $\frac{1}{2}$	.....	9 $\frac{1}{2}$
Nose to tail	3·7	.....	3·1
Fore-arm	1·6	.....	1·6 nearly.
Tail	1·4	.....	1·2 $\frac{1}{4}$
Thumb	·4	.....	·3

the neighbourhood of Falmouth; but Mr. Newman, in the same periodical for September 1852, has expressed a doubt (which is shared by others) of the existence of the continental *V. emarginatus* in this country. On this subject Mr. Buckton read part of a letter from Mr. Couch addressed to Mr. Borrer, to the following effect. Mr. Couch regrets that he has no specimens, it being his custom to send away his specimens as soon as he has made such an examination as he deems necessary. The last he had were sent to Mr. Heysham at Chester, and the little Horse-shoe Bat travelled all the way from Cornwall thither alive. He is preparing a paper on the subject of Bats for the 'Zoologist,' in which he has collected many particulars which he thinks interesting; but with regard to the disputed identity of his species he refers to the 'Naturalist' for November 1851, where will be found a paper on this species, with a figure, by Mr. Cocks of Falmouth. The specimen which Mr. Couch examined, and to which he assigned this name, agreed with the characters there pointed out; and appeared to differ widely from any other British Bat. The notch in the ears was much more decided than in Mr. Bell's figure.

Read also a "Notice of the appearance of myriads of a species of *Aphis* in the North of England, during the present autumn." By J. Hogg, Esq., F.R.S., F.L.S. &c.

These insects not only abounded in immense numbers in country places, but also in vast swarms in the very centre of the town of Stockton. As these insects appeared just at the time when the cholera had broken out in that portion of England, many people considered that they were connected with that disease; and that they were forerunners, or at least indicative of the presence of the cholera. This Mr. Hogg considers to be fabulous and absurd, but he thinks that some of the same causes which might promote cholera, might likewise assist in the rapid increase of these *Aphides* at the same season; such as warm, moist weather, the absence of wind, and other like causes. Or indeed the excess, or it may be the want of electricity in the atmosphere, might tend to account for the presence of cholera, and the extraordinary multitudes of these insects in the same localities; but that the existence of the cholera was in any way influenced by the *Aphides*, or the converse, he altogether disbelieves. Mr. Hogg exhibited some of these insects in the hope that the species might be determined. He had not examined them minutely, but believed that they might prove to be the *Aphis Rumicis*. They were taken by him at Norton, in the county of Durham, in the latter

part of September in the present year. He added that he has no recollection of having witnessed before such multitudes of these black, or dark-coloured, flies with light wings; and that they were extremely troublesome by flying into the eyes and mouth.

Read, further, a paper entitled "Remarks on Sarsaparillas." By Berthold Seemann, Esq., Ph.D., F.L.S. &c.

After quoting a remark of Sir W. Hooker, that those plants which are most useful to mankind are frequently the least known botanically, and the testimony of the late Dr. Pereira as to the unsatisfactory nature of our knowledge of the botanical sources of the various sorts of Sarsaparilla, Dr. Seemann proceeds to endeavour to elucidate the facts connected with this perplexing subject. He refers first to specimens collected by Dr. Warszewics, during his last visit to the Volcano of Chiriqui in Veraguas, and transmitted by him to Mr. Daniel Hanbury, and which Dr. Seemann pronounced to belong to the *Smilax officinalis* of Humboldt and Bonpland; a view which was confirmed by a tracing made in Paris by Mr. Hanbury, from the original imperfect specimens of that plant, and subsequently by specimens collected by Dr. Warszewics at Bajorque in New Granada, the locality where Humboldt and Bonpland obtained their *Smilax officinalis*, and which are completely identical both with the plant of the two distinguished travellers above named and with the specimens collected by Dr. Warszewics at Chiriqui. The author then extended his inquiry to other so-called species supposed to be allied to *Smilax officinalis*, and states that having examined the specimens of *Smilax papyracea* of Poiret, in the possession of Mr. Bentley, on which that gentleman had published an able article in the Pharmaceutical Journal for April 1853, he became convinced of the identity of that plant also with *Smilax officinalis*. He next refers to *Smilax medica* of Schlechtendal and Chamisso, well described and tolerably figured by Nees von Esenbeck, which he believes to be also identical with the plants previously examined; the supposed differences having originated in the extreme variableness in this genus of the roots, stems, branches and leaves, from which the principal characters of the three supposed species were derived.

The following is the description given by Dr. Seemann of the plant which unites under the name of *Smilax officinalis* the synonyms of *Sm. papyracea* and *Sm. medica*. It grows in the lower coast region as well as on the mountains at an elevation of 5000 feet above the sea, and is confined (as far as at present known) to the continent of America, where it is found between 20° N. and 6° S. latitude,

and 110° and 40° W. longitude. Jamaica, from whence so large a quantity is annually obtained, has been well ascertained not to produce any itself, the article known as "Jamaica Sarsaparilla" being imported into that island from the Spanish Main; nor is it authentically proved to occur in any of the other islands of the West Indies. The rhizoma is cylindrical, and the roots (*Sarsaparilla of Commerce*), abounding more or less in starch, according to age and locality, are as many as 10 feet in length, and generally furnished with branched rootlets (beards). The plant itself is glabrous in every part, and averages 50 feet in length. The stem is quadrangular, furrowed or striated, and on the edges furnished with flat prickles, which are occasionally curved upwards. The branches are either quadrangular or multiangular, and either with or without prickles. The petiole, sheathing at the base, is furnished with two spirally-twisted tendrils, which are often 10 inches long, and either furnished with prickles or destitute of them. The leaves are extremely variable; at times they are broadly cordate, almost trilobed, gradually tapering to an acumen; at others they are ovate-oblong, and even lanceolate, and rounded at the apex, but always mucronate; they are generally 5-nerved, the two outermost nerves being mostly bifurcated, and all the nerves prominent on the under surface, acutely edged and often furnished with prickles; the colour of the leaves is of a dark green, the under surface being a shade paler than the upper, but never glaucous; as in many other species of *Smilax*, their length varies from 2 inches to a foot, and their breadth at the base from 1 to 6 inches; in thickness also they vary considerably, being either coriaceous or more or less paper-like, and in the latter case furnished with transparent lineolar dots. The peduncles are axillary and solitary, somewhat flattened, and bear an umbel composed of about sixteen flowers. The flowers are still unknown. The berries are round, red, and of the size of a small cherry or less; and each contains two or three plano-convex seeds of a light brown colour.

Dr. Seemann does not expect that botanists will object to the union of the three supposed species; but he fears that pharmacologists may be disinclined to adopt his views, inasmuch as regarding the different commercial sorts of Sarsaparilla as essentially distinct, they lay great stress upon certain superficial characters of little botanical importance. Thus the so-called Lisbon or Brazilian Sarsaparilla, which comes in rolls about 3 feet long, is chiefly distinguished from the Jamaica Sarsaparilla, by having fewer rootlets or beards, and inasmuch as the beards contain a greater amount of mealy matter, is on that account of less value in the market. But the author states,

that, if the Lisbon Sarsaparilla be carefully examined, it will be plainly seen that the rootlets have been removed by some rough mechanical process, and that when gathered they had as much beard as the Jamaica kind, making it probable that if the merchant who buys up this Zarza in various parts of Brazil, would instruct the collectors that the preservation of these rootlets would not only save them trouble but also increase both the weight and commercial value of the roots, we should soon have from Brazil the same valuable Sarsaparilla which we now obtain from Jamaica. The distinction, however, on which pharmacologists lay the greatest stress is into "mealy" and "non-mealy," according as the mealy coat immediately below the outer cortical layer is of greater or less thickness, or entirely wanting. This distinction, which is at once seen to be by no means well-defined, depends moreover on the age of the roots and the locality in which they were collected, the formation of starch being probably entirely regulated by physical circumstances. In a bundle of Jamaica Sarsaparilla many roots may be found mealy at one end and non-mealy at the other. Again, the form of the cells of the nucleary sheath of the roots has been considered as furnishing good marks of distinction between the Sarsaparillas of Central and South America; and Schleiden declares that he can readily distinguish them microscopically. But this theory, as appears from Mr. Bentley's paper before referred to, does not seem to rest on any safe foundation.

Dr. Seemann believes therefore that he may safely conclude that the greater part of the Sarsaparilla of Commerce is the produce of one and the same species of *Smilax*; but he does not wish to infer from the identity of the three supposed species, that the commercial distinctions, now so universally acknowledged, ought to be given up. He believes that so long as the Brazilians continue to strip the roots of their beards, there will be in the market the so-called Lisbon Sarsaparilla, and as long as the inhabitants of the Spanish Main preserve these rootlets, there will be Jamaica Sarsaparilla; and further, that as long as the climate and other physical conditions of Guatemala remain unchanged, we shall receive from thence Sarsaparilla distinguished by its abundance of mealy matter.

December 20.

Thomas Bell, Esq., President, in the Chair.

John Dickinson, Esq., F.R.S., was elected a Fellow.

Read, a "Notice regarding a Weevil of the Vine and its Parasite."
By John Curtis, Esq., F.L.S. &c.

Numerous insects have long since been noticed as injurious to vines in the South of Europe, and their history and œconomy have been ably discussed by Baron Walckenaer and M. Audouin. Among the Beetles is a weevil, named by Fabricius *Attelabus Betuleti* (*Rhynchites* of Schönherr and other authors), which occasionally produces very extensive mischief to the vines of Burgundy, while in England its attacks are limited to the birch. During a residence at Genoa in June last, Mr. Curtis was obligingly taken to the Botanic Garden by M. Mussino to see alive the *Chrysomela Americana*, L., which inhabits a species of lavender, and his attention was called to the vines against the walls, which were attacked by the mildew, so widely spread during the past summer through Médoc and the wine-growing districts of France and Italy, and especially in Tuscany and Piedmont. While examining this mildew, he perceived many of the leaves of the vine rolled up like cigars; but the elaborate memoir of M. Debey on *Attelabus Betulæ*, L., renders it unnecessary to enter into detail on the wonderful mode in which these little animals generally cut and roll the leaves with mathematical precision. It is necessary, however, to state that the female weevil cuts the leaf through across the diameter, without dividing the midrib, then deposits an egg or two upon the upper surface, and subsequently rolls up the lower portion, leaving the upper part untouched, so that it remains green, and the leaf does not fall off for a considerable period, often probably until the tree sheds its leaves. In her mode of manipulation, however, the *Attelabus Betuleti* seems to differ from the *A. Betulæ* and most other weevils, inasmuch as the author observed, on cutting transversely, that the entire leaf appeared to be rolled up, from the base to the tip.

Mr. Curtis's principal object, however, in bringing the subject before the Society, was to call attention to a memoir by Prof. Filippi of Turin, published in the 'Nuovi Annali delle Scienze Naturali di Bologna' for January and February 1852, entitled "Storia Genetica di un Insetto Parasito delle Uova del *Rhynchites Betuleti*,"

a notice of which is given in the 'Annals of Natural History' for June of the same year. In this paper Prof. de Filippi gives a very singular and interesting account of the mode of reproduction of a Hymenopterous insect, probably a species of *Pteromalus*, whose business it appears to be to keep down the multiplication of *Attelabus Betuleti*. He believes that the facts observed by him in regard to this parasite are strictly analogous to those described as occurring in *Distomæ*, which (according to the well-known observations of Siebold and Steenstrup) do not directly generate other *Distomæ*, but larvæ which generate other larvæ, and then *Cercariæ*, which being themselves the proper larvæ of *Distomæ* are transformed into them. In like manner the Pteromaline insect of the *Attelabus* (and perhaps other parasitic insects) does not generate its progeny directly, but intermediate beings which are the mothers of this progeny, and which have received from Steenstrup the name of *Nurses*. This parasite then presents us, according to Prof. de Filippi, with a case of *alternation of generations*, the first example known in the class of Insects. Mr. Curtis, however, is of opinion that the case is rather one in which a second parasite deposits its ovum in the interior of the first while yet in the larva state, and thus prevents the too rapid increase of the first parasite, which might otherwise multiply so greatly as to exterminate the weevil itself. When and how the eggs of the second parasite are introduced into the first Mr. Curtis regards as a curious question, and well worthy of investigation on account of the physiological interest attached to the subject. He concludes by some remarks on the great importance of a knowledge of the œconomy of parasitic insects, by whose agency other noxious and larger species are rendered much less destructive than they might otherwise become; and of the diffusion of this knowledge, especially among the cultivators of the soil, lest (as is too often the case) they should be led to destroy the very creatures through whose means we are frequently protected, if not from absolute famine, at least from a scarcity of the most necessary productions of the earth.

Read also "Remarks on the so-called Eye-spot of the *Infusoria* and Microscopic *Algæ*." By Arthur Henfrey, Esq., F.R.S., F.L.S. &c.

Mr. Henfrey states, that in the course of an extensive series of observations on the microscopic *Algæ*, especially in investigations of the effect of reagents upon the tissues and contents of the cells, he has frequently been completely baffled by the uncertainty which presented itself as to the real existence of colours exhibited by objects. The decomposition of light taking place in these minute

bodies under high magnifying powers is such, that even with lenses most carefully corrected and fully sufficient for all general purposes of investigation, we are left altogether in doubt as to whether or not the phænomena of colour arise from refraction. He uses lenses made by Ross about eight years since, a quarter and an eighth of an inch, the latter of excellent defining power, and is convinced that these are not inferior to any glasses in use on the continent. But with them, particularly the latter, delicate membranes seen edgeways exhibit a blue tint, under certain circumstances, often giving rise to a difficulty in arriving at a decided opinion in questions connected with cellulose, when using the sulphuric acid and iodine test. Many phænomena might be cited in reference to this subject, but the main point to which he wishes to direct attention is, the doubt existing in his mind as to the nature of the red spot described by Ehrenberg as an 'eye' in the Infusoria. He has observed this object chiefly in the unicellular *Algæ* and zoospores, and was first led to suspect that the red colour depended on unequal refraction, in the cells of *Chlamydomonas Pulvisculus*. In these he has frequently found several red spots on one individual cell, which however could not all be brought into focus at once, and he has decidedly observed, that when these spots were brought into clear and well-defined focus, they appeared as bright colourless granules. Frequently no red spot at all could be found.

The idea suggested by this was further confirmed by noticing the similar variations of colour according to form in a granule (nucleolus?), in a half-decomposed, colourless, diseased cell.

Finally, he had recently found that he could bring out the crimson colour most beautifully in the central spot or 'hilum' of starch granules. When the lens is a little too far away from the object, the hilum appears like a minute black spot; then, carrying the lens a little nearer, it comes out as a beautiful crimson spot exactly like an 'eye-spot' in every respect. Adjusting the focus exactly, by bringing down the lens a little more, the hilum is seen as a well-defined spot of a brighter character than the rest of the starch-grain, but altogether devoid of any prismatic colour.

Although dwelling but briefly on this question here, Mr. Henfrey states that he has had it under consideration for some time, and he thinks it desirable to make known his supposition now, in order that other microscopists working with different lenses may direct their attention to the point, and furnish the results obtained with them, since almost all high objectives differ slightly in their correction.

Read further, "Notes on the Natural Order *Crescentiaceæ*." By Berthold Seemann, Esq., Ph.D., F.L.S. &c.

The author cites first the opinions in relation to the proper position of the genus *Crescentia* and its allies in the natural system successively entertained by De Jussieu, Endlicher and DeCandolle, the latter of whom associated them with *Bignoniaceæ*. Gardner first pointed out their claims to be regarded as a distinct natural order allied to the family last named, and Prof. Lindley adopted this view and first gave a diagnosis of the order, taken however only from a single species, *Crescentia Cujete*, L., for which reason Dr. Seemann proposes the following amended character.

CRESCENTIACEÆ.

Frutices vel arbores, glabræ v. glabratae; caule ramisque plus minusve angulatis. *Folia* alterna, fasciculata, v. opposita, petiolata v. sessilia, nunc simplicia, sæpissimè integerrima, nunc composita, 3-foliolata, v. pari- v. impari-pinnata. *Stipulae* nullæ, v. interdum e gemmæ axillaris foliis primariis spuria. *Flores* hermaphroditi, subregulares, v. irregulares, terminales v. axillares, v. sæpissimè ex trunco aut basi ramulorum orti. *Calyx* liber, gamophyllus, persistens, 5-merus, v. varius, deciduus, spathaceus, v. bipartitus. *Corolla* hypogyna, gamopetala, subcampanulata, infundibuliformis, v. hypocraterimorpha; limbo 5-lobo, subæquali v. subbilabiato; lobis per æstivationem duplicato-plicatis v. subplicato-imbricatis. *Stamina* 4, cum rudimento quinti, corollæ tubo inserta, ejusdem laciniis alterna, exserta v. inclusa. *Filamenta* simplicia. *Antheræ* biloculares. *Discus* hypogynus glandulosus, ovarii basin cingens, sæpè obsoletus. *Ovarium* liberum, 1-, 2-, v. rariùs 4- v. pluriloculare. *Ovula* indefinita. *Stylus* terminalis, simplex. *Stigma* bilobum, v. bilamellatum. *Fructus* baccatus 1-, 2-, v. rariùs 4- v. plurilocularis. *Semina* plurima, aptera. *Albumen* nullum. *Embryo* rectus, v. subcurvatus.

Crescentiaceæ thus defined inhabit chiefly the tropical and subtropical regions of America and Africa: they are not found in Europe or Australia, and only one species is met with in Asia. Several species are cultivated, and have become naturalized in different parts of the Old World; none possess any poisonous qualities. As far as at present known, the Order is composed of about thirty species, distributed under nine genera.

Dr. Seemann next adverts to the genus *Oxycladus*, described by Mr. Miers in the twenty-first volume of the Society's 'Transactions' and referred by that gentleman to *Bignoniaceæ*, of which he regards *Crescentiaceæ* as one division, while he forms another division of the genus *Oxycladus*. Dr. Seemann, however, states his opinion that

Oxycladus has nothing to do with *Bignoniaceæ*, even in the widest sense, but belongs to *Myoporaceæ*, being allied to *Stenochilus*, R. Br., and *Bontia*, L.

In conclusion, the author states that he distributes the true *Crescentiaceæ* into two sectional subdivisions, as follows:—

1. TANÆCIEÆ. Calyce persistente, regulari, 5-fido—*Colea*, *Periblema*, *Phyllarthron*, *Tanæcium*, *Tripinnaria*, *Sotor* (?).
2. CRESCENTIEÆ. Calyce deciduo, irregulari, spathaceo v. bipartito—*Parmentiera*, *Crescentia*, *Kigelia*.

He adds that all the plants belonging to the Order have a tendency to form winged petioli; and thinks it not improbable that the simple-leaved species may hereafter be looked upon as plants with abortive leaflets and highly-developed phyllodia. The ovary too, he remarks, in all *Crescentiaceæ*, is unilocular, with a truly parietal placentation; and it is only when the placentæ meet, as they generally do when the fruit approaches maturity, that the placentation appears to be axile, and the fruit two- or more celled.

January 17th, 1854.

Robert Brown, Esq., V.P., in the Chair.

John Disney, Esq., Frederick William Headland, Esq., George H. K. Thwaites, Esq., and the Rev. John G. Wood, M.A., were elected Fellows.

Read a letter from David Moore, Esq., A.L.S., of the Botanic Garden, Glasnevin, near Dublin, addressed to James Yates, Esq., F.L.S., &c. “On the introduction of *Anacharis Alsinastrum*, Bab. into Ireland.”

“It is rather remarkable,” Mr. Moore observes, “that it should have been noticed in England and in Ireland about the same time. I am not perfectly certain now, but I think it was in the early part of 1842 I first saw the plant growing in a small pond in the garden of Isaac M. D’Olier, Esq., of Booterstown, near Dublin. That gentleman has been long known for his zeal in horticultural pursuits, as well as for his fine collection of exotic plants, which he has been in

the habit of getting from various parts of England, as well as from the continent, along with some of which he considers the *Anacharis* was introduced to his collection, though he has no knowledge of its being so. At the time stated, Mr. D'Olier acted as Chairman of the Committee of Botany for the Royal Dublin Society, which caused me to have frequent official intercourse with him, and for which purpose I occasionally went to Booterstown. In the centre of his garden, where a number of gold and silver fish were kept in a small pond, we first noticed the *Anacharis*. I did not then know the plant, further than that it was not a British species, and brought some of it to cultivate in the Botanic Garden, where it was placed in an earthenware crock and put in the pond. Little more was thought about it, until the late Mr. Macauley brought it from the pond in Mr. D'Olier's garden to the College garden, about the time inquiry was awakened respecting it in England. My foreman then told me there was plenty of it growing in our pond, which I had not before noticed, but I had no doubt, on inquiry, of this being the increase of the few plants I first brought from Booterstown. In the way then I have stated, the *Anacharis* made its appearance in this neighbourhood, where I believe it is still confined: I have not seen or heard of its being elsewhere in Ireland, though it increases equally fast here as it does in England. There are now some millions of plants in our pond, and as many more destroyed since it was first introduced."

Read also, some observations "On the correctness of the position assigned to *Oxycladus* in the Family of *Bignoniaceæ*." By John Miers, Esq., F.R.S., F.L.S. &c.

Mr. Miers states, that after a careful consideration of the arguments advanced at the last Meeting by Dr. Seemann, he sees no reason to alter his conviction as to the proper position of the genus in question. Dr. Seemann contends that *Oxycladus* is too anomalous in form to be admitted among *Bignoniaceæ* on account of its fruit, which is a hard monospermous nut, with the seed suspended from near the summit of the cell, and of its embryo, which has large fleshy cotyledons, while there are no wings developed on the testa; and maintains that on these grounds it rather belongs to *Myoporaceæ*, with which family it agrees better in habit, having broom-like branches terminating in a spine, and especially with the genus *Bontia*, with which it agrees in its hard nut, and which it approaches in the country of its origin. Mr. Miers on the other hand believes that it is easy to oppose to these arguments a number of facts, showing

that *Orycladus* presents far greater discrepancies in relation to the *Myoporaceæ* than to the *Bignoniaceæ*. In *Myoporaceæ*, in nearly all cases, the leaves are alternate; the flowers have always didynamous stamens, without any rudiment of a fifth; the ovarium is only bilocular in two instances, which he has elsewhere shown (Ann. Nat. Hist. 2nd. Ser. xi. 439) are doubtful, or at least abnormal genera of the order; in nine other genera the ovarium is distinctly four-celled, with a single ovule suspended from the apex of each cell, and this ripens into a four-celled ligneous indehiscent nut, with a seed in each cell. The only remaining case is *Bontia*, which differs from all others of this family in having originally a bilocular ovarium, but where by the subsequent growth and inflexion of the placentæ, eight pseudo-cells are produced, each with a single suspended ovule. This ripens into a hard indehiscent eight-celled nut, each cell producing a single seed, with a thick osseous testa, which is often confluent with the sides of the cell. Mr. Miers's knowledge of this genus is derived wholly from the descriptions of authors, and he finds no observations of a more recent date than those of Gaertner and Jacquin; our evidence of its real structure is therefore imperfect, but enough is recorded to show that it is a very anomalous form, if it really belong to the *Myoporaceæ*. It is a large tree, 30 feet high, has a trunk 2 feet in diameter, with a large head of thick foliage; its leaves are always alternate, somewhat serrated, marked with transparent dots, and have an acrimonious taste. *Bontia* occurs in the West Indies, while all other species of *Myoporaceæ* are found in Australia, in Asia, or in the islands of the Pacific bordering on that continent.

The author next proceeded to indicate those points of structure in *Orycladus* which establish the relative value of its affinity to the *Myoporaceæ*, or the *Bignoniaceæ*. In this genus, both the branches and rudimentary leaves are distinctly opposite, as in *Bignoniaceæ*. in which family we find two other genera, where the branches terminate in spines, viz. *Catophractes* and *Rhigozum*: the flowers are bluish, a colour not met with in *Myoporaceæ*; they present a sterile fifth stamen, a circumstance almost constant in *Bignoniaceæ*, and never seen in *Myoporaceæ*; the anther-cells are distinct, and widely divaricated upon a large fleshy connective, as in *Bignoniaceæ*, not oscillatory, lunulate, and opening by a hippocrepiform fissure, and therefore almost one-celled, as in *Myoporaceæ*; the ovarium is seated upon a five-lobed fleshy disk, which never occurs in the latter family, though constant in *Bignoniaceæ*; it is completely bilocular, with about six ovules in each cell, suspended and attached by a ventral thread to a

distinct flat dissepiment, and arranged in three superimposed pairs upon its opposite faces, in two lines parallel with the axis, a structure which offers a marked character in the *Bignoniaceæ*, and unknown in the *Myoporaceæ*; of these twelve ovules, all become abortive, with the exception of one; the fruit is therefore 1-locular and monospermous, presenting an osseous nut, with four deep furrows in the apex, and divisible to the base along these striæ into four valves, two of these sutures being more easily separable, and always corresponding with the margin of the persistent dissepiment, which is pressed against one side, and which distinctly exhibits on both faces its several abortive ovules, the ripened seed filling the whole capacity of the nut. In *Myoporaceæ*, whether the nut be 4-celled, or by abortion 2-locular, the intervening space is always solid, and perfectly indehiscent, leaving small circular cells, surrounded by thick ligneous walls, without showing any marks of division; there is no analogy whatever between this structure and that of *Oxycladus*. The absence of the alary expansion of the testa, so common in *Bignoniaceæ*, is urged as a reason for excluding this genus from that family, but the argument is not valid, where as in *Oxycladus* only one of the ovules becomes impregnated, and where it is thus left at full liberty to acquire the size and shape of the whole space of the cell. The want of wings in the seeds occurs however in other *Bignoniaceous* plants; for instance in *Spathodea* of Palisot de Beauvois, from which all the species from the New World referred to that genus have been rightly separated by Chamisso under the name of *Dolichandra*. Mr. Miers has also found in Brazil another *Bignoniaceous* genus, *Adenocalymna*, the carpological characters of which are yet undescribed, which has a cylindrical, capsular, 2-celled fruit, containing several large, thick, angular seeds, attached by a large hilum to the broad dissepiment, and without wings. In *Argylia* the seeds are likewise apterous. The last consideration as regards *Oxycladus* is not the least important; its seeds are exalbuminous, as in *Bignoniaceæ*, whereas in those of the *Myoporaceæ* the embryo is always contained within albumen.

After the comparison of these several circumstances, the author is unable to perceive the existence of any marked affinity between *Oxycladus* and any genus of the *Myoporaceæ*, and therefore sees no reason to alter the conclusion at which he formerly arrived, that this genus, although deviating from the usual form of its fruit and seed, bears in every essential respect all the characteristic features of a member of the family of the *Bignoniaceæ*. It is not however in the singularity of the large fleshy cotyledons, or the wingless state of

the seed, that *Oxycladus* is remarkable, for Mr. Miers has shown that these occur in other genera of the *Bignoniaceæ*; its peculiarity consists in the development of only one of its many ovules, and in the shape of its cotyledons, which in most other instances are deeply cordate, or almost bipartite at each extremity, with the radicle placed between the lobes: in this genus, however, they are entire, oval, and plano-convex; in *Rhigozum* they are likewise fleshy, orbicular, and entire.

The limits of many genera of *Bignoniaceæ* appear, Mr. Miers adds, ill-defined, and the characters derivable from the seeds much neglected. Fenzl and DeCandolle have done much in extending our knowledge of the family, but the subject still requires farther investigation, for he has observed many singular deviations from recorded structure that have not yet been noticed. Should it be found desirable to class *Rhigozum* with *Oxycladus*, the character suggested for this tribe in his former paper would require modification. In that of the *Crescentiæ*, this name ought to be suppressed, and that of *Tanæciæ* substituted, with the same character there indicated: all the genera of this section of DeCandolle's *Prodromus* strictly coincide with the *Bignoniaceæ* in their completely 2-locular ovarium, and in the development of their ovules on the surface of the dissepiment, and they agree also with the genus *Bignonia* in the form of their embryo: *Crescentia* and *Kigelia*, however, present characters wholly at variance with the Order, because of their parietal placentation. He is not, however, persuaded of the propriety of establishing a separate order for these two genera, which has been done upon high authority, when they might so well form a good tribe of the *Cyrtandraceæ*. *Crescentia*, with its large amygdaloid embryo, does not differ more widely from the *Cyrtandraceæ*, than *Adenocalymna* does from *Bignonia*: in habit and in floral structure the two last-mentioned genera are scarcely distinguishable.

Read also Extracts from a Letter, addressed by Dr. Edward Vogel to Berthold Seemann, Esq., Ph.D., F.L.S.

Dr. Vogel, as is well known, is attached to the expedition dispatched by Her Majesty's government for the exploration of Central Africa. He quitted London on the 19th of February 1853, reached Tripoli in the beginning of March; and after a stay of several months, caused partly by the delays of his travelling companion, the brother of the Sheikh of Bornou, and partly by his own preparations, he started southwards towards the end of June, and after passing Benoulid and Soknu, reached Mourzouk on the 5th of August. On

the 15th of October he was to leave that place for Lake Tsad ; but previously he addressed, along with his official dispatches, various letters to his friends in Europe, treating of different branches of science ; and among these one to Dr. Seemann, dated " Mourzouk, October 8th, 1853," giving some account of the botanical features of the region between Tripoli and Mourzouk, from which the following extracts are taken :—

" There will shortly arrive at the Foreign Office in London a box containing amongst other things a collection of dried plants addressed to Mr. Robert Brown. The following will serve as a commentary on that collection ; and you will greatly oblige me by communicating it to that *savant*, and making known those parts which you consider fit for publication. The plants were chiefly collected in Fezzan, except a few on the coast of North Africa ; for I did not like to fill the paper I am able to carry with well-known things ; and, moreover, the numerous preparations for my journey left but little time for botanical pursuits during my stay at Tripoli. I was in hopes of making a rich harvest in the great valleys through which my route lay, about the 30th degree of north latitude ; but, contrary to expectation, all vegetation was dried up with the exception of a *Ruta*, which was to be met with in situations less exposed to the scorching rays of the African sun ; still, high bunches of withered Grasses, and fields covered with *Artemisias* and *Thymus*, gave evidence of what I might have collected if I had come three months earlier. The more I advanced towards the south, the more naked became the country, until at last, about Fezzan, nearly every vestige of wild plants had disappeared, save a shrubby *Tamarix* and a spinose *Papilionacea*, called *Agùl* by the Arabs, and used as fodder for the camels ; and the eye perceived, for days in succession, nothing but date palms, under which the drifting sand of the desert, the bane of vegetation, had accumulated to a considerable height, as if attempting to bury even these trees under its deadly mantle. In the gardens of the neighbourhood of Mourzouk the inhabitants cultivate with great care several kinds of grain and culinary vegetables. The seeds are sown in decomposed manure, with which the hard salty soil has previously been covered about 2 inches high. To irrigate a garden of about 100 square yards, one man has to work twelve hours, a labour for which he gets a fourth of the produce of the piece of ground he attends. During winter, *barley* and *wheat* are grown ; during the summer, *Gosub* and *Garfuli* ; of the latter two I have transmitted specimens, because they furnish the chief portion of the food of the inhabitants of the Sahara, and because there are

so many contradictory statements regarding their botanical name; indeed to such a degree do the accounts of travellers vary, that one calls them beans, another rice, while again a third party pronounces them to be millet. The "Garfuli mosri," so often mentioned by African travellers, is the Indian corn (*Zea Mays*), the spikes of which are gathered before they are quite ripe; and in that state they are toasted and eaten.

"To convey a notion of the poor return agriculture yields in this part of the world, I will state that the inhabitants surround *each* spike of the *Gosub* and *Garfuli abiad* with a neatly-made basket, in order to prevent the wild pigeons from picking the seeds.

"Among the few trees growing here, the finest is a *Cornus*, called *Kurno* by the Arabs; it attains a height of 80 feet, and a diameter of about 3 feet; the country about Sudan and Bornu is, I am informed, its true native land, and the 26th degree of north latitude appears to be its most northern range. A description, and additional information concerning this tree, will be found with the flowering specimens in my herbarium. The *Gum Acacia* will also be found in my collection; it enlivens and adorns the most stony sides of the valleys of the Wadi Scherzi and Cherbi. The specimen of the gum is very small; but there was some difficulty in procuring more, as all the trees growing near the road are generally well searched by the Arabs, who collect the gum as an article of food for themselves. I could never find the eating of gum-arabic much to my taste. Most of this article is brought by the Tuariks, and seems to grow between Dgerma and Ghat.

"According to Sir W. Hooker, in the Admiralty 'Manual of Scientific Inquiry' of 1851, the plant producing the senna of commerce is still unknown botanically. I collected it in Wadi Cherbi, near Dgerma, west of Mourzouk, where it grew wild under date palms; it is found in enormous masses in Ahir, to the south of this place; but it is now-a-days gathered in very small quantities, as senna-leaves, on account of their trifling value (half-a-crown the cwt.), are not sufficiently remunerative to bear the cost of the transport, and the 24 per cent. transit duty levied upon them here. I have also sent seeds of the Sudan cotton-plant, in case I should not go far enough west to collect them in their native country. In the materia medica of the Arabs, *Peganum Harmala*, vernacularly termed *Harmel*, occupies a prominent place. It is celebrated as a preventative against ophthalmia. For that purpose the immature seed-vessels are recommended; every Arab swallows in the spring of the year about a dozen of them, fancying that in doing so he will be exempt

from all diseases of the eyes. I have not been able to ascertain whether the sced-vessels purify the blood or act as a purgative. *Peganum Harmala* ranges from the north coast of this continent to Fezzan, and is very common; as is also the *Cucurbitacea*, known by the name of Colocynth, the fruits of which are eaten by the ostriches. This *Cucurbitacea* covers the valleys of the Black Mountains; in the Wadi Cherbi and Wadi Scherzi, the most fertile districts of Fezzan, it is a most troublesome weed. The Tibus are very fond of the seeds; they roast them in the manner the Germans occasionally do those of the pumpkin, after they have previously been soaked twelve hours in water to deprive them of their bitter taste. The fruit itself is used against urinary complaints and diseases of the sexual organs, which are very common in these parts; it is placed in a basin of milk, and after remaining in it about twelve hours, the fluid is drunk. *Ricinus communis* is common in the neighbourhood of Tripoli, and the oil of it might become an article of export, if they would only take the trouble of gathering the seeds. I met here, in Fezzan, an old acquaintance, in the shape of the sunflower (*Helianthus annuus*), which, growing to the height of about 9 feet, is the only ornament of the small cottage gardens; its seeds are eaten. I was also very glad to find *Tulipa sylvestris*, a great ornament of the Targona mountains. I have been unable to collect more than a single specimen; for although the plant occurs in the locality mentioned in enormous quantities, I arrived too early (end of March) to see it in flower. In my collection there are specimens of a plant resembling in foliage the thorn, and I have mentioned on the slip of paper accompanying it, that the bark of its root is used by the Arabs for tanning leather and dyeing red. (A small parcel of this drug is for Sir W. Hooker.) I have omitted to add, that the charcoal of this shrub is used in manufacturing gunpowder; for there are, it must be known, a great many secret powder-mills, especially in Benoulid, which manufacture an inferior sort of powder, sold for about two shillings the pound.

“After this digression I return to the theme I had in view in commencing this letter,—to give an account of the useful and cultivated plants of Fezzan. I will begin with the *date-palm*. All Fezzan and half of Tripolitania live upon it. Here every door, every post is made of date-palm wood; the ceilings of the rooms are of the stems of that tree, between which are laid the leaves of the palm, instead of the cane used by us. The poorer classes live in huts entirely made of date-palm leaves. Date-palms furnish the most common fuel (the poor people bringing a bundle of it on their backs to this

place from a distance of from six to eight miles, for which they get one piastre, *i. e.* 2*d.*). Dates are the food of both man and beast; camels, horses, dogs, all eat dates. Even the kernels of this fruit are soaked in water, and after having become soft, are given to the cattle*.

“On the sheet enclosed I have given figures and descriptions of thirty-eight varieties of the date-palm, from which it will be seen that this tree varies quite as much as our cherries and plums; in the tree itself, independent of the fruit, I have never been able to find a difference. Of the enormous numbers in which this palm occurs you can hardly form a conception. When Abdel Gelil besieged Soknu (1829), he felled all the date-palms he could, to compel the town to surrender, and his people cut down, during seven days, 43,000 trees; and yet there are still 70,000 to be found. Their produce is comparatively small;—100 full-grown trees yield about 40 cwts. of dates, worth at this place 30 shillings. In Tripoli the same quantity would fetch about four times that sum. The dates, after having been gathered, are dried in the sun, and when quite hard, buried in the sand. They may thus be preserved about two years; but after the first eighteen months they are attacked by the worms, and in the beginning of the third year nothing is left of them but the kernels. As an every-day food dates are considered very heating; and this is the reason why they are not much used on a journey, travellers being obliged to drink too often. They are most wholesome, and taste best, when made into dough with barley. When the heart of the leaves has been cut out, a sweet thickish fluid collects in that cavity, called *Lagbi*, which is very refreshing and slightly purgative. A few hours afterwards the fluid begins to ferment, becomes acid and very intoxicating. (The sap is not tapped, as Dr. Gumbrecht has stated in Wappäu’s ‘Handbuch der Geographie und Statistik,’ Band ii. p. 57, 7th edition.) From the ripe fruit a syrup is prepared, used especially for making leather-pipes oil-tight, and also for distilling a brandy called *arogi*.”

* There is no grass, nor any other herbage, except a little *Sassfah* (*Melilotus*), cultivated with almost as much care as the corn, and fetching on that account a good price; a bundle, about as much as one is able to hold in both hands, is sold for 2 piastres (4 pence). I was obliged to send my camels about 100 miles to the north, the nearest place where there is sufficient pasture for them. Here, about Mourzouk, there is nothing but sand and salt; the ninety gardens, outside of the town, cover together about a quarter of an English square mile. In the whole town of Mourzouk there are only two cows, one of which belongs to the pasha; there are no goats; sheep are brought from Wadi Scherzi, fifty miles distant. When we happen to have milk for our tea or coffee, we consider it a feast.

After giving many other details concerning the date-palm, Dr. Vogel proceeds thus:—"I have taken great care to note down the southern limits of the fruit-trees, and I will give you the result of my observations. In Tripoli there are oranges, lemons, pistachios, pomegranates, figs, St. John's bread, mulberries, peaches, apricots, almonds, olives, opuntias, and grapes in great abundance. Apples and pears are rather plentiful, but of poor flavour. The best varieties of pears degenerate in a very few years. Cherry-trees there are three; one of them stood in the garden in which my people were located, and I gathered from it six cherries. Melons and water-melons arrive at great perfection, and the latter I have seen weighing as much as 150 lbs. They are sown on the hard hills of the desert, and the young plants are protected from the sun by boughs; they require no artificial irrigation, the heavy dew being sufficient for their growth. Potatoes also succeed in Tripoli; the tubers are very large, and have a fine flavour. Chestnuts there are none. Of the above-mentioned fruits the following go as far south as Mourzouk (lat. $25^{\circ} 55'$), viz. pomegranates, figs, peaches, almonds and grapes. The vine succeeds extremely well on the shores of the natron lakes of Fezzan; the branches of this plant have very small leaves, and climb over pomegranates and fig-trees; the most common grapes are the black varieties; the white are scarce. A few apple-trees are found in Wadi Schati (about $26^{\circ} 30'$ N.L.), but their fruit is unfit for use. Oranges, lemons, pistachios, and St. John's bread do not go further than the Targona Mountains; they are confined to a district of about fifty miles from the coast. The olive-tree is not found beyond Benoulid, on the southern slope of the Targona Mountains ($31^{\circ} 44'$ N.L.), and at the same place is found the last *Opuntia vulgaris*. The mulberry-tree goes as far south as Soknu ($29^{\circ} 4'$), the apricot as far as Sebha ($27^{\circ} 3'$). A group of about fifty olive-trees is found, it is true, near the village of Abiad, in Wadi Cherbi (27° N.L.), but they bear no fruit. Cotton is seen here and there in gardens, commencing at Bondjem, (both *Gossypium arboreum* and *herbaceum*.) but the state of the soil does not admit of its being extensively cultivated. The vine is said to grow wild in Tripolitania, but that statement must be incorrect; I have never seen it except cultivated."

February 7.

Thomas Bell, Esq., President, in the Chair.

Mr. Edward Newman, F.L.S., exhibited specimens of *Ophioglossum Lusitanicum*, L., found in Guernsey, in a complete state of fructification, in January 1854, by Mr. Wolsey.

Read a "Note on the Elaters of *Trichia*." By Arthur Henfrey, Esq., F.R.S., F.L.S. &c.

After referring to observations by Hedwig, Kaulfuss and Corda, asserting the existence of spiral fibres in the filamentous elaters mixed with the spores of *Trichia*, and to those of M. Schleiden and of M. Schacht, by whom these spiral fibres are called in question, Mr. Henfrey states, that having examined the elaters of a species of *Trichia* (*Tr. serotina*, Schrad.?), in some specimens sent to the Society from New Zealand by Mr. Ralph, he is prepared to assert positively the existence in them of spiral fibres exactly analogous to those in *Marchantia polymorpha*. The number of fibres in an elater of this species of *Trichia* is three; in some species Corda describes a much greater number, but this Mr. Henfrey regards as open to doubt. The fibres thin off towards the very gradually attenuated ends of the tubular elaters, and apparently become confluent there, in the same manner as he has himself described in those of *Marchantia polymorpha* (Linn. Trans. vol. xxi. p. 107); but the ends are so fine, that even with a power of 1000 diameters and a good light, he could not clearly define the terminations of the fibres. The tubular character of the elaters was proved by a transverse section of certain curved filaments, which gave a circular form; and the spiral structure was clearly distinguishable with a power of 250 diameters; but in order to count the fibres, it was necessary to take out a few of the elaters, and to mount them in the thinnest possible film of liquid under very thin glass, and apply a magnifying power of 1000, when the individual fibres could be made out with quite sufficient clearness to allow of their being drawn with the *camera lucida*. These elaters, Mr. Henfrey observes, may be regarded as very good test-objects for the defining power of the higher object-glasses; or, perhaps—considering the confusing effect of the crossing nerves of the number of parallel spiral fibres—as test-

objects, by which to measure the value of observations on the more difficult tissues. Viewed in this light, he regards the conclusions on this subject drawn by M. Schleiden and by M. Schacht as indicating an inferiority in the microscopes used by those observers.

Read also, "Notes on the habits of *Medusæ* and of small Fishes." By Charles W. Peach, Esq. Communicated by Dr. Francis, F.L.S.

Mr. Peach's observations were made at Peterhead, N.B., in the beginning of August last, at which time *Cyanea aurita* and *Cyanea capillata* (or *C. inscripta* of Peron?) were so abundant in the harbour and bay as occasionally very much to inconvenience the fishermen, and render it difficult to lift the oars, especially of small boats, from amongst them. Round these *Medusæ* very small fishes were observed playing, sometimes sporting round *C. aurita*, and quitting it on a sudden for *C. inscripta* when an enemy came near. Occasionally two or three might be seen attending one of the *Cyanea*; and when attacked or alarmed, rushing under its umbrella and among the tentacula, so as to shelter themselves in the large folds connected with the ova, where they remained until the danger had passed, and then emerged again to sport and play around their sheltering friend. When under the umbrella seeking shelter, they lay so close as to allow themselves to be taken into a bucket with the *Medusa*, from beneath which after a short time they would come out and gambol as while in the sea. In this way Mr. Peach captured many young whittings, measuring from less than an inch to $2\frac{1}{2}$ inches in length. It was evident that they resorted to the *Medusæ* for protection, and not, as sometimes stated, that they are preyed upon by these glass-like creatures; and it is probably with a view to greater security that they prefer the stinging species, with its eight bunches of long tentacula and large fringed ovaries, to *Cyanea aurita*, with its single, and frequently short row of delicate appendages. What, then, Mr. Peach asks, becomes of the paralysing influence of the tentacles of this *Medusa* on fishes? This, he thinks, opens a new field for observation. He believes, too, that the facts which he has observed, if not conclusive against, at least throw considerable doubt on the fish-eating propensities ascribed to the *Medusæ*; for he is convinced that in these instances the fishes resorted to the *Medusæ* as to protectors, and not enemies. In no instance did he observe a fish in the stomach of the *Medusæ*, but all were free to depart when they pleased. The *Cyanea aurita*, he adds, is called at Peterhead "Loch Lobberton" and "Loch Robertson," and the other species "the Doctor." In an instance subsequently recorded in his journal,

Mr. Peach states that a small whiting, which was gliding round a small weak *Cyanea aurita*, was attacked by a young pollack, or "baddock," whose movements it easily evaded by dodging round the *Medusa*. A second baddock, however, soon joined in the pursuit; but both were for some time baffled, until an unlucky move drove the whiting from its poor shelter, and then a severe chase took place. The pursuers were joined by others, who followed like a pack of hounds, until the whiting became exhausted, and was left by its enemies, who were unable to swallow it, to all appearance dead. In this state the tide gently drifted it along with the *Cyanea*, until after a time it recovered, swam slowly to its protector, and took refuge as before. The pack soon observed it, drove it again into open water, and this time succeeded in really killing it. During their attack upon it, Mr. Peach repeatedly threw stones among them to induce them to desist; but so intent were they on the pursuit, that they dashed on unheedingly, although at any other time the smallest stone would have alarmed and driven them aside.

Read a "Notice on the Characters and Synonyms of the genus *Senna*." By M. J. B. Battka, of Prague. Communicated by G. Bentham, Esq., F.L.S.

The following are the characters by which M. Battka distinguishes the genus:—

SENNA, *Breyn. Prodr.* ii. p. 59; *Tourn. Inst.* p. 390; *Gærtn. Carp.* ii. p. 312. t. 146.

Calyx 5-sepalus. *Petala* 5, inæqualia. *Filamenta* longiora incurva. *Antheræ* 2-porosæ, 10, supremæ 3 steriles, infimæ 3 radiatæ. *Stigma* centrale. *Legumen* membranaceum, oblongum v. reniforme, latum, foliaceum, plano-compressum, bivalve, pluriloculare, dissepimentis transversalibus; loculis monospermis, non pulposis, ad sedes seminum torulosis. *Semina* albuminosa, rostellata, ad suturam superam leguminis hilo funiculis strictis longioribus affixa, testâ carnosâ, matura et siccata subcordata rugulosa v. scrobiculata, margine hilo et micropyle callosa, appendicula (loco deficientis plumulæ) lirello-cochleariformi ornata; cotyledones foliaceæ, trinerves; radícula recta; plumula nulla.

Under the head of "Petioli eglandulosi; foliola obliqua," M. Battka enumerates four species,—*S. obovata*, *S. acutifolia*, *S. angustifolia*, and *S. tomentosa*, of which he gives the following characters and synonymy:—

1. SENNA OBOVATA, foliis 3-6-jugis; foliolis obovatis vel retuso-obovatis mucronulatis basi angustioribus, stipulis petiolorum lanceolato-linearibus

bus, leguminibus arcuatis supra seminum sedem verticaliter interruptè cristatis.

Senna, *Math. Com.* 571; *Fuchs. Hist.* 447 (1542); *Dod. Pempt.* 360; *Trag. Hist. St.* 964; *Cam. Epit.* 538; *Lob. Adv.* 406; *Dalech. Lugd.* 218; *Burm. Ind.* tab. 33. fig. 2.

S. florentina, *Bauh. Hist.* p. 377 (excl. ram.); *Chabr. Sciag.* 81 et 611.

S. nostras, *Cæs. pl.* 6. c. 34. p. 249.

S. foliis obtusis, *Ger. Hist.* 1297. ic.

S. Espanol, *Solio, Diss. Mad.* 1774, c. ic.

S. Italica, *C. Bauh. Pin.* 397; *Park. Theat.* 225; *Tournef. Inst.* 618; *Ray, Hist.* 1742; *Sloane, Hist. Jam.* 2. p. 47; *Moris. Hist.* ii. p. 201. tab. 24. fig. 2; *Breyn. Prod.* 2. p. 90; *Tabern. Ic.* 903; *Cam. Hort.* m. 159; *Miller, Dict.* n. 2.

S. officinalis, *Gærtn. tab.* 146. fig. 4.

S. hermol, *C. B.*

Sené de Tripoli, *Pomet, Hist. d. Drogues, Uebersetz.* 1717, p. 180.

Cassia Senna, *Linn. Herb., Sp. Pl.* i. p. 539. no. 9; *Murr. App. Med.* 2. p. 502; *Willdenow, Sp. Pl.* ii. p. 520. no. 24; *Woodv. Mat. Med.* 446. t. 162 (excl. ram. fol.); *Lam. Dict.* p. 46, *Ill.* 3. t. 332. fig. 3 a, b, d et f; *Swartz, Obs.* 161; *Ait. Hort. Kew. edit.* 2. v. 3. p. 27; *Nocca, Inst.* 2. p. 3; *Persoon, Ench.* i. p. 457; *Galliz. Bot. Agr.* 2. p. 413; *Jacq. Eclog. Pl. Rar.* 87. tab. 87; *Forsk. in H. Lugd.*; *Delile, Flore d'Egypte*, f. 420; *Nectoux, Voyage d'Egypte*, t. i. p. 19; *Sieber, Herb. Ægyptiac.*

Cassia Senna β . italica, *Linn.*; *Nees, Düsseldf. Pflz.* t. 348 (excl. syn.); *Wagner, Ph. Med. Bot.* p. 149. t. 180.

C. foliis sejugis subovatis, *Linn. Syst.* p. 393; *Mat. Med.* p. 110.

C. obovata, *Collad.* p. 92. t. 15. f. A.; *Hayne*, xi. tab. 42 (excl. gland.); *Le Prieur et Perr. Fl. de Seneg.*; *Wallich, List*, no. 5319; *Th. Vogel, Syn.* p. 35; *Nees, Düsseldf. Pflz.* 347.

C. obovata et obtusata, *Bisch. Med. Ph. Bot.* p. 14; *DeCandolle, Prodr.* ii. p. 492.

C. obtusa, *Roxb. Fl. Ind.* 2. p. 344.

C. obtusata, *Hayne*, xi. tab. 43; *Th. Vogel, Syn. Gen. Cass.* p. 36 (sec. *Bisch.*).

Frutex habitat in desertis Ægypt. et Tripol., in Syriâ et Senegaliâ; folia Senna de Tripoli et Aleppo in commercio dicta, inter folia Sennæ Alexandrinæ admixta. Legumina nom. folliculorum Sennæ c. leguminibus S. acutifoliæ in commercio venduntur.

2. SENNA ACUTIFOLIA, foliis pinnatis 3-5-jugis sine et cum impari; foliis ovalibus lanceolato-acutis subæqualibus nervo medio piloso, stipulis linearibus subulatis pilosis, leguminibus lato-oblongis et reniformibus.

Cassia acutifolia, *Delile, Flore d'Egypte in Explic. des Planches*, ii. p. 213 (excl. *Icon.* tab. 27. fig. 1); *Rich. Bot. Med.* ii. p. 573.

C. orientalis, *Persoon, Syn. Pl.* p. 457 (excl. syn. *Forsk.*).

C. lanceolata, *Colladon*, p. 93. t. 15. fig. C (excl. descript.); *Hayne, Off.*

Gewächse, xi. t. 41 (excl. synonym.); *Nees, Düsseldf. Pflz., Consp.* 347 (excl. syn.); *DeCandolle, Prodr.* ii. p. 492 (excl. gland.); *Nectoux, Voy. d'Égypte*, p. 20. tab. 2.

C. alexandrina foliis acutioribus, *Math. Com.* 571. f. 2; *C. Bauhin, Pin.* 397; *Tournef. Inst.* 618; *Ray, Hist.* 1742; *Moris. Hist.* ii. p. 201. s. 2. t. 24. fig. 1; *Tabern. Krauterb.* iii. p. 220; *Breyn. Prodr.* 2. p. 89; *Miller, Dict.* n. 1.

C. Senna β , *Linn. Sp. Pl.*; *Mat. Med.* 200; *Murray, App. Med.* 2. p. 502; *Willdenow, Sp. Pl.* 2. p. 520; *Woodv. Mat. Med.* 446. t. 162 (excl. ram. fruct.); *Sennaar, Kotschy* (1840), in *Hb. Mus. Brit.* n. 315.

Sené de la Palte, *Pomet, Hist. d. Dr. Uebersetz.* (1717) p. 179.; *Diction. d. Dr.* 2. p. 545.

Frutex habitat in Ægypto et Sennaar.

Senna alexandrina et officinalis in commercio dicta.

3. *SENNA ANGUSTIFOLIA*, caule lævissimo, foliis pinnatis 5-7- subinde 9-jugis; foliolis angustè lanceolatis plerumque glaberrimis, stipulis subulatis, leguminibus lato oblongis rariùs incurvis, seminibus albidis rugulosis.

Cassia angustifolia, *Vahl, Symb.* i. p. 295; *Willden. Sp.* 2. p. 523. in *Herb. Berol.*

C. Senna, *Forskal in Herb. Mus. Brit.* (excl. descr. in *Fl. Ægypt. Arab.* p. 85. n. 58); a *Dom. Wallich missa ex Horto Bot. Calcuttæ, Hb. Schumach.*!

C. lanceolata, *Royle in Herb. Mus. Brit.*; *Illustr. Himal. Mount.* p. 186, 291. t. 37; *Wight, in Mus. Brit. Hb. Penins. Ind. Or.* no. 651; *Ehrenb. et Hempr. in Hb. Berol.*!

C. indica, *Schuhm. Plantelare*, t. i. p. 577.

C. elongata, *Lemaire Lisancourt, Dict. des Drogues.*

C. acutifolia, *Nees, Düsseldf. Pflz.* tab. 346 (excl. synonym. *Consp.*).

C. Ehrenbergi, *Bisch. Bot. Zeit.* 1844, col. 51 (excl. leg. sublineari).

Sené de Mokka (de la Pique), *Pomet (Uebers. 1717)*, p. 180.

Cassia ligustrinoides, *Schr. (sec. Vogel).*

Frutex habitat in Arabia, in Lohaja, Mocha, Yemen; et in India orient. (Agra), in Tinevelly et Calcutta colitur.

Senna de Mecca et orientalis in commercio dicta.

4. *SENNA TOMENTOSA*, foliis 5-6-7-jugis; foliolis ovato-oblongis plerumque parvis utrinque pubescentibus mucronulatis, stipulis hastatis, leguminibus adolescentibus nigris flavo-velutino-pubescentibus; suturâ superiori pilis setaceis ciliatâ, seminibus interdum lævibus setulosè pilosis.

Cassia pubescens, *R. Brown, in Salt. It. App.*

C. ovata, *Merat et Lens, Dict.*

C. acutifolia β , *Delile in Hb. Propr.*

C. obtusata, *Hochstetter et Steudel in Schimp. Pl. Arab.* no. 780.

C. pubescens et tomentosa, *Ehrenb. et Hempr. in Hb. Berol.*

C. holosericea, *Fresen. in Flora* 1839, p. 54.

C. æthiopica, *Guib. in Hist. d. Drogues*, 3 ed. iii. p. 219.

C. Schimper, *Steudel, Nomencl. Bot.* ed. 2.

C. cana, *Wender* (1837) *in Flora* 1841, p. 355.

Frutex habitat in Arabia et Nubia, foliis inter folia Sennæ Meccensis

(Yemen) ab auctore detecta et a clarr. Bové et Schimper in Arabia

(Dschedda) et a cl. Darnaud in Valle Dumrich (Nubiæ) collecta.

Sennæ de Mecca et rariùs Alexandrinæ in commercio admixta.

February 21.

Thomas Bell, Esq., President, in the Chair.

Mr. Joseph Robson was elected an Associate.

Read a "Note on the genus *Ancistrocladus* of Wallich." By G. H. K. Thwaites, Esq., Superintendent of the Botanic Garden of Peradenia, Ceylon. Communicated by J. D. Hooker, Esq., M.D., F.R.S., F.L.S. &c.

The author refers to the various positions which different authors, relying on the circumstance of the fruit of *Ancistrocladus* being surrounded by the enlarged segments of the calyx, have assigned to that genus, which has been successively placed in *Combretaceæ*, *Malpighiaceæ*, and *Dipterocarpeæ*; from all of which, however, it differs by its seeds being albuminous. An examination of the flowers and fruit in various stages of development has induced him to conclude that it will associate better with *Symploceæ*, with which it agrees in its undivided exstipulate leaves, its character of inflorescence, imbricate calyx and corolla, persistent calyx, stamens adhering to the base of the corolla, inferior ovary, albuminous seeds and cylindrical embryo; but from which it differs in its scandent habit, its calycine segments becoming enlarged, its solitary erect ovule, and the peculiar structure of its albumen. He notices a slight affinity to *Myristiceæ* and *Annonaceæ*, its young ovule calling to mind that of *Myristica*, and the embryo not being very dissimilar; while the scandent habit and uncinatè ramuli give it a considerable resemblance to *Artabotrys*. The following generic character has been drawn up from fresh specimens of *Ancistrocarpus Vahlîi*, Arn.,

and from the figure of *Anc. Heyneanus*, Wall., given in the last volume of Dr. Wight's 'Icones Plantarum Indiæ Orientalis':—

Genus SYMPLOCEIS *affine* ANCISTROCLADUS, Wall.; *Wormia*, Fahl;
Bigamea, Kær.

CHAR. GEN.—*Flores* hermaphroditi. *Calyx* tubo cum ovario connato; limbo 5-partito; laciniis oblongis, irregularibus, imbricatis, tribus majoribus, omnibus increscentibus, persistentibus. *Corollæ* petala 5, æqualia, concava, basi connexa. *Stamina* 5, imæ corollæ inserta, petalis alterna (in *Anc. Heyneano* stamina 10 in seriebus duabus); filamenta basi incrassata, monadelpha, apice cuspidata; antheræ adnatæ, biloculares, longitudinaliter dehiscentes, loculis basi divergentibus. *Ovarium* inferum, 1-loculare. *Ovulum* unicum, erectum, anatropum. *Stylus* subglobosus, persistens; stigmata 3, erecta, linearia, compressa, truncata, decidua. *Nux* coriacea, calycis laciniis coronata. *Semen* cerebriforme, erectum, testâ plicato-intricatâ albumen carnosum plicis suis involventi. *Embryo* orthotropus, clavatus; cotyledones subfoliacei, divergentes; radícula prope hilum posita.

Frutices *Iudici et Zeylanici, soboliferi, scandentes*; ramis *elongatis, terebintibus*; ramulis *brevibus, patentibus*; uncis *circinatis, sub nodis ramulorum positis, internodia terminantibus*; foliis *lanceolatis, utrinque angustatis, sessilibus, integerrimis, lævibus, penniveniis, densè reticulatis, in ramis distantibus, ad ramulorum apices aggregatis, vernatione convolutis*; inflorescentiâ *axillari, racemosâ*; racemis *plùs minùs ramosis*; pedunculis *angularibus, paucifloris*; floribus *alternis*; pedicellis *brevisimis, rachì articulatis*; bracteis *minutissimis*.

Ancistrocladus Vahlîi, Mr. Thwaites observes, is very abundant in some of the warmer districts of Ceylon, and is a very troublesome weed to the cultivators. The Cinghalese name is *Gonawel* or *Gonapittanwel*.

The paper was accompanied by magnified drawings of the parts of fructification.

Read also "Notes on some Ferns in the Wallichian Herbarium." By Thomas Moore, Esq., F.L.S. &c.

These notes are the result of an examination of the Ferns of the Wallichian herbarium, with the view in the first instance of determining the genus *Prionopteris* of Wallich, cited by both Presl and Fée, but evidently without any knowledge on the part of either of those botanists of the plant on which it was founded. *Prionopteris Farguhariana*, Wall. Cat. No. 184, was thus ascertained to be *Matonia pectinata*, R. Br. in Wall. Pl. Asiat. i. p. 16. t. 16, a name adopted by Dr. Wallich in his Catalogue at the bottom of page 23, where he

directs it to be substituted for *Prionopteris*. In the course of this examination, Mr. Moore further determined *Sphæropteris Hookeriana*, Wall. Cat. No. 775, in corrig. p. 248, to be the same with *Diacalpe aspidioides*, Blume; a genus distinguished from *Sphæropteris* by its sessile, not stipitate, sori, and which Mr. Moore refers to a section (*Woodsieæ*) of *Polypodicæ*, which connects that group with the *Cyathea*. Dr. Wallich compares it with *Davallia stipellata*, Wall. Cat. No. 260, which it resembles in general appearance, but the fructification is altogether different. *Davallia stipellata* was identified with *Acrophorus nodosus*, Presl, and doubtfully with *Monachosorum davallioides*, Kunze. This genus the author referred rather to *Aspidicæ* than *Davalliæ*, placing it with *Cystopteris* in a subsection of the former, which forms a connecting link with the latter through the genus *Microlepia*. In the view here proposed it would include most, if not all, of the species which have been referred to *Leucostegia*, as well as a fern described by Sir W. Hooker under the name of *Davallia Jamaicensis*. The species of the genus *Acrophorus* would consequently stand as follows:—

1. *Acr. nodosus*, Presl = *Aspidium nodosum*, Blume; *Davallia stipellata*, Wall.; *Davallia nodosa*, Hook.; *Monachosorum davallioides*, Kunze?

2. *Acr. immersus* = *Davallia immersa*, Wall.; *Leucostegia immersa*, Presl.

3. *Acr. chærophyllus* = *Davallia chærophylla*, Wall.; *D. ligulata*, Wall.; *D. pulchra*, Don, fide not. MS. in Herb. Soc. Linn.; *Leucostegia chærophylla*, L. *ligulata*, and L. *pulchra*, J. Smith.

4. *Acr. affinis* = *Leucostegia affinis*, J. Smith; *Davallia affinis*, Hook.

5. *Acr. hispidus* = *Davallia hispida*, Heward; *D. Novæ-Zelandiæ*, Colenso.

6. *Acr. membranulosus* = *Davallia membranulosa*, Wall.

7. *Acr. parvulus* = *Davallia parvula*, Wall.; *Leucostegia parvula*, J. Smith.

8. *Acr. Jamaicensis* = *Davallia Jamaicensis*, Hook.

March 7.

Thomas Bell, Esq., President, in the Chair.

Charles Darwin, Esq., and Samuel Anderson, Esq., were elected Fellows.

Mr. N. B. Ward, F.L.S., exhibited specimens of *Thuretia quercifolia*, *Hemitrema elegans*, and *Claudea elegans*, and two new species of reticulated *Algæ*, discovered in November 1853 in Belligam Bay, Ceylon, by Dr. W. H. Harvey; the one a new species of *Claudea*, *C. multifida*, Harv.; and the other, a new genus dedicated to the well-known natural-history publisher, under the name of *Vanvoorstia spectabilis*, Harvey.

Mr. Ward likewise exhibited a specimen of a new British *Alga*, *Desmarestia pinnatinervia*, Montagne, discovered by Mr. Sawers at Loch Foyle, about twenty miles below Londonderry, Ireland; and two species of *Trichomanes*, lately discovered in Alabama, United States, by T. M. Peters, Esq.; the one identical with *T. radicans*, the other a new muscoid species, dedicated to the discoverer (under the name of *T. Petersii*) by Dr. Asa Gray, who has recorded the discovery and given characters of the new species in the 'American Journal of Science and Art,' vol. xv. 2nd series, 1853.

Mr. S. Stevens, F.L.S., exhibited a portion of a large collection of insects lately received from Mr. R. Fortune, collected by him in Northern China, including many new and remarkable species; and called the attention of the Fellows present to the striking resemblance which many of them bore to species found in England, whilst others were of a totally different character and unlike those from any other country. He also exhibited a few beautiful *Lepidoptera* lately received from Natal, and collected by M. Gueinzus, some of the smaller moths closely resembling those found in England.

At the request of the Chairman, E. L. Layard, Esq. read a notice of the Timber Trees of Ceylon, prepared by Mendis Mohandiram, some account of which has recently appeared in the 'Colombo Observer'; and made numerous remarks on the list of trees and on the uses to which they are applied.

March 21.

Thomas Bell, Esq., President, in the Chair.

Frederick D. Dyster, Esq., M.D., and John Thomas Syme, Esq., were elected Fellows.

Mr. Ward, F.L.S., exhibited living specimens of *Gymnogramma leptophylla*, Desv., grown in one of his cases from mould taken from its native habitat in Jersey in September 1853; and observed that this plant, like the *Trichomanes*, attains a much greater luxuriance in a closed case than in its native situation, and lasts very much longer.

Mr. Adam White, F.L.S., exhibited a specimen, from the collection of Mr. Aspinall Turner, of *Hypocephalus armatus*, Desm., and made some observations on its structure and affinities.

Mr. Westwood, F.L.S., exhibited a small collection of insects of most of the different orders, collected at Darjeeling and in other parts of India by Capt. Slater of the Bengal Army. Among them he particularly noticed a rare species of *Paussidæ*, *Jumnos Ruckeri*, *Bombyx Huttoni* (the moth which produces the new kind of Indian silk), *Epicipera* sp. (a moth having all the appearance of a species of *Papilio*), an apparently new species of *Papilio* resembling the genus *Euplea*, &c.

Read a paper "On the genus *Myrmica* and other Ants." By John Curtis, Esq., F.L.S. &c.

After referring to the more important published works on the subject of Ants, such as those of Latreille, Nylander and Fœrster; and to the difficulties attending the study of this family on account of the different phases under which each species appears, Mr. Curtis proceeds to enumerate the British species of *Myrmica*, *Stenamma* and *Myrmecina*, and to describe and figure some English *Myrmicæ*, which are either new or imperfectly known. He commences by dividing the British *Formicidæ* as follows:—

A. with a single scale upon the petiole.

Palpi 6- and 4-jointed.

Mandibles of female elongated 1. *Formica*, Linn.

Mandibles of female triangular 2. *Ponera*, Latr.

B. with two nodules on the petiole.

Superior wings with the apical cell elongate and open.

Palpi 6- and 4-jointed 3. *Myrmica*, Latr.

Palpi 4- and 3-jointed 4. *Stenamma*, Westw.

Superior wings with the terminal cell

closed, oval and pedicled 5. *Myrmecina*, Curt.

He next gives detailed characters of the genus *Myrmica*, under which he enumerates the following species:—

1. *Myrmica rubra* = *Formica rubra*, *L.*; *M. scabrinodis*, *Nyl.*, var.

2. *M. lævinodis*, *Nyl.*

3. *M. vagans* = *Formica vagans*, *Fabr.*; *M. ruginodis*, *Nyl.*

4. *M. LONGISCAPUS*, *Curt.*, a new species which resembles *M. lævinodis*, but the males are much smaller, the antennæ are much longer, and instead of the scape being only as long as the two basal joints of the flagellum (as in *M. lævinodis* and *M. rubra*), it is equal in length to the eight following joints. Other differences are also pointed out and figured. The species was first found in Perthshire, and Mr. Curtis has since received specimens collected in the neighbourhood of Manchester by Mr. R. Wood.

5. *M. PERELEGANS*, *Curt.*, another new species, of which the male, female, and neuter are figured, and of which a detailed description is also given. It was found by Mr. Curtis near Bournemouth in Hampshire, in July 1850, and seems to approach the *Formica subterranea* of Latreille, but the neuter has the upper surface of the head black, and the first nodule has not a long petiole, as described and represented in all Latreille's figures; the male has not very pale yellow legs; nor the female a brown, very shining thorax, with a brown petiole. It may be related to *F. acervorum*, *Fabr.*, but that species is described as having the back of the thorax black.

6. *M. acervorum* = *F. acervorum*, *Fabr.*; *M. lacteipennis*, *Zett.*

7. *M. DENTICORNIS*, *Curt.*, found by Mr. Curtis in Scotland in July 1825, and no doubt allied to *M. lobicornis*, *Nyl.*, but having the tooth in the knee at the base of the scape in the neuter much less developed, and other differences in the rugosity and striation of the head, thorax and nodules. Of this species the male and neuter are also figured.

8. *M. cæspitum* = *F. cæspitum*, *L.*; *M. fuscula*, *Nyl.*; *M. impura*, *Færst.* var.; and *M. modesta*, *Færst.*?

9. *M. tuberum* = *F. tuberum*, *Fabr.*; *F. tuberosa*, *Latr.*

10. *M. simillima*, *Nyl.* MSS.

11. *M. graminicola* = *F. graminicola*, *Latr.*

12. *M. unifasciata* = *F. unifasciata*, *Latr.*

13. *M. domestica*, Shuck.

Under the genus *Stenammas*, Westw., Mr. Curtis enumerates two species :—

14. *St. Westwoodii*, Steph., of the male of which he gives a description, together with a figure of the wing.

15. *ST. ALBIPENNIS*, Curt., a new species discovered by himself near Dover in July 1852, which is described in detail.

The genus *Myrmecina*, Curt., is limited to a single species :—

16. *M. Latreillii*, Curt., of which the male and female are described at length, and the latter figured, with details of the several parts.

In conclusion Mr. Curtis expunges from the list of British insects *Formica pubescens*, Latr., and *F. emarginata*, Oliv., admitted on doubtful authority ; and *F. cognata*, Steph., which is not to be found in Mr. Stephens's cabinet, now in the British Museum.

Read also some "Notes on the Habits of the common Garden Ant, *Formica nigra*, L." By George Daniell, Esq. Communicated by the Secretary.

This ant infests in large numbers Mr. Daniell's garden at Chobham. Stragglers appear in the greenhouse about the middle of February, and they had this season become numerous by the 5th of March : as the weather becomes warmer they spread themselves all over the garden. In fine weather they bring forth their white pupæ and spread them in little heaps in the sun by the side of a turf, stone, or garden-pot ; not unfrequently forming their dwellings in the bottom of the flower-pots among the roots of the plants. As the summer advances they even extend their colonies into the meadows, and form small round hillocks among the grass. They are very pugnacious and defiant, and do not hesitate to attack flies, gnats, and even bees. A number of them were on one occasion seen clustering round a honey-bee, and on being struck off with the finger-nail, they returned to the charge in the most fearless and daring manner, and eventually dragged off the bee. Last year, when the vines were much infested with the *scale*, or *Coccus Vitis*, L., thousands of ants clustered on the trunks of the vines, apparently feeding on the black excrement voided by this pest. In the same manner they feed around the green *Aphides*, which more particularly infest the *Calceolarias*. Not only the cast skins of the *Aphides*, but the insects themselves, are carried off by the ants. The *Aphides* appear to be comparatively safe while buried beneath the long hairs of the *Calceolarias*, and other similar plants ; but the ants evidently make great efforts to dislodge

them, while the *Aphides* parry the attack with their legs. On shaking the plants and dislodging some of the *Aphides*, the latter were immediately set upon by the ants below, which first broke their legs and stripped them of their wings, and then carried them off. The winged female ants are seen in June, not however using their wings much in flight, but quivering and shaking them as they walk along, each accompanied by several workers.

April 4.

Thomas Bell, Esq., President, in the Chair.

J. J. Stainton, Esq., was elected a Fellow, and Mr. Charles M^rIntosh an Associate.

Mr. Ward, F.L.S., exhibited specimens of *Gentiana verna*, L., recently received from its new locality at Galway; and also of *Andromeda tetragona*, L.; both of which had flowered on open peaty banks in his garden at Clapham Rise.

Read a paper entitled "Remarks relative to the Affinities and Analogies of Natural Objects, more particularly of *Hypocephalus*, a genus of *Coleoptera*." By John Curtis, Esq., F.L.S. &c.

Mr. Curtis commences his paper by a reference to the numerous attempts made of late years to establish a perfectly natural system, which, he believes, will never be attained. In our progress towards the establishment of such a system, we are sure to find disturbing forces, producing aberrant types of form, which, like discordant notes in music, will not chime in anywhere; and to this description of animals belongs the anomalous beetle, exhibited by Mr. Adam White at the last meeting of the Society, which resembles so many individual members of different families, yet agreeing with none, that it has from its first discovery been a subject of speculation, in which M. Desmarest, Dr. Gistel, Dr. Burmeister, M. Guérin-Ménéville, and Mr. Westwood have taken part. M. Desmarest considered it as allied to the *Silphidæ*, and Dr. Burmeister and Mr. Westwood are agreed that it is related to the *Cerambycidæ*; but after a careful investigation Mr. Curtis is constrained to believe that it is

more nearly allied to the *Lamellicornes*. With the view of showing this to be the case, he contrasts the leading characters of the *Lamellicornes* and *Longicornes*, and particularly compares the genus *Hypocephalus* with those members of both families to which it offers either affinity or analogy, and in particular with *Cyrtognathus*, with which Mr. A. White had especially associated it. He admits that there is a very considerable analogy between *Hypocephalus* and *Cyrtognathus*; but observes that if we look to the antennæ of the latter having 12, instead of 11 joints, to their great length and relative proportions, as well as to the situation, form, and magnitude of the eyes, the size and figure of the thorax, the scutel, sternum, and elytra; having wings for flight; to the long sprawling legs, neither robust nor truly 5-jointed, to the long simple tibiæ, the dilated and bilobed and spongiöse tarsi, it is impossible to allow that there is any affinity: *Cyrtognathus* is a Longicorn, *Hypocephalus* is not. The author then gives a detailed description of *Hypocephalus armatus*, Desm.?, observing at the same time that there are so many differences between M. Desmarest's figure and Mr. Turner's specimen, examined by him, that they are, in all probability, if not distinct, of different sexes. From the peculiarities of its structure Mr. Curtis proceeds to deduce the probable habits of the insect, of which little is known from actual observation; and concludes by some further observations on its proper place in the system. In the course of these remarks he maintains the great importance of the tarsal system of Geoffroy, as adopted by Latreille, as a basis for the primary divisions of the *Coleoptera*, and explains the nature of the exceptions which occur in several groups to the general type of development in this particular. He particularly alludes to the supposition that the so-called *Tetramera* are really pentamerous; but maintains that the portion considered as a fourth or extra joint, even when articulated, is not the analogue of the fourth joint of the *Pentamera*, but merely a head or fulcrum at the base of the terminal joint, which is rendered necessary from the third joint being bilobed and cushioned beneath. He does not, however, insist that *Hypocephalus* is a Lamellicorn; all his claims for it are based on its being truly pentamerous, which draws it nearer to the *Lucanidæ* than it can possibly be attracted to the *Cerambycidæ* by any less important character. He begged, however, that he might not be misunderstood as wishing to detract from the value of the structure of the mouth in the formation of systems, for although it may be subject to great modifications, and depart from the typical forms like the changes in the tarsi, such anomalies are perhaps confined to the

minuter members of a family, and a comparison of the trophi is unquestionably of the greatest importance in arriving at the true affinities of insects.

The paper was accompanied by drawings of *Hypocephalus* and its details, and also of the details of *Cyrtognathus*.

April 18.

William Yarrell, Esq., Vice-President, in the Chair.

Charles Spence Bate, Esq., and Isaac Byerley, Esq., were elected Fellows.

Read a letter from Robert Wakefield, Esq., F.L.S., to John Curtis, Esq., F.L.S., "On some of the Habits of Ants."

In this letter Mr. Wakefield relates some observations, made by himself many years ago, with reference to that curious insect called by Horace "*magni Formica laboris*." Most modern writers, he observes, including Huber, have relinquished the old idea that Ants amass grain for their winter store; but he states that he has seen the black species (*Formica nigra*, L.?) for days and nights together industriously occupied in dragging to its cells the seeds of the common violet (*Viola odorata*, L.). He first noticed this fact on the 3rd of July, 1832; and he regards it as a subject of curious inquiry for what purpose, if not for their own future provision, they could accumulate these stores? Could they be intended as food for the *Aphides* during winter? That they work all night has long been known; Pliny says only during the full moon, but Mr. Wakefield observed them at work at midnight on two successive nights, the 6th and 7th of June, in rainy weather and without any reference to the full moon. The late Mr. Joshua Milne, F.L.S., was summoned by a neighbour one morning in February to see a colony of red ants, which he had turned up while digging in his garden; and mixed with the ants Mr. Milne saw many living *Aphides*, and also some vegetable substance on which they had probably subsisted during the winter. Many observers have noticed ants caressing *Aphides* during the summer; but Mr. Wakefield had never before

met with any one who had seen them together during their winter retreat.

In confirmation of the storing up of food for winter provision by some species of Ant, Mr. Adam White, F.L.S., referred to Colonel Sykes's Observations on the Storing Ant of Poonah, the *Atta providens*, described and figured in the 'Transactions of the Entomological Society;' and to a Monograph of the East Indian Ants by Mr. Jerdon, published first in the 'Asiatic Journal,' and subsequently in the 'Magazine of Natural History.'

Mr. Adam White, F.L.S., also exhibited the type-specimen of a fine Prionidous Beetle (*Baladeva Walkeri*), described by Mr. Waterhouse, from the collection of the late Sir Patrick Walker, and closely related to *Dorysthenes rostratus*, Vig., the type-specimen of which, described by Fabricius under the name of *Cyrtognathus rostratus*, from the cabinet of Sir Joseph Banks, forms part of the collection presented to the Linnean Society by that distinguished patron of science. Mr. White regretted that he had been unable to attend the last meeting of the Society, at which Mr. Curtis's paper on *Hypocephalus* was read. He thought, however, that Mr. Curtis laid too great stress on the tarsal system, which Mr. W. S. MacLeay had shown to be very weak when used alone as a leading character, a fact of which Latreille himself was well aware. He stated that having for years studied Longicorn Beetles, he could not fail to be struck, the first time he saw the specimen of *Hypocephalus*, with the correctness of Dr. Burmeister's determination, and with Mr. Westwood's observations on its Longicorn character. To Mr. Curtis's observation that it was pentamerous, he replied that the *Parandridæ* are all so, and yet are essentially Longicorn in type; that *Trictenotoma* of Mr. G. R. Gray, of which four species are now recorded, is heteromerous, and is even sublamellicorn in its antennæ; that insects, and indeed animals generally, which are fossorial or internal feeders, or aquatic, are often in external characters wonderfully similar to genera in totally different groups, and have (what are often deemed) essential characters of the group so adapted and changed as to be quite altered in external appearance. Of these modifications he gave several instances both in vertebrated and articulated animals; and in particular directed attention to such Longicorn *Coleoptera* as *Erichsoniä*, *Thaumasus* (regarded by Olivier as a species of *Ips*), *Torneutes*, *Cantharocnemis*, *Sipylus*, and *Anoploderma* of Guérin, and a pentamerous Australian genus (*Dorx pentamera*), known to him only by Mr. Newman's description.

Mr. White next proceeded to exhibit a small but valuable collec-

tion of Thibetan Coleopterous Insects, made by Dr. T. Thomson, F.L.S., which he proposes hereafter to make the subject of a paper. He remarked on the Mediterranean character of these denizens of an Alpine plateau, such as exists at Iskardo, where they were collected; and in reference to the destruction of species, drew attention to the remarkable genus *Deucalion*, a Longicorn insect discovered on barren rocks near Madeira by Mr. Wollaston, F.L.S., which will shortly be published in Mr. Wollaston's work on the Coleoptera of Madeira.

May 2.

Thomas Bell, Esq., President, in the Chair.

Professor P. J. van Beneden, James D. Dana, A.M., Professor André Marie Constant Duméril, Professor Karl Anton Meyer, Professor Friedrich Anton Wilhelm Miquel, and M. Jean François Camille Montagne, were elected Foreign Members.

The necessary business of the Meeting having been disposed of, the President proposed that, in consequence of the recent death of Nathaniel Wallich, Esq., M.D., one of the Vice-Presidents of the Society, and in consideration of his long connexion with, and eminent services to the Society and to natural history, the Society should adjourn, which was unanimously agreed to.

Anniversary Meeting.

May 24.

Thomas Bell, Esq., President, in the Chair.

This day, the Anniversary of the birth of Linnæus, and that appointed by the Charter for the Election of the Council and Officers, the President opened the business of the Meeting with the following Address:—

GENTLEMEN,

It has long appeared to me that the character of our Anniversary Meetings, the monotony of which has generally been broken only by the sad though interesting obituary, which has always been so ably drawn up by our talented and estimable Secretary, might be rendered more attractive, and, perhaps, more useful, by a brief account of the progress which the interval between the two annual periods has witnessed in those departments of science, the cultivation of which is the great object of the Linnean Society. This, it was my particular desire to have done upon the present occasion; but circumstances to which I need not particularly refer, have prevented me from doing any justice to so large and difficult a task. Should I, however, again have the honour of receiving your suffrages, and be re-elected your President, I shall hope to be able to lay before you at a future anniversary, some such report as that to which I have alluded. It is certainly useful as well as pleasant to stand still, as it were, from time to time and mark the discoveries and improvements which have attended our progress; and, in our own case particularly, to watch the results of the influence which this Society *ought* at least to exercise, and doubtless *does* exercise upon the advancement and diffusion of natural knowledge. It is true that this is in some measure obtainable by the perusal of the publications of the Society, which give the history of our own doings; but there is still wanting some more extended outline, including the discoveries of naturalists of other countries, which might not only give much interesting information, and point out many subjects for our own study or investigation, but cheer and excite us to further exertion, by the stimulus of a generous emulation.

Whilst, however, I have been prevented from fulfilling the task which I had proposed to myself, there are some circumstances connected with the Society which may afford room for a few observa-

tions from me, and thus occupy a portion of the time which must elapse before the result of the ballot is declared.

The past year, Gentlemen, has been to us a painfully eventful one. The number of distinguished men who have been removed from us by death is unusually large; and it is remarkable that whilst on the 7th of last month there had been but *four* deaths on our list, by that day three weeks the number was doubled, by the loss of four of our very distinguished Fellows. The names of Aikin, and Jameson, and Newport, and Stokes, and Wallich need but to be mentioned to show the extent of our loss. It is not my intention to infringe upon the customary task which Mr. Bennett always performs so admirably, but I should not be acting in consonance with your feelings, nor doing justice to my own, were I wholly to omit the expression of my deep and sincere grief, in which I am sure you all sympathize, at the removal from amongst us of so many who were endeared to us not only by a community of pursuit and a congeniality of taste, but by their social qualities, and the frequent reciprocation of kindly feelings and of words and acts of friendship.

I cannot avoid a few passing words expressive of my esteem for some of these lamented friends. My venerable and respected friend Arthur Aikin was, for a period approaching forty years, I believe, my colleague as a lecturer at Guy's Hospital; and was probably, at his retirement from the chair of Chemistry at that school, the oldest lecturer, excepting perhaps myself, in any of the hospitals of the metropolis. Although I was not thrown in the way of any particular intimacy with him, I saw enough of his peculiar simplicity of heart, amiability of temper, and high honourable principle, as well as his extensive information and clearness of understanding, to make me esteem and respect him highly. Besides, who is there, that has now numbered so many years as to have received the education of his childhood half a century ago, that does not recollect with the liveliest pleasure the names of Charles and Arthur, the little heroes of the delightful children's books, written by the father and the aunt, Dr. Aikin and Mrs. Barbauld; and with these reminiscences, who does not feel an additional interest in the consideration that the venerable octogenarian, who has so lately been taken from us, was the identical little Arthur whose name is associated with these early and pleasant teachings?

Of George Newport I would fain say a few words here. I need not advert to his numerous and invaluable publications; they are known to you all, and to every physiologist in Europe. His dis-

coveries in the minute anatomy of Insects, and in the physiology of generation as observed in the Amphibia, are of the first importance, and are acknowledged as such wherever these subjects are known and investigated. These are matters which I may well leave; nor shall I encroach upon Mr. Bennett's province by speaking of the events of his life. But there is one point in his character on which I am anxious to dwell for a few moments, and on which few are able to speak so decidedly as myself. I had known him from the very commencement of his career. It was during the time that I was occupied in lecturing on Comparative Anatomy at Guy's Hospital, that I first met Newport at the house of a mutual friend, and that some of his earliest papers on Insect Anatomy were shown to me. I was even then delighted with their evident accuracy, the elaborate minuteness of detail as well as the beauty of the illustrations with which they were accompanied. I mention these circumstances only to show that I had known and estimated him from a very early period. It happened that I had from that time very frequent communication with him, and latterly, some of his most important papers passed through my hands as Secretary of the Royal Society; and I had also the opportunity of witnessing many of his experiments. Gentlemen, it has been said that his temper was peculiar, and even that he was scarcely fair in acknowledging the merits of those who laboured in the same field with himself. I cannot hesitate to deny in general terms the latter accusation, and to modify the former by the assurance that it was in great measure from the want of knowing him thoroughly, and allowing for and yielding to his peculiarities, that he so often came into painful collision with his fellow-naturalists. I had occasion frequently to differ from him: I never hesitated to tell him frankly of what I considered his faults, and to point out errors and suggest alterations in his papers. I will not say that he always followed the proffered advice, although he has done so even against his existing opinion; but he always received the suggestion in the most friendly manner, and I never had a moment's misunderstanding with him. He loved and followed science for her own sake; and if occasionally he appeared somewhat tenacious of his opinions and over-anxious for his own fame, surely this was pardonable in one who gave up all for the pursuit of knowledge, depriving himself without a murmur of even the most common comforts, that he might devote himself the more unreservedly to the one noble object of his life. He worked for knowledge, and perhaps for fame; but he never prostituted science to gain, nor mingled ignoble motives with his pursuits. I was de-

sirous to say thus much of one whom I really esteemed, and whose loss, as a profound and ardent investigator of nature, I sincerely deplore.

Of Mr. Charles Stokes, as a man of the most varied and extensive information, of fine and highly cultivated taste, of the most sincere, and warm, and kindly feelings, of unflinching integrity,—as the universal favourite of all who knew him, from the philosopher to the child,—I can tell you nothing that would not be far better told by Mr. Bennett. I cannot wholly pass over without a few words, the loss of our estimable Vice-President Dr. Wallich. Here too I shall leave the history of his life and labours to better hands. As a thoroughly true-hearted man, as a warm and sincere friend, as a man of great intelligence and learning, he was well known to you all; and I feel that, as a Society, we have sustained a severe loss by the death of a Vice-President, who was always ready, as long as his health enabled him to act for us, to afford us the advantage of his great experience, his counsel and support.

But, Gentlemen, if we have to grieve at the inroads which death has made amongst the most distinguished of our Fellows, there is another side of the picture for our contemplation, to which we may turn for some degree at least of compensating satisfaction. The accession of Fellows during the past year has been more than usually numerous, and amongst those who have recently joined us, are several rising naturalists whom we may expect to follow worthily in the steps of those whose labours are now over. I am sure I may be permitted to congratulate the Society on the accession to our list of one honoured name, of whom we may well be proud; and it is no disparagement to others, if I particularize Mr. Charles Darwin, the philosophic traveller, the acute observer, the accomplished and learned naturalist, and the author, amongst other inestimable works, of one of the most complete Monographies that has ever appeared on any group in the animal kingdom. It was principally on account of Mr. Darwin's Monograph of the *Cirripedes* that the Royal Society awarded to him the Royal Medal of last year, and I trust that we may hope for contributions to our Transactions from the same pen.

On the Foreign list we have lost a large number, six out of fifty, and some of these are venerable names. In selecting their successors the Society has been able to choose men in no wise, I trust, their inferiors.

The name of the veteran *Duméril* stands at the head of the list of Zoologists who have been chosen by us on the recent occasion. This venerable naturalist has now been prominently before the sci-

entific world, as an accurate and learned systematic zoologist and anatomist, for more than half a century. His numerous reports on various branches of natural history, contained in the *Comptes Rendus*, show the variety and extent of his studies; but, as an original writer, he is best known to the world by his valuable works on Erpetology; for there is scarcely a group of the Reptilia and Amphibia that has not been illustrated by his pen. His most important work is the 'General History of Reptilia,' the last volume of which (the 8th) is now in the press. During the greater part of its progress it was the joint production of himself and my lamented friend Bibron, who was cut off in the prime of life and in the midst of a most promising scientific career, before the work was completed. After a period of twenty years, during which time it has been in progress, it has at last been brought to a conclusion, and must be acknowledged as one of the most complete systematic works that has ever appeared, and worthy to take its place by the side of the 'History of Crustacea' by our distinguished foreign member Dr. Milne-Edwards, which forms one of the same important series of Monographs. It will, I am sure, be a very agreeable and cheering event, at his advanced age, to receive the compliment which has been paid him by the Linnean Society.

Van Beneden, the learned Professor of Louvain, is well known as one of the most original and successful physiological observers of the present day. At a time like the present, when the subjects of Embryology and early development, and the changes which take place during the first periods of life, have occupied the attention of physiologists to an unprecedented extent, the works of Van Beneden have been appreciated as amongst the most important contributions to this branch of science. His papers have usually been published in the Transactions of the Brussels Academy of Sciences, and have treated principally of the anatomy and physiology of *Mollusca*, of *Entozoa*, and of *Polypes*. In the first of these classes his researches into the anatomy of *Dreissena* led him to the knowledge of the true relations of this curious genus and its proper place amongst the *Mytilidæ*. In the *Gasteropoda* his dissection of *Helix Algira* enabled him to clear up some curious points in the anatomy of the pulmoniferous group of this class, and led him to assign a distinct subgeneric character to this species; and in the same group, the early evolution of the nervous system was more fully exhibited than had before been done, in a paper on the anatomy of the common *Limax griseus*. The *Pteropoda* also early engaged his attention, and his examination of *Pneumodermon* enabled him to ascertain that

in some parts of its structure it approximates to certain of the Annelides. A very beautiful and interesting fact was also observed by this author in his examination of the development of *Aplysia*. This is, the existence of a nautiliform shell, with an operculum perfectly closing the mouth of the shell, and adherent to a part which becomes the foot of the animal,—a very interesting proof that the real affinities of Mollusca must be studied in their embryogeny. But the discoveries by which he is perhaps best known and most distinguished, are those on the impregnation and development of different forms of Polypes. In these researches many important points in the physiology of these animals are established, and there is a great degree of originality and ingenuity displayed in the manner in which they were conducted and the results deduced. The bisexual character of *Alcyonella*, the occurrence of distinct male and female organisms on the same polypary,—the nature of the former proved by its containing true zoosperms,—the existence of a circulation and of a distinct nervous system in the same polype, its independent, and isolated, and free condition in the early stage of its life, are all facts of great interest in the history of this tribe of animals. I need only further refer to his researches on *Campanularia*, which give the clearest exposition of a distinct metamorphosis in the transition from the form, organization, aspect and habits of the Medusæ to the subsequent condition of the Polype. I need not allude to the important bearing of these facts upon the question of embryonic transformation, so remarkably illustrated in other forms by the researches of Sars, of Lovén, of Dalyell, of Steenstrup, of Huxley, and many others. I must just glance at one more of this excellent observer's demonstrations. In a paper on certain cestoid worms, he shows that this form is nothing more than an early, but not the earliest, condition of the *Trematoda*; that, in fact, the *Tetrarhynchi* are *Scolex* on their first evolution, *Tetrarhynchi* in their second stage, *Bothriocephali* in the third, and finally *Trematoda*; and in the same group he has shown, by his observations on the development of *Linguatula* (*Pentastoma*, Rudolphi), that by its embryology it is nearly related to the *Lernæadæ*, and thus removed from the Helminthoid group, with which it had been previously associated.

In recommending to the Society the American traveller and naturalist *James Dana*, the Council were determined by numerous and valuable works which have evinced a very extensive acquaintance with systematic zoology, as well as with physical geography in its relations to animal life. On the temperature limiting the distribu-

tion of Corals, on the structure and classification of Zoophytes, and particularly an elaborate and admirable work on the classification and geographical distribution of the Crustacea; these and many other subjects in natural history have been ably treated by this gentleman, and, together with his numerous works on mineralogy and on descriptive and physical geology, exhibit the results of great labour and talent.

*Dr. Miguel**, one of the distinguished botanists recently elected on the foreign list, has been for some years the Professor of Botany and Director of the Botanic Garden at Amsterdam; and both there, and previously at Leyden, has been very active in the cultivation of systematic botany. He has worked out with great labour and care some very difficult tribes, especially the *Piperitæ*, of which he published a general Monograph in 1843, besides several preparatory and subsequent supplementary papers in German and English journals. He has also illustrated the Figs in a considerable number of detached papers, particularly a synopsis of them in Hooker's Journal. The Floras of Surinam and of the Dutch East Indian possessions have also been illustrated by him. Amongst his papers on these subjects may be mentioned "Commentarii Phytographici," "Stirpes Surinamenses," and "Analecta Botanica Indica." He also wrote the *Urticeæ* and *Piperitææ* for Martius's 'Flora Brasiliensis,' and papers in various journals, German, French, Dutch, and English.

Dr. Carl Anton Meyer was first known as a botanical traveller in the Russian dominions, either alone or in company with Ledebour or Bunge, and his earliest works were systematic descriptions, or enumerations of the plants collected, or floras of the localities investigated. These were chiefly an enumeration of the Caucasio-Caspian plants, from the eastern extremity of the chain of the Caucasus and the provinces bordering on the Caspian Sea. A great part of Ledebour's 'Flora Altaica' was also from his pen, and a supplementary enumeration of plants from the same parts. He afterwards became attached for many years to the Imperial Academy of Sciences of St. Petersburg, and ultimately succeeded Dr. Fischer as Director of the Imperial Botanic Garden. He has during this period published several monographies in the Petersburg Transactions, on *Ephedra*, on *Thymeleæ*, on *Cerium*, &c. I may be permitted here to notice, as a very propitious and agreeable circumstance, that at a time when the political world is surcharged with

* For the sketches of the labours of the three Botanical Foreign Members, the President is indebted to Mr. Bentham and the Rev. M. J. Berkeley.

the desire of war and desolation, and the great empire of eastern Europe is actually awaiting the onset of our fleets and armies; when the feelings of these two great nations are excited to the highest degree of hostility against each other, two of the principal scientific societies of this country, the Royal Society and our own, have each selected for the honour of being placed on the list of its foreign members, a professor attached to the principal scientific institutions of our great political enemy. The Royal Society has just elected the celebrated physiologist Von Baer, and we have conferred the same honour on Carl Anton Meyer. Thus it should always be. Science should know no hostility, national or personal; and well may he, whose mind is devoted to the love and investigation of nature, find reflected in his own heart the pure and holy harmony which characterizes all the objects of his study and regard.

Dr. Jean François Camille Montagne, who is by birth a Parisian, in very early life entered into the French navy, and was with Napoleon in the expedition to Egypt at the close of the last century, in the capacity of "Timonnier." He did not, however, remain long in the navy, but qualified himself as army surgeon, so as to be with the army at Boulogne at the time of the threatened invasion of England. His original literary tastes tended to philology, in which he made considerable progress, but gradually, in the course of his travels with the French army and subsequent captivity, he acquired a love of natural history which has never deserted him, and which is as lively now that he has passed his seventieth year as it was on its first conception. On his return to Paris after the peace, he found that France was dependent on other nations for all information about the *Cryptogamic* collections brought home by her numerous expeditions, and in consequence he devoted himself to that especial branch of botany, and for many years was almost the only person in his native country who followed it with any success. And at the present time, when numerous admirable Cryptogamists have arisen in France, in great measure in consequence of the example of Dr. Montagne, there is not one who surpasses him in the knowledge of species, or in botanical literature, for which his intimate acquaintance with many foreign languages gives him great facilities. His works are far too numerous to mention, and though the greater part are devoted to descriptive botany, they are by no means confined to it; and he was perhaps the very first to recognise the true structure of the hymenium of the higher Fungi, on which the present advanced state of Mycology mainly depends.

I have to apologize, Gentlemen, for occupying so much of your

time by what can only be considered a poor substitute for an anniversary address; yet I cannot conclude without adverting, which I do with the greatest satisfaction, to an event of recent occurrence which must prove of the utmost interest and advantage to botanists, —I allude to the transmission to Kew of the splendid herbaria and library of Mr. Bentham, and their unreserved donation to the country. It is, I believe, about forty years since this collection was commenced, and it would be impertinent in me to pretend to appreciate the value of forty years' labour of such a man as Mr. Bentham; but I am assured by those who are well acquainted with this collection, and are fully competent to its appreciation, that its value and importance can scarcely be overrated. In this place it would be a work of supererogation, and in me it would be highly presumptuous, to dwell upon the merits of Mr. Bentham as one of the first of existing botanists;—as one, in fact, who adds to an almost unexampled systematic knowledge of plants, a profound acquaintance with their structure and affinities. I will only add, that the circumstance of Mr. Bentham's having taken up his residence at Kew, is an event that must be most gratifying to the botanists of this country; and especially as his magnificent donation, to which I have alluded, will, I understand, be made fully available to their use. I cannot offer a more propitious and grateful close to my address, than this record of an act of munificent generosity, such as is rarely indeed witnessed during the life of the donor.

The Secretary then read the following notices of those Members with whose decease the Society had become acquainted since the last Anniversary.

Arthur Aikin, Esq., was born at Warrington in Lancashire on the 19th of May, 1773. He was the eldest son of John Aikin, M.D., long and honourably distinguished in the world of letters; and the grandson of John Aikin, D.D., eminent for his learning and abilities, Divinity Tutor of Warrington Academy, then the institution for higher instruction in most repute among the Presbyterian Dissenters. The celebrated Mrs. Barbauld was his aunt. In Arthur, the family vocation declared itself from infancy: in his seventh year his father entered him at the excellent free-school of his native town, where he made a rapid progress, and the start thus gained was never lost. He derived from his father, together with an ardent love of literature, ancient and modern, a taste for zoology, for English botany, and for chemistry; and a visit at the age of 12, in the house of Dr. Priestley, then pursuing at Birmingham his brilliant course of che-

mical discovery, confirmed him in his predilection for the last-named science. His destination was early fixed for the ministry: after some years passed under the tuition of Mr. and Mrs. Barbauld, he became a student of the New College, Hackney, and a favourite pupil, in their respective lines, of Gilbert Wakefield, and of Priestley, who delighted him by claiming his assistance in the arrangement of his new laboratory. For nearly two years Mr. Aikin was the minister of a highly respectable congregation at Shrewsbury; but at the end of that time (from motives which did him nothing but honour) he relinquished the clerical profession. He made several tours in North Wales, of one of which, undertaken in 1796 in company with his brother Charles and another friend, he published an interesting and instructive account, under the title of 'Journal of a Tour through North Wales and Part of Shropshire, with Observations in Mineralogy and other branches of Natural History,' Lond. 1797, 8vo. Henceforward his home was in London, and for many years in the house of his brother, the late Mr. Charles Rochemont Aikin, in conjunction with whom he delivered Lectures on Chemistry and Chemical Manufactures, of which a 'Syllabus' appeared in 1799, and published 'A Dictionary of Chemistry and Mineralogy,' Lond. 1807, 2 vols. 4to; and 'An Account of the most recent Discoveries in Chemistry and Mineralogy,' Lond. 1814, 4to.

About the year 1814 Mr. Aikin became one of the Secretaries of the Geological Society, then newly established, and of which he was an original member; and published 'A Manual of Mineralogy,' Lond. 1814, 8vo, of which a second edition was called for in the following year. In 1817 he was elected Secretary of the Society of Arts, which office he continued to hold until 1839; and during this period (chiefly in the years 1828-38) he delivered to the Society a series of "Illustrations of Arts and Manufactures," a selection from which he collected into a volume published in 1841. He was also active in the formation of the Chemical Society, of which he became President during the years 1843 and 1844, being the third and fourth years of its existence. The last office which he retained was that of Lecturer on Chemistry at Guy's Hospital, which he resigned in 1852, after holding it for more than thirty years. Through a long career, he preserved, without the smallest deviation, "the even tenour of his way." To an extraordinary variety, extent and accuracy of knowledge, both theoretical and practical, he united a total absence of ambition, simple and courteous manners, an imperturbable temper, and great benevolence of heart. He never engaged in a controversy, and never made an enemy. His election into the Linnean

Society dates from 1818; and there is a short communication from him noticed at p. 507 of the fifteenth volume of our Transactions. He died at his residence in Bloomsbury Square on the 15th of April in the present year.

The Right Hon. John Cust, Earl Brownlow, D.C.L., F.R.S. &c., was born on the 19th of August 1779; educated at Trinity College, Cambridge, where he took the degree of M.A. in 1801; and created D.C.L. at Oxford in 1834. He became, in 1802, one of the Members for the borough of Clitheroe, which he continued to represent until he succeeded his father in the Peerage as Baron Brownlow in 1807. In 1809 he was appointed Lord Lieutenant of the County of Lincoln, and in 1815 he was advanced to the dignity of an Earl. His Lordship was thrice married, first to Sophia, daughter of Sir Abraham Hume, Bart.; through whose relationship to the Bridgewater family, his eldest son, the late Lord Alford, came into possession of the great estates of the Earl of Bridgewater, which have lately, by a decision of the House of Lords, been confirmed to his grandson, the present Earl. Earl Brownlow was a liberal and intelligent patron of literature and science: he became a Fellow of the Linnean Society in 1828, and of the Royal Society in 1838; and presided with much cordiality at the Meeting of the Archæological Institute, held at Lincoln in 1848. He died at his seat, Belton House, near Grantham, on the 15th of September last, in the 75th year of his age.

Frederick Thomas Henry Foster, Esq., was the son of Lady Elizabeth Foster, daughter of the fourth Earl of Bristol and afterwards Duchess of Devonshire, by her first husband, John Thomas Foster, Esq., of Stonehouse, in the county of Louth. He was elected into the Linnean Society in 1813, and was also a Fellow of the Horticultural Society. His death took place at his house in Pall Mall on the 29th of last June, at the age of 75; and his library, which was extensive, and contained many curious and valuable works, has since been dispersed by public auction.

Robert Jameson, Esq., Professor of Natural History in the University of Edinburgh, was the third son of Thomas Jameson, and was born at Leith on the 11th of July 1774. At the usual age he was sent to the Grammar School, but evinced no particular love for letters, while he gratified thus early his taste for natural history, by collecting such animals and plants as could be found on the beach at Leith and in the neighbourhood. He entered the Humanity-class in 1788, but the love of adventure and the desire of studying nature had induced in him so strong an inclination for the life of a mariner,

that his father had actually yielded a reluctant consent to his going to sea, when some friends interfered and prevailed upon him to relinquish his wishes and to become the apprentice of Mr. Cheyne, a surgeon in his native town. In 1792 and the following year he attended the lectures of Dr. Walker, then Professor of Natural History in Edinburgh, and a man deservedly respected for the extent of his knowledge, the soundness of his views, and the benevolence of his character. With him young Jameson soon became a favourite pupil, and was shortly afterwards entrusted with the care of the Museum. Occasionally too he accompanied the Professor on dredging excursions down the Frith of Forth, and his note-book shows that on these trips they were often successful in obtaining zoological treasures. During this period he commenced the study of Botany; and gave the first evidence of his mineralogical proficiency in an "Essay on Gems," communicated to his friend Dr. Anderson's periodical entitled 'The Bee.' In the year 1793 he paid his first visit to London, where he was kindly received by Sir Joseph Banks, and other leading naturalists. On his return to Leith he seems to have altogether abandoned the practice of Medicine, although he still continued to study Anatomy under John Bell, and Comparative Anatomy in conjunction with Charles (afterwards Sir Charles) Bell. He also paid much attention to the study of Ornithology and Entomology; and became intimately acquainted with Dr. Rotheram, Dr. Black's assistant, through whom he added to his chemical knowledge a large amount of mineralogical information, and from whom he perhaps acquired the intense desire to visit the mines of Germany, which he was soon after enabled to gratify. His father, in the mean time, entered fully into his views, assigned him a suitable room for a laboratory, and supplied him with the necessary apparatus and with assistants in conducting his experiments.

In 1794 he resided for three months in the Shetland Islands, zealously occupied in exploring their geology, mineralogy, zoology and botany; and in 1797 he visited the Isle of Arran with the same view. The result of these tours was given in his first separate work, entitled 'An Outline of the Mineralogy of the Shetland Islands and of the Island of Arran, with Dissertations on Peat, Kelp, and Coal.' He next, in company with Charles Bell, paid a visit to the Hebrides and Western Islands in the summer of 1798; in 1799 he investigated the Orkneys; and in 1800 he again turned his steps to the Isle of Arran. His 'Mineralogy of the Scottish Isles,' in 2 vols. 4to, records the observations made during these several excursions. In 1800, his long-projected visit to Freyberg was at last paid, and he remained

there for nearly two years, studying Mineralogy and Geology under the famous Werner, not merely in the lecture-room, but in the mines themselves; where, clothed in the miners' dress, and going through the same routine duty with them, he acquired much practical knowledge. The state of his father's health recalled him to Scotland, although it appears to have been his full intention to have again returned to Freyberg; but on the death of Dr. Walker, in 1804, he was appointed Professor of Natural History, and his residence became thenceforth fixed in Edinburgh. In the same year he published the first part of a 'Mineralogical Description of Scotland,' which, however, was not extended beyond the county of Dumfries. In 1808 he founded the Wernerian Natural History Society, of which he was elected Perpetual President; and to its "Memoirs" he became a frequent contributor. His 'Elements of Geognosy' were published in the following year, and first introduced into England in their full extent a knowledge of the doctrines of the Wernerian school. The first edition of his 'System of Mineralogy, comprehending Oryctognosy, Geognosy, Mineralogical Chemistry, Mineralogical Geography, and Economical Mineralogy,' appeared in 1808; and a second edition, much enlarged and improved, in 3 vols. 8vo, was issued in 1816.

Such are some of the principal separate contributions of Professor Jameson to Natural History, and especially to Mineralogy and Geology. But these give only a faint idea of the extent of his multifarious labours. 'The Edinburgh Philosophical Journal,' commenced in 1819, and for the first six years conducted by him in conjunction with Dr. (now Sir David) Brewster, but afterwards continued under his sole editorship, constitutes an invaluable repository of scientific information, and contains numerous original articles as well as a multitude of translations and notices furnished by himself. In the 'Memoirs of the Wernerian Society,' in 'Nicholson's Journal,' in Thomson's 'Annals of Philosophy,' and in Napier's edition of the 'Encyclopædia Britannica,' are many papers contributed by him, and not confined to his more immediate subject, but embracing also Meteorology, Mechanics, and Zoology, both recent and fossil. A translation of Cuvier's celebrated 'Discourse on the Theory of the Earth,' which in a short time ran through five impressions of six thousand copies; some excellent articles on the Physical Geography of Africa and India, in the 'Edinburgh Cabinet Library,' and an edition of Wilson's 'American Ornithology,' revised and scientifically arranged to serve as a text-book in schools and universities, gave variety and relief to his more important labours. And these

extensive literary undertakings were carried on while engaged in the delivery of two courses of lectures in each year, which were attended by many of the most distinguished naturalists of the present century; for it is no small part of the praise of Professor Jameson that so many of his pupils have since risen to high distinction. During all this period, too, he was busily engaged in the formation of a very large collection in the several branches of Natural History, containing, it is stated, nearly 40,000 specimens of rocks and minerals geographically arranged; 10,000 specimens of fossils; 800 specimens of skeletons and crania; 8000 birds; 900 fishes and reptiles; many thousand insects, &c., together with a fine collection of drawings, casts, models, geological and geographical maps, and instruments for surveying. This museum, in which all the specimens were arranged and placed by his own hands, forms a highly appropriate memorial of the practical character of the man.

After having filled the Chair of Natural History for half a century, he died at his residence in the Royal Circus on the 19th of April in the present year; and to show their sense of his distinguished merits the citizens of Edinburgh awarded him a public funeral, which took place on the 28th of last month, and was attended by the Members of all the literary, artistic, antiquarian and scientific societies in Edinburgh, the different medical colleges, the Senatus Academicus, the Lord Provost, Magistrates and Council of the City. He was a member of a great number of scientific bodies, both at home and abroad; and joined the Linnean Society as early as 1797, being at the time of his death the fourth in seniority on the list of our Fellows.

George Newport, Esq., F.R.S., F.R.C.S. &c., was born on the 14th of February 1803, in the city of Canterbury, where his father carried on the business of a wheelwright, to which he was himself apprenticed at the age of 14. From an early period he began to devote his leisure hours to the study of Natural History; and in 1825 he became a Member of the Canterbury Philosophical Society, and delivered several short Courses of Lectures before the members on Mechanics and on Entomology. On the opening of the Society's new building in 1826, he was elected Curator, and held that office for about two years; at the expiration of which period his increasing desire for enlarging his knowledge of natural history rendering him anxious to attach himself to a profession in which this taste could be fully indulged, he was apprenticed to Mr. Weekes, a surgeon at Sandwich. After leaving Sandwich he became a Student at University College, London, in which he attended the Medical Classes,

still, however, continuing to devote the whole of his leisure time to the study of nature, and especially of Insect-physiology. In 1832 appeared his first contribution to the 'Philosophical Transactions,' consisting of a memoir "On the Nervous System of the *Sphinx Ligustri*, and the changes which it undergoes during a part of the Metamorphoses of the Insect." For this paper, prepared under circumstances of great disadvantage, and with very imperfect means of observation, he obtained the Royal Medal; and this success stimulated him to renewed exertions in a career in which he became greatly distinguished. After becoming a Member of the College of Surgeons in 1835, he was appointed, through the influence of Dr. (now Sir John) Forbes, House-Surgeon to the Chichester Infirmary, on quitting which he entered into general practice at the West-End of London; but his heart was wholly in his scientific pursuits, and after a few years he resigned the practice of his profession, and depended almost entirely on a pension of £100 a year from the Civil List. He became a Fellow of the Royal Society in 1846, and of the Linnean in 1847; and his time was constantly occupied in researches into the more abstruse points of Animal Anatomy and Physiology, the results of which he communicated chiefly in papers read before those Societies, and before the Entomological Society, of which he was for two years (1844-1845) President. In his researches he was peculiarly remarkable for the sagacity with which he planned his course of observations, the extreme neatness and ingenuity of his contrivances, his ready manipulation, the minuteness of his dissections, and an acquired dexterity in drawing either with the right hand or with the left, which gave him great advantages in microscopical delineations. As an observer it is astonishing how much he accomplished in his earlier days with optical means of a very imperfect kind, and how little he found to correct in these observations when supplied with the best modern instruments. By these, however, he was enabled to enlarge the field of his observations, and to make great advances towards the solution of various problems of high physiological interest, more especially in relation to the reproduction of lost parts, and the impregnation and development of the ovum in vertebrated animals. It was while engaged in searching in the marshy grounds near Shepherd's Bush for his annual supply of frogs and other amphibious animals, with a view to the farther prosecution of his researches on the last-named subject, that he caught a severe cold, terminating in fever, of the effects of which he died at his residence in Cambridge Street, on the 7th of last month, and in the fifty-second year of his age. The following is a list of his papers in the Philo-

sophical and Linnean Transactions, and in those of the Entomological Society :—

1. On the Nervous System of the *Sphinx Ligustri*, and the changes which it undergoes during a part of the Metamorphoses of the Insect. *Phil. Trans.* 1832, p. 383.

2. On the Nervous System of *Sphinx Ligustri* (Part 2) during the later stages of its Pupa and its Imago State; and on the means by which its development is effected. *Phil. Trans.* 1834, p. 389.

3. On the Respiration of Insects. *Phil. Trans.* 1836, p. 529.

4. On the Temperature of Insects, and its connexion with the Functions of Respiration and Circulation in this Class of Invertebrated Animals. *Phil. Trans.* 1837, p. 259.

5. On the Organs of Reproduction and the Development of the *Myriapoda* (1st Series). On the Structure, Relations and Development of the Nervous and Circulatory Systems, and on the Existence of a complete Circulation of the Blood in Vessels in *Myriapoda* and *Macrourous Crustacea*. *Phil. Trans.* 1841, p. 99.

6. On the Reproduction of Lost Parts in *Myriapoda* and *Insecta*. *Phil. Trans.* 1844, p. 283.

7. On the Impregnation of the Ovum in *Amphibia* (1st Series). *Phil. Trans.* 1851, p. 169.

8. On the Impregnation of the Ovum in *Amphibia* (2nd Series revised), and on the Direct Agency of the Spermatozoon. *Phil. Trans.* 1853, p. 233.

9. Monograph of the Class *Myriapoda*, Order *Chilopoda*, with Observations on the General Arrangement of the *Articulata*. *Linn. Trans.* xix. p. 265, and p. 349.

10. On the Anatomy and Affinities of *Pteronarcys regalis*, Newm.; with a Postscript containing Descriptions of some American *Perlida*, together with Notes on their Habits. *Linn. Trans.* xx. p. 425.

11. On the Aqueous Vapour expelled from Bee-hives. *Linn. Trans.* xx. p. 277.

12. Note on the Generation of *Aphides*. *Linn. Trans.* xx. p. 281.

13. On the Natural History, Anatomy and Development of the Oil-Beetle (*Meloë*), more especially of *Meloë cicatricosus*, Leach.—First Memoir: The Natural History of *Meloë*. *Linn. Trans.* xx. p. 297.—Second Memoir: The History and General Anatomy of *Meloë*, and its Affinities, compared with those of *Strepsiptera* and *Anoplura*, with reference to the connexion which exists between Structure, Function and Instinct. *Linn. Trans.* xx. p. 321.

14. The Anatomy and Development of certain *Chalcididae* and

Ichneumonidæ, compared with their Special Economy and Instincts ; with Descriptions of a new genus and species of Bee-Parasites. *Linn. Trans.* xxi. p. 61.

15. Further Observations on the Genus *Anthophorabia*. *Linn. Trans.* xxi. p. 79.

16. The Anatomy, &c. (continued). *Linn. Trans.* xxi. p. 85.

17. Further Observations on the Habits of *Monodontomerus* ; with some Account of a new *Acarus* (*Heteropus ventricosus*), a Parasite in the Nests of *Anthophora retusa*. *Linn. Trans.* xxi. p. 95.

18. On the Ocelli in the Genus *Anthophorabia*. *Linn. Trans.* xxi. p. 161.

19. The Natural History, Anatomy and Development of *Meloë*.—Third Memoir : The External Anatomy of *Meloë* in its relation to the Laws of Development. *Linn. Trans.* xxi. p. 167.

20. On the predaceous Habits of the Common Wasp, *Vespa vulgaris*, L. *Ent. Trans.* i. p. 228.

21. On the Habits and Structure of the Nests of gregarious *Hymenoptera*, particularly those of the Hive-Bee and Hornet. *Ent. Trans.* iii. p. 183.

22. On the habits of *Megachile centuncularis*. *Ent. Trans.* iv. p. 1.

23. On the means by which the Honey-Bee finds its way back to the Hive. *Ent. Trans.* iv. p. 57.

He was also author of a Prize Essay (proposed in conjunction by the Entomological Society of London and the Agricultural Association of Saffron Walden) entitled " Observations on the Anatomy, Habits and Economy of *Athalia centifoliæ*, the Saw-fly of the Turnip, and on the means which have been adopted for the prevention of its ravages." Lond. 8vo. 1838 ; as well as of the article " Insects," and several other important contributions in the ' Cyclopædia of Anatomy and Physiology.'

Charles Stokes, Esq., F.R.S., F.G.S., &c., was an eminent Member of the Stock Exchange, and carried into all his pursuits the same clear head and the same sound judgment which distinguished him in the more practical business of life. His leisure hours were devoted with equal energy and success to the cultivation of a taste for the fine arts, and to the study of various branches of natural science. In the former, music, painting and sculpture, each claimed a large share of his attention. An intimate friend of the late Sir Francis Chantrey, by whom he was appointed one of his executors ; an ardent admirer of Turner, of whose original drawings he had collected a large and valuable series ; an early and intelligent patron of lithography, while

yet a new and untried art in England; a zealous encourager of improvements in the microscope; the possessor of a valuable cabinet of coins, remarkable especially for its illustrations of the various phases of the government of France from the commencement of the Revolution in 1789 to the second establishment of the empire under Louis Napoleon in 1851; his good taste, his extensive acquirements, and the ready kindness with which both his knowledge and his collections were imparted to others, gained him universal affection and respect. His natural-history collections were extended into various departments, and were as remarkable as his artistic and numismatic for choice and well-selected specimens; of these the most important were those of zoophytes and of fossil woods, the latter in particular containing many beautiful and instructive illustrations both of structural peculiarities and of the process of fossilization. On the last-named subject he published in the 'Transactions of the Geological Society' a valuable paper, entitled "Notice respecting a piece of Recent Wood, partly petrified by carbonate of lime, with some remarks on Fossil Woods," in which his views of the progressive steps in the process of petrification are detailed; while another paper in the same Transactions, "On some Species of Orthocerata," characterized like the former by much novel and minute information, and by a powerful and original turn of thought, laid the foundation for all those curious researches concerning Orthoceratites by which Palæontology has of late years been so greatly enriched.

The Linnean Society are indebted to him for the communication of a letter from Mr. M^c Arthur, "On the Discovery of Milk in the Mammæ of the *Ornithorhynchus*," a notice of which is inserted in the seventeenth volume of our 'Transactions.' He became a Fellow of the Royal Society in 1821, and of the Linnean Society in 1808; and died at his residence in Gray's Inn on the 28th of December last, at the age of 70, leaving a void among the large circle of his friends which can never be supplied. The extent of his knowledge in various departments of natural science would be very imperfectly measured by his published writings; and his interest in everything relating to them continued, notwithstanding his sufferings from a painful disease, unabated to the last. His varied acquirements, his conversational powers, his thorough benevolence of heart, united as they were with fine taste in matters of art, and clear judgment upon all subjects, formed a combination of talents and accomplishments too rare not to be highly appreciated in the possession and deeply lamented in the loss.

Charles Baring Wall, Esq., the son of Charles Wall, Esq., by

Harriet, daughter of Sir Francis Baring, Bart., was a member of Christchurch, Oxford, where he graduated, B.A. in 1818, and M.A. in 1821. In 1819 he became M.P. for Guildford, and in successive Parliaments represented that town, Wareham, Weymouth and Salisbury. He was possessed of much good sense and sound practical views, and took great interest in all subjects connected with art. For many years he was a Director of the British Institution, and he was generally placed on all committees of the House of Commons in which the interests of art were concerned. He became a Fellow of the Royal Society in 1830, and of the Linnean Society in 1831; and died at his family-seat, Norman-Court, near Stockbridge, Hants, on the 14th of October last, at the age of 58.

Nathaniel Wallich, Doctor of Medicine and Philosophy, F.R.S. Lond. and Edinb., and one of the Vice-Presidents of the Linnean Society, was born at Copenhagen on the 28th of January 1786. He commenced his botanical studies under the direction of Professor Vahl, and went to India in the year 1807, at the age of one-and-twenty, in the capacity of surgeon to the Danish settlement at Serampore. Immediately on his arrival in Bengal he became acquainted with Dr. Roxburgh, then Superintendent of the Company's Botanic Garden at Calcutta, by whose friendship he continued to benefit until 1812, when the state of his health obliged him to proceed to the Mauritius. About a year after his return to India from this excursion, he received a commission in the medical service of the East India Company; and on the departure for England of Dr. Buchanan Hamilton, in the beginning of 1815, he was nominated to the temporary charge of the Calcutta Garden, which appointment was subsequently permanently confirmed on the recommendations of Dr. Fleming, Mr. Colebrooke and Sir Joseph Banks. At this time the Botanic Garden had been in existence nearly thirty years; during which period, by the combined exertions of Colonel Kyd, its founder, and of Dr. Roxburgh, it had become one of the finest establishments of the kind in existence; and the unwearied energy of Dr. Wallich during the thirteen years that elapsed before his first return to Europe, not only added enormously to the extent of its collections, both living and preserved, but enabled it to transmit to Europe and America, for distribution among all the more important public and private gardens, a vast and quite unprecedented amount of plants and seeds. In 1820, Dr. Carey commenced at Serampore the publication of Dr. Roxburgh's manuscript 'Flora Indica,' and to this volume, as well as to a second, which succeeded it in 1824, Dr. Wallich contributed numerous "Descrip-

tions of Plants more recently discovered," which greatly enhanced the value of the work. In the mean time Dr. Wallich had been deputed in 1820 on a botanical excursion to Nepal, which lasted till the beginning of 1822, and in the course of which he made very extensive collections of plants, a large proportion of which were entirely new, and sets of which were immediately transmitted with great liberality to several of the principal herbaria in London and elsewhere. A severe fever, caught on his descent to the plains, which he had in vain endeavoured to root out by a cruise at the head of the Bay of Bengal, confined him to his bed for two months, and compelled him to seek benefit from a voyage to Penang, Singapore, and some other places in the Straits of Malacca, from which, after an absence of five months, he returned on the last day of the year 1822, with renovated health and rich botanical collections. In 1824 he commenced the publication of a selection from his Nepal collections, under the title of "*Tentamen Floræ Nepalensis Illustratæ*," of which two numbers, each consisting of 25 plates, were issued. These plates were the botanical firstfruits of the new art of lithography in India, and both drawings and lithographs were executed by native artists under Dr. Wallich's superintendence. In the following year he was deputed by the Government to inspect the timber forests of the Western Provinces, and availed himself of this favourable opportunity to examine and collect the plants of the kingdom of Oude, the province of Rohilcund, the valley of Deyra, &c.; and in the two succeeding years, 1826 and 1827, he accompanied a mission from the Indian Government to the Court of Ava, visited the mountains in the neighbourhood of that capital, and proceeded afterwards to the newly-acquired territories on the coasts of Martaban and Tenasserim, in all of which he made most extensive collections. Such were the principal excursions in which Dr. Wallich was himself personally engaged up to the close of the year 1827; but the resources liberally placed at his command by the Government enabled him still further to increase the immense stores which he had thus accumulated. More than three hundred persons were employed in the Botanic Garden itself, and collectors connected with it were stationed in various parts of India, such as Sylhet, Nepal, Kamaon, Penang, &c. The zeal and liberality of many private individuals also contributed much to its enrichment; inso-much that the number of indigenous plants (as well as those of foreign origin) in the Garden was largely increased, and the herbarium was ultimately extended to upwards of 8000 species. From this collection specimens were frequently transmitted to the prin-

cial herbaria in Europe, and many of the more important novelties were published in various works. Dr. Wallich's health had now, however, become so much impaired by repeated attacks of illness that it was deemed indispensable that he should visit Europe for his recovery; and he arrived in England in the year 1828 with the great bulk of his collections. Here, instead of converting his leave of absence into a period of leisure, he immediately obtained permission of the Directors of the East India Company to proceed to the distribution of his duplicate specimens, together with those of the other herbaria of Continental India in their possession; and after these duplicates had been most liberally distributed among all the great public establishments and principal private herbaria throughout the world, the type-collection, containing a complete series of all the species, was munificently presented by the Court of Directors, on the recommendation of Dr. Wallich, to the Linnean Society, of whose museum it forms a most valuable and important part. During the period of this laborious and absorbing occupation, Dr. Wallich also found time to commence and bring to a conclusion his '*Plantæ Asiaticæ Rariores*,' Lond. 1830-2, 3 vols. folio, consisting of no less than 300 beautifully executed coloured plates, selected chiefly from a collection of 1200 drawings, made by native artists, and rendered peculiarly valuable by carefully executed details and by accurate and elaborate descriptions. In these respects it is well worthy to rank with his predecessor Dr. Roxburgh's '*Plants of the Coast of Coromandel*,' and the two together form a most magnificent contribution to botanical science.

In 1833, Dr. Wallich returned to India and resumed the charge of the Botanic Garden, which he continued to enrich both with native and exotic plants, and to render eminently useful by the transmission of Indian species to the gardens of Europe. From a Report presented to the Government of Bengal, and quoted by Dr. Joseph Hooker, it appears that between January 1836 and December 1840, that is to say in the space of five years, 189,932 plants were distributed from it to nearly 2000 different gardens. Soon after his resumption of his official duties, Dr. Wallich was placed at the head of a scientific mission, the chief object of which was to examine and report on the nature of the cultivation of the Tea-plant in the newly conquered province of Assam, which the members of the Commission thoroughly explored in every direction, bringing with them on their return large collections in every department of natural history. In 1843, his health again failing, it became necessary to seek a milder climate, and he visited the Cape of Good

Hope; but even under these circumstances of broken health, he still pursued his favourite avocation, and gratified his friends in England by the transmission of a considerable collection of South African plants. Once more he returned to Calcutta, but after a vain struggle against his old enemy, the pestilential climate, he was compelled finally to quit it, and to return to England, where he arrived in 1847.

In addition to the active duties of his position, which he performed with consummate skill; to his numerous and arduous excursions in almost every part of both the Indian Peninsulas; to the Herculean labour of amassing, arranging, and naming his immense collections; to the superintendence of the native artists, employed in the production of a large and important series of botanical drawings; and to the publication of the splendid works already mentioned, Dr. Wallich was the author of numerous reports and papers on horticultural and botanical subjects, published in the 'Transactions of the Asiatic Society of Calcutta,' the 'Transactions of the Society of Arts,' Sir W. J. Hooker's 'Journal of Botany,' the 'Linnean Transactions,' and other scientific collections. Those which appeared in our own 'Transactions' are two in number, being a "Description of two new Genera of Plants from Nepal (*Colquhounia* and *Hemiphragma*)," in the 13th volume, and a "Description of a new Genus of Plants belonging to the Order *Nymphæaceæ* (*Barclaya*)," in the 15th. To our Society he was always most devotedly attached; he became a Fellow in 1818; and in 1849, on the election of Mr. Brown to the Presidency, he became one of its Vice-Presidents. We owe to him not only the munificent gift of the great Indian herbarium, presented at his recommendation by the Court of Directors of the East India Company in 1832, but also a continued succession of benefits and services during the whole period of his connexion with the Society; and the very last expressions which he addressed to the Secretary, little more than a week before his death, were a request that he would convey "to his dear, good, kind friends of the Linnean Society his most affectionate remembrances." He was a man of warm affections, of ready wit, and of pleasing manners; a most amusing companion, steady in his attachments, and indefatigable in his exertions for the advancement of his favourite science. He died at his house in Upper Gower-street, on the 28th of April, in the 69th year of his age, and was buried in the cemetery at Kensal Green, on the 3rd of the present month, the President and many other Fellows of the Society paying the tribute of respect due to his memory by attending his remains

to the grave. He became a Fellow of the Royal Society in 1829; and nearly all the more important scientific societies of Europe, America, and the East had enrolled him among their members.

The loss among our *Foreign Members* has been unusually severe, no fewer than six having died within the year.

Gotthelf Friedrich Fischer, M.D., Professor of Natural History in the University of Moscow, and Vice-President of the Medico-Chirurgical Academy, was born at Waldheim, in Saxony, on the 15th of October 1771. He became a pupil of the celebrated Mining Academy at Freyberg, at the same time with Von Buch and Alexander von Humboldt; and completed his medical studies in the University of Leipzig, where he also paid much attention to Botany and Comparative Anatomy, of his proficiency in which latter pursuit he gave early evidence in his 'Versuch über die Schwimmblase der Fische,' Leipzig, 1795, 8vo. After leaving the university he accompanied the brothers Humboldt on a tour through Germany and France, and remained for some time in Paris, where he attended the lectures of Cuvier, and diligently investigated the natural-history collections of the Museum. Among the results of his studies at this period may be mentioned his treatise 'Ueber die verschiedene Form des Intermaxillarknochens in verschiedenen Thieren,' Leipzig, 1800, 8vo; his 'Naturhistorische Fragmente,' Frankfurt am Main, 1801, 4to; and 'Das National-Museum der Naturgeschichte zu Paris,' Frankfurt, 2 vols., 1802-3, 8vo. In 1800 he received a call as Professor of Natural History in the Central School at Mayence, but found on his arrival that the chair had been given to another, and accepted in its stead the appointment of Librarian, which for a time led him away to an entirely new study, that of typographical antiquities. On this subject he published several valuable works, including an 'Essai sur les Monumens typographiques de Jean Guttenberg,' Mainz, 1804; 'Beschreibung typographischen Seltenheiten und merkwürdigen Handschriften, nebst Beiträgen zur Erfindungsgeschichte der Buchdruckerkunst,' 6 Hefte, Nürnberg, 1801-5; and a 'Notice du premier Monument typographique en caractères mobiles avec date,' Mainz, 1804. As a member of the Municipal Council of Mayence he was sent to Paris on a special mission, the object of which was to procure for that town some commercial privileges, and obtained from the First Consul a considerable grant of books for its library. He also founded at Mayence a Natural-History Society, of which he became Secretary; and, as a proof that he had not abandoned his former studies, published his 'Anatomie der Maki und der ihm verwandten Thiere,' Frankfurt, 1804, 4to. In

the last-named year he was appointed Professor and Director of the Museum of Natural History at Moscow, where a new field was opened to his talents, in which he continued to labour with indefatigable industry to the close of his life. In 1805 he founded the Society of Naturalists of Moscow, which afterwards obtained permission to take the title of Imperial, and whose labours under his active and vigilant superintendence are so well known and appreciated by the scientific world. In the same year he also published the first volume of his '*Description du Muséum d'Histoire Naturelle,*' the copper-plates of which, in the absence of any competent artist, he engraved with his own hands. This museum, which he had greatly enriched, and which contained, among other remarkable objects, a very large and valuable collection of skulls, intended as the foundation of a general Comparative Anatomy of Crania, of which he published the '*Prodromus*' in 1811, was destroyed by the burning of the city in 1812. Undeterred, however, by this great calamity, he immediately set to work to replace, as far as possible, the treasures which had been lost, and exerted himself so strenuously that the new museum in the course of a few years became the depositary of a very rich collection of natural objects. Soon after his removal to Moscow, he began to turn his attention more particularly towards Entomology and Fossil Zoology, and his numerous contributions to the Bulletin and Memoirs of the Moscow Society in both these departments of science attest the zeal, energy, and perseverance with which he laboured in their promotion. Among the more important monuments of his extensive knowledge in these two branches, it is proper especially to mention his '*Entomographia Imperii Rossici,*' Moscow, 1820-43, 4 vols. 4to; his '*Oryctographie du Gouvernement de Moscou,*' Moscow, 1830-7, fol.; and his '*Bibliographia Palæontologica Animalium Systematica,*' Moscow, 1810, 4to. As works of a more general nature, which exercised an important influence on the rising naturalists of the empire, and contributed to the enlargement of science beyond its limits, it may be sufficient to refer to his '*Zoognosia,*' of which the third edition, in 3 vols. 4to and 8vo, was published at Moscow in 1813-14; and his '*Museum Demidoffianum,*' Moscow, 1806-7, 3 vols. 4to. His separate publications and papers in Transactions and Journals, enumerated in the '*Bibliographia Zoologiæ et Geologiæ*' of the Ray Society, amount to no fewer than 150, and embrace almost every variety of subject, Comparative Anatomy, and the systematic arrangement and description of Mammalia, Birds, Reptiles, Fishes, Mollusca, Insects, Worms, and Polypes, (recent and fossil), Minerals, and their

geognostic and geological relations. He was elected a Foreign Member of the Linnean Society in 1820, and was Knight of several of the principal Russian Orders. He died at Moscow on the 6th of October last, having nearly completed his 82nd year.

Charles Gaudichaud, Member of the Academy of Sciences of the Institute of France, was born at Angoulême, on the 4th of September 1789. He became *Pharmacien de la Marine*, and in that capacity made three important voyages of discovery in the ships *l'Uranie*, *la Physicienne*, *l'Herminie*, and *la Bonite*, under the command of Captains Freycinet, Durand, and Villeneuve Bargemont. In the course of these voyages he visited successively South America, the Mauritius, Bourbon, St. Helena, New Holland, the Sandwich Islands, Tierra del Fuego, the East Indies, and part of China, dwelt on five different occasions at Rio Janeiro, and thrice doubled Cape Horn. The shipwreck of the *Uranie* in the Falkland Archipelago, on the 14th of February 1820, had nearly led to the loss of all his collections, his herbaria remaining under salt water for forty days; but a large portion of them, amounting to 2500 plants, were saved by repeated washings in fresh water during the four months' residence of the crew in those islands, a Flora of which, published in the '*Annales des Sciences Naturelles*,' was among the earliest of his contributions to botanical science. The botanical part of the '*Voyage de l'Uranie et de la Physicienne*,' Paris, 4to and folio, 1826, was his next great work, and in this he introduced (besides a general view of the nature of the vegetation of the several countries visited by the expedition) a remarkable dissertation on the structure and systematic arrangement of Ferns, in which he especially dwelt on the importance of the characters to be derived from the attachment of their stipites and the relative number and position of the vascular bundles contained in them. At a subsequent period he devoted himself almost wholly to the study of Vegetable Physiology, and warmly adopting the views of Du Petit Thouars on the growth of plants, he published a multitude of memoirs on this important subject, which led him into a lengthened controversy with M. Mirbel, whose doctrines he strenuously attacked. Rejecting as merely hypothetical the existence of the cambium, he explains the phenomena of growth by the development of the bud, which he calls the *phyton*, and which he regards as being composed of ascending (tigellary) and descending (radical) fibres, by the elongation of which, and not by the solidification of the cambium, he maintains that the trunk increases in its several dimensions, while it is from the buds themselves that it derives both

nutriment and life. The principal of these memoirs, the result unquestionably of a long series of careful observations and of much philosophical discrimination, is entitled 'Recherches générales sur l'Organographie, la Physiologie et l'Organogénie des Végétaux,' Paris, 4to, 1841. It was during his visit to the Isle of Bourbon, on his second voyage in 1836, that he received the intelligence of his election into the Botanical Section of the Academy of Sciences at Paris; and his election as a Foreign Member of the Linnean Society dates from 1837. In later life he suffered much from the deterioration of his health by the exposure and fatigues of his different voyages; and he died at Paris on the 16th of January in the present year.

Adrien de Jussieu, M.D., Professor of Rural Botany in the Jardin des Plantes, the only son of Antoine-Laurent de Jussieu, the celebrated author of the 'Genera Plantarum' (himself the nephew of Bernard de Jussieu and of two other distinguished botanists), was born in Paris, on the 23rd of December 1797. He commenced his scientific career by the study of medicine, but soon directed his attention more particularly to the accessory sciences, and after a while devoted himself, like his illustrious predecessors, entirely to botanical pursuits. His first important publication was his inaugural thesis, 'De Euphorbiacearum generibus medicisque earundem viribus tentamen,' Paris, 1824, 4to, which contained a complete generic monograph of that extensive and difficult family, his general observations on which were at the same time published in the 'Mémoires du Muséum d'Histoire Naturelle,' under the title of "Considérations sur la Famille de Euphorbiacées." He next occupied himself in the preparation of monographs of several important families of plants, among which may be especially noted *Ternstroemiaceæ*, *Rutaceæ*, *Meliaceæ*, and *Malpighiaceæ*. To his investigations of the latter family he appended a remarkable dissertation on their structural peculiarities, and in particular on the singularly anomalous character of many of their stems. On the return of M. Auguste de St.-Hilaire from Brazil, he became associated with that botanist in the publication of the 'Flora Brasiliæ Meridionalis,' to which he contributed the characters and descriptions of numerous families. In these various works he established his character as a systematic botanist of the highest class. His "Mémoire sur les Embryons Monocotylédones," published in 1839, in the 'Comptes Rendus' of the Academy of Sciences, and in the 'Annales des Sciences Naturelles,' is remarkable for giving, in a few pages, with great precision and clearness of expression, the results of a most

extensive series of observations, conducted with his habitual caution and sagacity, into the structure and development of a great number of monocotyledonous embryos, and throwing new and important light on a very obscure point of botanical investigation. Numerous other papers in the 'Mémoires de la Société d'Histoire Naturelle de Paris,' the 'Mémoires du Muséum,' the 'Annales des Sciences Naturelles,' and the 'Dictionnaire Classique d'Histoire Naturelle,' (among which latter the articles on Systems and Methods, and on Botanical Geography deserve particular mention,) attest the extent, the variety and the depth of his botanical knowledge. His last great work, his 'Traité élémentaire de la Botanique,' is unquestionably the clearest, the completest, and the most succinct exposition of the present state of the science, free from vague and disputable theories; it has been translated into English and various other European languages, and is calculated more than any other work of a similar character to attract and inform the student, and to lead him to more elevated views. In 1826 Adrien de Jussieu succeeded his father, who then retired, as Professor at the Muséum d'Histoire Naturelle; in 1831 he became a Member of the Academy of Sciences; and in the same year a Foreign Member of the Linnean Society. He died at Paris on the 29th of June last, in the 56th year of his age, leaving no male heirs, and apparently the last botanist of an illustrious race, which has for three generations, and for nearly a century and a half, stood in the foremost rank of botanical science. To his high scientific attainments he added much and varied erudition, great simplicity of manners, and a lively and amiable disposition, which rendered him a universal favourite. His funeral, which took place on the 1st of July, was attended by a numerous concourse of friends and pupils; and discourses commemorative of his services and character were pronounced over his grave by M. Brongniart in the name of the Institute, M. Duméril in that of the Museum, M. Milne-Edwards in that of the Faculty of Sciences, and M. Decaisne as the representative of the Agricultural Society.

Kaspar Georg Karl Reinwardt, Member of the Royal Academy of Sciences of Amsterdam, was born on the 3rd of June 1773, at Lüttringhausen, in the Duchy of Berg, now forming part of the government of Düsseldorf. From the age of 14 he resided in Holland, and studied ancient and modern languages, natural history, pharmacy and medicine in the University of Amsterdam, where he took the degree of Doctor of Medicine and Philosophy. In the year 1801 he was named Professor of Chemistry, Botany and Natural History

in the University of Harderwÿk, in which position he so distinguished himself by his acquirements in those branches of science and by his talent in communicating knowledge to his pupils, that in 1808 he was appointed Director of the Royal Museum of Natural History and Professor of Natural History and Medicine first at Amsterdam, and afterwards (in 1810) at Leyden. In 1815 he received from the Government of the Netherlands a commission to visit the Dutch possessions in India in the capacity of Director of Agriculture, Arts and Sciences; in the execution of which he travelled through the greater part of those possessions between that year and the year 1822. While resident in Java, the Society of Arts and Sciences at Batavia was reconstituted under his presidency; and the 9th volume of its Transactions contains a detailed description from his pen of the Mountain Chain of the Island of Java, which he had investigated both with reference to its physical characters and its geographical relations. After his return to Europe he published important observations on the Gold Mines and the Natural History of the Moluccas, and a multitude of Essays, Observations, Dissertations and Academical Discourses on subjects connected with Natural History, Agriculture, Medicine and Pharmacy, the greater part of which are contained in the Memoirs of the Institute of Sciences of Amsterdam and Haarlem, of which (as well as of the Academy which has now succeeded to its place) he was a distinguished Member. A few years ago he relinquished his professorship, and he died in Leyden on the 6th of March in the present year, and in the 81st year of his age, of a chronic bronchitis under which he had long been suffering. His scientific attainments in various branches of knowledge were accompanied by great kindness of heart and a most friendly disposition; and not only were his doors freely opened to men of science from all countries, but his extensive collections, and his rich and valuable library, were liberally placed at their disposal. His election into the Linnean Society dates from 1835.

Auguste de Saint-Hilaire, was born at Orléans in the year 1779. At an early age he evinced a predilection for the study of natural history, and when scarcely seventeen attached himself with ardour to entomology. His inclinations were, however, thwarted for a time by the necessity of making a journey into Holstein; but while there, the acquisition of the German and English languages greatly enlarged his means of obtaining scientific information. On his return after a few years to France, he again applied himself to entomology, but soon quitted it for botany, to which he devoted the remainder of his life. He had been offered the post of Auditor of the

Council of State, and many motives combined to induce him to accept this appointment; but after a fortnight's consideration he resolved to refuse it, as incompatible with his favourite pursuit. Living at a distance from any large collections, having no teacher, and but few books, his observations were at first limited to the plants of his immediate neighbourhood, which he submitted to a rigorous examination. His earlier contributions to science were published in the 'Bulletin de la Société des Sciences Physiques, &c. d'Orléans,' in Desvaux's 'Journal de Botanique,' and in the 'Bulletin de la Société Philomatique.' He next entered on the preparation of an 'Histoire complète des Pistils et des Fruits des Plantes de la France,' for which he collected extensive materials, but finding that its completion would require many years of travel and observation, he determined to extract from it a series of memoirs calculated to throw light on some of the more important points of vegetable physiology. With this view he published in the 'Annales,' and in the 'Mémoires du Muséum d'Histoire Naturelle de Paris,' several valuable memoirs, the most remarkable being the first of a series "Sur les Plantes auxquelles on attribue un placenta central libre," which at once placed him in the rank of the more scientific and philosophical botanists of the day. About this time an opportunity offered itself of observing the vegetation of a warmer country, and he eagerly embraced the permission given him by the Duke of Luxemburg, who was appointed ambassador at Rio, to accompany him to Brazil, in the southern provinces of which empire, in the Cisplatine province, and in Paraguay, he travelled during the six years from 1816 to 1822. His various journeys reached an extent of 2500 French leagues, and his collection amounted to about 7000 species of plants, of most of which he made analyses on the spot, 2000 birds, 16,000 insects, and 129 quadrupeds, besides reptiles and other animals. While in Brazil he continued his communications to the 'Mémoires du Muséum d'Histoire Naturelle'; and immediately after his return he set about the publication of the results of his travels in the various departments of botanical science. These were chiefly given in an 'Aperçu d'un Voyage dans l'Intérieur du Brésil,' in the 'Mémoires du Muséum'; in his 'Histoire des Plantes les plus remarquables du Brésil et du Paraguay,' 4to, Paris, 1824; in his 'Plantes usuelles des Brésiliens,' 4to, Paris, 1824-8; in the 'Flora Brasilæ Meridionalis,' of which 24 fasciculi, forming 2 vols. and a part of a third, were published by him with the assistance of Adrien de Jussieu, Cambes-sésés and other botanists, between 1825 and 1833; in his 'Voyage dans le Province de Rio Janeiro et de Minas Geraes,' Paris, 1830,

2 vols. 8vo ; and in his ' Voyage dans le district des Diamans et sur le litoral du Brésil,' 2 vols. 8vo, Paris, 1833. His health in the mean time became greatly deteriorated by his labours, both in the cabinet and in the field ; he fell into an extreme state of nervous debility, lost the faculty of speech, and in a great degree of sight also ; and was compelled to retire to Montpellier, where the pure air, and the care of his friendly physicians, Dunal and Lallemand, at length restored him in a great measure to his former activity. He resumed his contributions to the ' Mémoires du Muséum,' and published in 1840, in 8vo, his last great work, under the title of ' Leçons de Botanique, comprenant principalement la Morphologie végétale, la Terminologie, la Botanique comparée, et l'Examen de la Valeur des Caractères dans les diverses Familles naturelles.' In this work he has given a *résumé* of the philosophical ideas which formed through life the groundwork of his botanical investigations, and which fixed the stamp of originality on his views, while the accuracy of his observations gave a high value to his systematic labours. He was elected a Correspondent of the Academy of Science during his absence in Brazil, and in 1830 succeeded Lamarck as a Member of the Botanical Section. His election into the Linnean Society dates from 1827, and he died on the 3rd of May 1853.

Christian Friedrich Schwägrichen was the son of Christian Gottfried Schwägrichen, a merchant of Leipzig, in which town he was born on the 16th of September 1774. He took the degrees of Master of Arts and Doctor of Medicine in the University of Leipzig, and in 1799 published a Dissertation, entitled ' Topographiæ Botanicæ et Entomologicæ Lipsiensis Specimen Primum,' which was followed in the same year by ' Topographiæ Botanicæ Lipsiensis Specimen Secundum,' and in 1804, on his appointment to the chair of Extraordinary Professor of Natural History, by ' Topographiæ Naturalis Lipsiensis Specimen Tertium.' In the title-page to the latter he dropped his first Christian name, and ever afterwards used that of Friedrich only. In 1803 he published an elementary work on Natural History, entitled ' Unterricht in der Naturgeschichte für Schülen,' 2 vols. ; and in 1819, ' Topographia Naturalis Lipsiensis ad Anthropologiam et Medicinam applicata.' But by far the most important of his works are those which treat of Mosses and Hepaticæ. On the latter he published ' Historiæ Muscorum Hepaticorum Prodrômus,' Lips. 1814, 4to ; and in regard to the former he commenced by editing, in 1801, the posthumous work of his predecessor Hedwig, entitled ' Species Muscorum Frondosorum,' which he followed up in successive years, until 1842, with numerous supple-

ments, containing together three hundred and twenty-five 4to plates. Besides these more important works he also edited an enlarged edition of F. Adolf Heyne's 'Pflanzen Kalender'; he translated into Latin the text of Schkuhr's 'Enchiridion Botanicum'; and he commenced a 'Species Muscorum Frondosorum' in continuation of Willdenow's edition of the 'Species Plantarum' of Linnæus. As a descriptive muscologist he is remarkable for his elaborate descriptions, and the multitude and accuracy of his figures. In 1815 he became Ordinary Professor of Natural History in the University of Leipzig, resigned his Professorship in 1852, and received on his retirement the Prussian Order "Pour le mérite." His election as a Foreign Member of the Linnean Society took place in 1823, and he died in his native town on the 2nd of May 1853.

The Secretary also announced that 17 Fellows, 6 Foreign Members, and 2 Associates had been elected since the last Anniversary.

At the election which subsequently took place, Thomas Bell, Esq., was re-elected President; William Yarrell, Esq., Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the Council in the room of others going out:—R. C. Alexander, M.D.; G. B. Buckton, Esq.; C. J. F. Bunbury, Esq.; John Curtis, Esq., and Thomas Thomson, M.D.

June 6.

Thomas Bell, Esq., President, in the Chair.

The President nominated Francis Boott, Esq., M.D., Robert Brown, Esq., William Spence, Esq., and William Yarrell, Esq., Vice-Presidents for the ensuing year.

William Ferguson, Esq., and Thomas Bacon Phillips, Esq., were elected Fellows.

Mr. J. D. Salmon, F.L.S., exhibited two specimens of Kestrels, preserved by Mr. Reynolds of Thetford, Norfolk, in which the substance used for colouring the legs had been introduced internally beneath the scales of the tarsi.

Read a Letter from Mr. C. J. F. Bunbury, F.L.S., addressed to the Secretary, mentioning the occurrence of a specimen of the Hoopoe (*Upupa Epops*, L.) in the English Channel on the 15th of April last, which after flying twice or thrice round a steamer, entered one of the windows of the saloon, and was there taken, apparently exhausted with fatigue.

Read also the following extracts from a Letter from Dr. Frederick Welwitsch to Richard Kippist, Esq., Libr. L.S., translated from the German, and communicated by Mr. Kippist.

St. Paul de Loanda, Tropical W. Africa, S. Lat. 8° 48' 5".

March 2nd, 1854.

My dear Friend,

Although I have now been above seven months in Africa, it is only to-day that the first opportunity has occurred of sending letters direct to London, and even of this opportunity I received such short notice that I have only time to send you a few hasty lines of news. You must not therefore be surprised, if this, my first African letter, proves somewhat confused, since I returned to Loanda only yesterday evening, from an excursion into the interior, and find myself so surrounded by pressing occupations of all kinds, that I scarcely know where to begin.

My journey from Lisbon here was so far favourable that it gave me a good opportunity of becoming acquainted, superficially at least, with the flora of Madeira, St. Vincent's (Cape Verd's), St. Jago, Sierra Leone, and the incomparably lovely Ilha do Principe. In Sierra Leone I staid nine days, and bethought me, with each new plant I encountered, of our old friend George Don.

What astonished me more than anything else at Sierra Leone was the circumstance that the English, who have now been so long in full possession of this charming territory, nevertheless still remain in utter ignorance of the adjoining negro-district; more particularly with respect to the interior of that part of tropical Africa.

In Sierra Leone I saw the first parasitical *Orchideæ*, and almost always in company with a gigantic species of *Platyserium* (*P. alci-corne*?) [*P. Stemmaria*, *Desv.*]

In Prince's Island I wandered, while climbing the highest peak (Pico de Papagaio), for a whole hour among flowering examples of *Caladium bicolor*, and many other splendid tropical species, which are not to be found in Sir W. Hooker's recently published 'Flora Nigritiana.' Of *Filices* alone I collected about Free-town in Sierra Leone, and on Prince's Island, above twenty species, mostly gigantic

forms; among them a *Gleichenia* (anne *Gl. Hermannii*, R. Br.?), "stipite scandente sæpiùs 25-pedali."

I arrived in Loanda (Saõ Paulo de Loando), the capital of Angola, in the beginning of October 1853, and since that time I have not lost a moment, but my whole time has been employed in excursions; so that I have already become acquainted with and plundered upwards of forty miles of coast, from the Guizembo River (three miles N. of Ambriz) to near the mouth of the mighty Cuanza (about 9° 30' S. Lat.), and possess the materials for a Flora of Loanda, of five to six * miles in circumference, in well-preserved specimens.

The total number of plants which I have hitherto collected, as well on the islands as in Sierra Leone and Angola, may amount to about 800 species, but increases daily as the rainy season approaches; all those hitherto collected having been obtained in the dry (and therefore unfavourable) season. March and April are here in Angola the rainy months; and the period of the highest and most luxuriant development of vegetation falls in the months of May and June, so that I have good right to hope that my collection may very shortly be increased to, perhaps, more than double its present amount, since the annual species, as a matter of course, make their appearance only in the rainy season.

What especially surprises me here, with respect to the geographical distribution of certain genera, is the occurrence of three or four *Aloes*, of a *Stapelia* (*Heurnia*), and several other Cape genera. Of *Euphorbia* I have already found near Loanda a gigantic species, with a stem 2½ feet in diameter and upwards of 30 feet high, forming woods, as the *Pinus sylvestris* does with us! This species, which is readily discernible even from ship-board, is not noticed in the 'Flora Nigritiana.'

In the lakes of the interior, distant about one to three German (four to twelve English) miles from the coast, I have found almost everywhere magnificent Nymphæas (*N. carulea*, *micrantha*, *dentata*, &c.) and *Pistia*; and in addition, our *Typha angustifolia* and *Scirpus maritimus*.

Of trees, there occur in the dry coast-flora only *Adansonia*, *Sterculia*, n. sp., an *Afzelia*, *Eriodendron anfractuosum*, and a *Bauhinia*, with three species of Palm: on the rivers, however, the tree vegetation becomes more dense, and more abundant in species; the list being then augmented by *Avicennia africana*, *Laguncularia racemosa*, and *Rhizophora Mangle*; of which, the *Laguncularia* always remains

* Q' German miles = 4½ English.

a shrub, but the other two sometimes appear as great trees. A *Caparidea* too, the beautiful *Mærua angolensis*, DeC., appears as a tree, even in the neighbourhood of Loanda, but extremely seldom; usually only as a shrub 5–6 feet high. Among my collections several species of *Strychnos*, and another *Loganiacea*, likewise occur, most of which may probably prove to be new species. In the woods of Euphorbia (*Candelabra*, n. sp.) is found a wonderfully beautiful terrestrial *Orchidea*, with a scape 4–5 feet high, which ends in a spike of a foot long with large yellow flowers. A truly magnificent *Crinum* (*Broussonetii*?) luxuriates in boggy places; and on hilly slopes, the *Adansonia digitata* is nearly covered by a glaucous-leaved *Loranthus* with deep red flowers.

It is much to be regretted that excursions in this country are attended with so much expense, and such great inconveniences of all kinds. Although the Portuguese Government allow me £45 per month, I shall nevertheless be under the necessity of contracting heavy debts before I return to Europe, since everything is at least three times dearer here than in London. As there are few roads, and fewer beasts of burden, all baggage, provisions, water, presses, paper, beds, cooking utensils, with the necessary articles for barter (*e. g.* guns, powder, brandy, cotton goods, glass-pearls, &c.), must be conveyed on the heads of negros; so that even the shortest excursion of three or four days costs an enormous sum.

Meanwhile, my reliance is upon England; that is to say, I anticipate that my cases of living plants, insects, seeds, &c., as also a few herbaria of the flora of this neighbourhood, will be duly honoured; and in that hope, I intend within two or three weeks from this time, to make up a sample-collection for London. About the 16th or 18th of the present month, the English Ship of War *Penelope* will leave here for England, and I shall avail myself of this opportunity to send living plants, as well as seeds and *Hymenoptera*, to Messrs. Wilson Saunders, Hooker, &c.

Read also a Paper “On a new species of *Anomourous Crustacean* belonging to the family *Homolidae*, found by Mr. Wm. Lobb, at Monterey in California, in the winter of 1850.” By Adam White, Esq., F.L.S. &c.

This species Mr. White stated to be in some respects allied to *Lithodes* (*Echinocerus*) *cibarius* from the Columbia River, but to differ from it in the more regularly triangular and depressed form of the carapace, and in the outer antennæ having two or three beautiful petaloid processes at the base, instead of the strong thorn-like spines

at the base of the other. The abdomen is singularly pitted on the under side; the surface of the carapace is covered with strawberry-like tubercles, and the thick spines with which the legs are covered are similarly ornamented. The most singular character however is the absence of the hinder pair of legs, or (as the President suggested) their apparent absence, there being no hole between the carapace and abdomen through which these appendages could come.

Mr. White gave a revision of the species of *Lithodes*, which had been much added to, since the work of Prof. Milne-Edwards, by a Japanese species described by De Haan; three species from Fuegia, obtained on the voyage of Dumont D'Urville; one described by Edwards and Lucas; another by Dana; and another by Mr. White himself. He proposed for the fine species obtained by Mr. Lobb, the name of *Lithodes (Petalocerus) Bellianus*, in compliment to the President of the Society.

Read also a Memoir "On the External Membrane of the Unimpregnated and Impregnated Ova of the Common Salmon." By John Hogg, Esq., M.A., F.R.S., F.L.S. &c.

In illustration of his paper, Mr. Hogg presented to the Society two phials containing (preserved in spirit) mature ova as they fell from the female Salmon unimpregnated, and others taken at the same time and artificially impregnated. They were taken by Mr. Harrison in December last, and sent to Mr. Hogg in January by Isaac Fisher, Esq. of Richmond, Yorkshire. "The ova in both phials," says Mr. Harrison, "were taken from one fish in the River Tees, on the 27th of Dec. 1853. The female fish was held up by the head, and when the spawn was ready it run out by itself. The ova were with the milt for about half a minute, or as soon as they could be got away. The impregnation naturally takes place in a moment, as is always the case in a stream, where the milt shed in the running water passes rapidly over the ova." Mr. Hogg was unable to obtain either the immature ova from the same female, or ova naturally fecundated—two other conditions which he was desirous of examining to complete the series of his observations.

The object which Mr. Hogg had chiefly in view was the microscopic examination of the external membrane of the ovum in these several conditions, in relation to the statements made by different authors as to its structure and the changes it is supposed to undergo. Thus in the 'Book of the Salmon,' by Messrs. Fitzgibbon and A. Young (Lond. 1850), it is stated (p. 183), that "the eggs of that part of the roe nearest to the vent will be always found of larger size than

those situated higher up in the stomach; they are softer also, and their outward filaments (or membranes) are thinner and more porous, and thus they are fitter for impregnation—for absorbing the milt of the male as it is poured over them.” And again, p. 185, “Although the unripe ova should be expressed, they would be useless for production, for their absorbing pores are still closed against the interpenetration of the milt, and consequently in this state impregnation is impossible.” In like manner Mr. Jacobs, in a communication published in the ‘Hanover Magazine’ for the year 1763, quoted in Yarrell’s ‘British Fishes’ (ed. 2nd, vol. ii. p. 93), says of the common Trout and of the Salmon also, “After an egg has been fructuated by the sperma of the male, which slips through an invisible opening into it, it lodges in the white liquor, under the shell and round the yolk.” Recent discoveries, Mr. Hogg continues, have shown that the fecundating principle of the male fish (as of every animal in which there is a sexual communion) is solely derived from the seminal animalcules or spermatozoa. In the words of our late distinguished Fellow, Mr. Newport, “The spermatozoa alone, in all cases of communion of the sexes, are the sole agents in impregnating the ovum, and impregnation cannot be effected by the *liquor seminis*” (Phil. Trans. 1851, p. 172). Dr. Martin Barry indeed has asserted (Phil. Trans. 1840, p. 533, and pls. 22 & 23. figs. 164–169) that he had observed an attenuation, or an orifice like a cleft, in the thick transparent membrane of the ovum of the Rabbit, at the period of, and after, fecundation, through which the spermatozoa enter; and in a recent communication to the Royal Society (Proceedings, vol. vi. p. 335), the same author has referred to a lately published work by Dr. Keber, in which Dr. Barry states, “That physiologist describes the penetration of the spermatozoa into the interior of the ovum, in *Unio* and *Anodonta*, through an aperture formed by dehiscence of its coats, analogous to the micropyle in plants.” On submitting portions of the external membrane of both the unimpregnated and impregnated ova of the Salmon contained in the two phials presented to the Society, to the Society’s microscope, Mr. Hogg was unable to detect any perceptible difference between them, even when magnified at a considerable power. The membrane in both conditions was a perfectly transparent tissue, and appeared, to Mr. Kippist as well as to himself, to be entirely plain; that is to say, unfurnished in both conditions with either cells or pores, or anything resembling a cleft or aperture. Examination of the entire ova from both phials with a good lens gave the same result, affording not the least appearance of a cellular or porous structure in their external membranes,

or of any orifice or cleft; thus agreeing with Mr. Newport's statement (Phil. Trans. 1851, p. 203), that "on careful examination of the envelopes of the frog, he had not been able to detect any fissure or orifice." In conclusion Mr. Hogg refers to the most recent discovery of that lamented physiologist, which seems to set this question at rest, by showing that while spermatozoa are found "within the vitelline cavity in direct communication with, and penetrating into the yelk," they "do not reach the yelk of the Frog's egg by any special orifice, or canal, in the envelopes, but actually pierce the substance of the envelopes at any part with which they may happen to come in contact, as I have constantly observed while watching their entrance" (Phil. Trans. 1853, p. 271).

Read further a memoir "On the Osteological Relations observable among a few Species of the Bovine Family." By Walter Adam, M.D. Communicated by R. Brown, Esq., V.P.L.S.

Dr. Adam commences his Paper by referring to a communication made by him to the Society in 1831, and published in the sixteenth volume of its 'Transactions,' "On the Osteological Symmetry of the Camel," in which an attempt was made to trace, throughout one large animal, the identities and variations of osteological dimensions characteristic of a species. In the present memoir he proposes, by an osteological comparison of some species in a cognate group of animals, to exemplify the more striking resemblances and deviations in form which are exhibited among the components of a zoological family. The skeletons examined were nine in number, all contained in the collection of the British Museum, and consisting of both males and females of three species, the *Bos Bantiger* of Java, the *Bibos Gaurus* of Nepaul, and the *Bison Americanus*; and of males only of three other species, the Aurochs (Bison) of Lithuania, the Caffre Buffalo of the Cape of Good Hope, and the short-horned Buffalo of the river Gambia. As in his previous paper, Dr. Adam takes as the standard of measurement the basilar length of the cranium, which, divided into 72 parts, forms the means of comparison with all the other dimensions. In conformity with this standard, he gives the proportional measurements of all the principal parts of the nine skeletons examined, with elaborate minuteness, in a tabular form, and adds also a series of tables, in which the dimensions are represented by proportional straight lines instead of figures.

June 20.

Thomas Bell, Esq., President, in the Chair.

The President exhibited two specimens of the Megalopoid form of the genus *Planes*, and made some observations on their structure and affinities.

Read an extract from a Letter dated "Santarem, 27th March, 1854," addressed to Samuel Stevens, Esq., F.L.S., by Mr. H. W. Bates, "On some Particulars in the Natural History and Habits of Termites."

"It is curious," Mr. Bates says, "that for two months before receiving your last letter, I have been attending to the *Termites*. I began first to look for M. Schiödte's new *Staphylini*, and ended by becoming greatly interested in the *Termites*, without, however, finding the *Staphylini*. Some of the results of my examination up to the present date I intend to send on a separate sheet; the specimens will follow next month. I have examined about a hundred colonies. Some of the results I have come to are,—that there are no *truly apterous imagos*; that there are only two kinds of larvæ, fighters and workers; that a large hillock is always an agglomeration of *many very distinct* species, which build with very different materials; that some species cherish only one ♀ and one ♂ adult in a colony, whilst others have a great number (50 or 100) adults, the ♂ and ♀ in about equal numbers; lastly, I have detected a very good character to distinguish ♂ and ♀ in the *pupa* and *adult* states, and have found pupæ in various stages of growth or *ecdysis*, without, however, as yet detecting the first moult from the larva to the pupa, to decide what becomes of the monstrous apophyses of the head, and the mandibles of the soldier (fighter) larva."

Read also a Letter addressed to the Secretary by Dr. George Buist, "On the Construction of the Nest of a Species of Mason-Wasp in the Neighbourhood of Bombay."

"I observe," says Dr. Buist, "that some specimens of the nest of the Mason-Wasp or bee from India were placed before a late meeting

of your Society. Perhaps the following account of the habits of this curious insect may interest you; they are given from personal observation. The male of the mason-bee is about twice the size of the common wasp, but nearly of the same colours; the thin portion which unites the thorax and abdomen being nearly an eighth of an inch in length, and scarcely thicker than a horse's hair. The female is about one-eighth this size, and of a bright shining bottle-green, like a blistering fly. She bears no resemblance to the male, and they are only seen together when the eggs are being laid. Early in October, so soon as the rains are fairly over, the mason-bee begins to build. Having selected a spot for his nest, generally in some quiet corner, to which however there is free access and egress, he approaches with a piece of wet mud about the size of a pea, which he holds with his fore-feet against his breast, close up to his mouth. He first makes a neat thin ring, of about an inch in diameter, and then brings this up by successive additions until it assumes very nearly a spherical form. The opening at the crown is now drawn up like the neck of a bottle, and turned over with a flat lip, an opening being left of about an eighth of an inch in diameter. Two or three of these little dwellings, which take from six to eight hours to finish, are commonly built together and left to dry before anything more is done; the outer shell having in the process of construction been partially filled with mud, and divided into compartments, a considerable space being left open within the principal aperture which gives entrance to them all. So soon as they are firm enough, and whilst still damp, the female is seen running and flitting about them, and dropping a few eggs in each; and immediately after this the male is seen to approach the nest warily with what appears to be a cumbrous load in his arms. This turns out to be a large green caterpillar, about three-quarters of an inch in length, fully the size of the bee which carries it: this is now thrust through the bottle-neck aperture into the nest. The struggles of the resisting worm being met with many a punch, nip, and dig from the inexorable bee, it seems at last to sting its victim to death. The moment it is fairly within the bottle, a little globule of mud is brought, and the mouth of it hermetically sealed. More bottles in succession are built, provisioned, and sealed up in this way, till the collection consists of six, eight, or ten; when fairly completed, the builder seems to take no more heed of them: he is shy and easily frightened, and will abandon his operations and quit the house altogether if he observes anybody near. I have never happened to see

the grubs or young bees; but about a fortnight after the work just described has been finished, the nests are all found to be burst through, and the fragments of the shell and casing of the chrysalis are found inside. I have watched these operations frequently at Bombay, and only regretted that the pressure of other avocations prevented me from gathering more particulars than I have now given. So far as they go they may be relied on."

Read also a paper "On some remarkable Spherical Exostoses developed on the Roots of various species of *Coniferæ*." By Joseph Dalton Hooker, Esq., M.D., F.R.S., F.L.S. &c.

Dr. Hooker states that the exostoses which form the subject of his paper were first observed by him on the roots of the *Podocarpus dacrydioides* of New Zealand, collected by the Rev. W. Colenso; and subsequently at Kew, in company with the Rev. M. J. Berkeley, he found similar organs to be of very general occurrence among *Coniferæ*. As examples he mentions *Araucariæ* of several species, *Podocarpus*, *Taxodium*, *Dacrydium*, *Thuja*, *Cupressus*, *Phyllocladus*, and *Cunninghamia*. Mr. Berkeley has described, in the 'Gardeners' Chronicle,' exostoses on the roots of the Pea, and Dr. Hooker has also been long familiar with other examples, especially with a most remarkable modification of them on the Laburnum, pointed out to him by Prof. Henslow, who has also shown him others on the Garden Bean, and on species of *Lathyrus*, both wild and cultivated, as well as on other *Leguminosæ*. Except, however, in the instance of *Taxodium distichum*, in which they have been noticed by the elder DeCandolle ('Théorie Élémentaire,' Ed. 2. p. 356), and in which they exist in a very peculiar condition, he is not aware of their prevalence in *Coniferæ* having been anywhere noted. In *Podocarpus dacrydioides*, the species selected for illustration, the roots and rootlets are studded at intervals with spherical bodies, of diameters varying between the $\frac{1}{40}$ th and $\frac{1}{60}$ th of an inch, either attached by a very short pedicel, or absolutely sessile, and sometimes even sunk into the bark of the root. They are easily detached, leaving a small scar, are of a soft and spongy consistence, smooth and even on the surface, of a pale reddish colour, and in a vertical section are seen to be composed of—(1) a mass of spongy cellular tissue, aggregated round (2) a central vascular axis, which extends from the wood of the root to the centre of the sphere, and (3) a delicate cuticle. Each of these tissues is described in detail, and illustrative figures of the exostoses of *P. dacrydioides* and of their microscopic anatomy

accompany the paper. With regard to the exostoses of the roots of other plants, Dr. Hooker observes that for the most part their structure is approximately the same as those of the *Podocarpus*, but they are very much larger in most herbaceous plants than in the arboreous, are more irregular in form, and are destitute of the vascular axis. In some species they are perennial, in others annual. In the *Laburnum* they form fleshy branched masses, as large as the fist, and are full of vascular tissue. Morphologically, he looks upon them as transformed root-fibrils, but regards their special function as obscure, although they may be supposed to be subservient to the office of selection of nutriment. In conclusion, he indicates a remarkable morphological analogy between them and the tubers of the root-parasite *Balanophora*, which are supplied with an abundant development of vascular tissue, mainly derived from the vascular axis of the roots upon which the *Balanophoræ* are parasitical. In this case, Dr. Hooker thinks there can be no doubt that the parasite exerts a specific or diseased action in the root-stock, which results in the development of a vascular bundle analogous to a rootlet, which is prolonged into the tuber of the parasite, and which afterwards increases greatly, branches, and resembles in its appearance as well as in its relation to the root-stock, the vascular branches occupying the axis of the branched exostoses of the *Laburnum*. On the subject of the development of the tissues of *Balanophoræ*, however, he reserves further details for a monograph of that Order which he is preparing to lay before the Society.

June 20, 1854.

Thomas Bell, Esq., President, in the Chair.

Read the commencement of a paper "On the Structure of the Seed and peculiar form of the Embryo in the *Clusiaceæ*." By John Miers, Esq., F.R.S., F.L.S. &c.

The author stated it to be his object to direct the attention of botanists to the structure of the seed, and particularly of the embryo in this family, the nature of which had been hitherto quite misunderstood. During his residence in Brazil he had made several observations on the *Clusiaceæ*, which he hoped would assist in defining the characters and limits of the genera, hitherto very imperfectly described. These more general remarks would be reserved for a future occasion, his object being now confined, as a matter of primary importance, to the consideration of the seminal structure observable in this family.

He began by tracing a history of the facts and conclusions recorded on the subject. The earliest is that of Jussieu in 1789, where, in his ordinal character of the *Guttiferae*, he states that the embryo is erect, without albumen, and with hard corky cotyledons, a character probably drawn only from *Calophyllum*. Gærtner next figured the analysis of three species of *Garcinia*, and described the seed as having a coriaceous testa, a thin integument, and a solid fleshy nucleus exhibiting in its axis a different development of a terete form, the whole constituting one compact inseparable mass: from these facts he concluded, contrary to the opinion of Jussieu, that the great body of the nucleus is a large albumen, and that the axile portion is a pseudo-monocotyledonous embryo, all closely united together in one solid body. Richard, in 1811, figured the analysis of the seed of *Clusia palmicida*, and it is singular that although the structure of *Pekea* (*Caryocar*) *tuberculosa*, described at the same time, has been copied into every botanical work since published, the equally important facts recorded of the seed of *Clusia* have entirely escaped the notice of every succeeding botanist except Jussieu. Richard there correctly describes the seed of *Clusia* as being enveloped in pulp, one extremity of its brittle testa pierced with an aperture, beneath which the nucleus exhibits a small protuberance cleft in two, which he states to be two minute cotyledons, the principal mass of the embryo being an enormous radicle: he points out the existence of an inner integument, one end of which is attached to the aperture in the extre-

mity of the testa, the whole forming, in his own peculiar technology, "an epispermic antitropal embryo." Mr. Miers states there is one essential error in this otherwise correct description; that, like other botanists, Richard has mistaken the base for the apex of the seed. Jussieu, commenting on these facts in 1813, infers that *Clusia* cannot belong to *Guttifera*, but must constitute the type of a distinct family near *Marcgraaviaceæ*. Choisy, in 1822, in a memoir on the *Guttifera*, ascribes in his ordinal character, features different from those of Jussieu, and equally opposed to those of Gærtner. He states that the seeds are without albumen, that the embryo is erect, and that the cotyledons are large, fleshy, either separable, or combined in one mass. In *Garcinia*, he says, the seeds are arillate, and the cotyledons thick and conjoined; but in *Clusia*, he concludes that these presumed cotyledons are separable, a feature which no succeeding botanist has verified. He alludes in no way to the very different structure of the seed in *Clusia*, as recorded by Richard, although, when stating the separability of the cotyledons in that genus, this idea may probably have been derived from some indistinct recollection of the analysis of that eminent carpologist. In the 'Prodrômus' of DeCandolle (1824), the characters given of the *Guttifera* are only a recapitulation of the facts stated by Choisy in the above-mentioned memoir. Cambessèdes, in a very able essay published in 1828, affirms that in the *Guttifera* the embryo is erect, the cotyledons large, thick, very entire, and united into one mass; the radicle is very small, of a nipple-like form, while its direction in regard to the point of attachment of the seed is deserving of attention, because this character (generally of primary importance) is here variable. He then states that in *Clusia criuva* the radicle is directed to the extremity of the seed farthest removed from the point of its attachment; he describes the embryo of *Clusia* and *Calophyllum* as being erect and inverted, the small mammæform point, which he calls the radicle, being at the apex, or opposite extremity to the basal point of attachment, while in *Mammea* and *Mesua* the small radicle points in a contrary direction, *i. e.* to the basal point of attachment. He therefore erroneously concludes that in this family the embryo is either homotropal or antitropal, or in other words, is sometimes directed to that point of the seed next the hilum, at others towards the opposite extremity. These statements, it will soon be seen, are founded in error. In the following year, M. Cambessèdes, in describing the Guttiferous plants collected by A. St. Hilaire in Brazil, details the structure and position of the seed in *Clusia* in still more minute and positive terms; but Mr. Miers states that little dependence is to be

placed on such definitions, especially in regard to the terms *base* and *apex* of the seed, because in the figures there given the seed is placed in a position diametrically opposite to that in which it is attached to the placenta, and there is therefore an evident misconception of the whole structure. Von Martius, in his admirable work on the plants of Brazil, gives no account of the structure of the seed of the many Guttiferous genera he there details; but he describes minutely the seed of *Platonia insignis*, where the nucleus, enclosed within the testa, is stated to consist of a large mass of fleshy albumen, having in its centre a long terete embryo with a superior radicle, the whole consolidated into one integral inseparable mass. As this form of embryo was opposed to the general conclusion of botanists in regard to the structure of the seed in *Clusiaceæ*, he suggested the propriety of placing the genus *Platonia* in a distinct family, which he called *Canellaceæ*, thus associating it with *Canella alba*, a plant very different in habit and floral structure, and of which little is known of its carpological structure. Endlicher, in his 'Genera Plantarum,' gives the character of each genus of the *Clusiaceæ* in accordance with the views of Cambessèdes, and arranges *Platonia*, following Martius, in the *Canellaceæ*, as a suborder of *Clusiaceæ*. Pöppig, in describing several Guttiferous plants of Peru and Brazil, gives no account of the structure of the seed. Lindley, in his 'Vegetable Kingdom' adopts the views of Cambessèdes in regard to the *Clusiaceæ*, at the same time that he admits *Platonia* as a member of that family. Miquel, describing in 1844 a species of *Arrudea*, in like manner misconceived the structure of the seed, attributing to it an embryo with plano-convex cotyledons and a very short radicle. Lastly, Choisy, in a more recent memoir (1850), while he treats at some length on the organography, affinities, and subdivisions of the *Guttiferae*, and gives differential characters of the several genera of the family, nowhere alludes to the structure of the seed, which is the more remarkable, because the facts published in the thirty years elapsed since his first memoir are completely at variance with his former views on the subject.

Mr. Miers then proceeds to give the results of his own observations on the structure of the seed, selecting first that of a species of *Clusia*, closely allied to *Clusia criuva*, upon which Cambessèdes principally relied in the construction both of his ordinal and generic characters of the family. The seed-vessel is here described as being formed of five fleshy valves, which break away from a central five-winged persistent column, in the angular recesses of which several seeds are horizontally attached in two longitudinal rows. Each seed is about an eighth of an inch in length, is oval, slightly gibbous on

the upper side, the lower or ventral face presenting a prominent keel, extending from the base to the apex; the external tunic is fleshy, of an orange colour, and easily scraped off, when beneath the keel is seen a conspicuous raphe, one end of which proceeds from the basal point of attachment and terminates in the apex, where it is lost in an aperture seen in the crustaceous shell of the seed; this aperture is in the centre of a radiately striated cup; the shell is striately-punctate outside, smooth inside, and is lined with a free membranaceous integument, contracted at its summit into a narrow neck of a darkish colour, by which it is suspended from the extremity of the raphe-like cord that has penetrated through the apical aperture: a solid nucleus filling the cavity of this inner integument is of a pale-green colour, marked by numerous parallel yellow striæ which cease around an areolar space at the base, in the middle of which is seen a minute shining tubercular point: the apex of the nucleus is distinguished by a short hemispherical nipple-shaped protuberance of a smaller diameter, which is divided to its base by a distinct transverse cleft into two equal portions, the bottom of this commissure on the ventral side corresponding with the dark-coloured neck of the inner integument, as well as with the somewhat lateral aperture in the summit of the outer shell, and with the termination of the cord described; on making a longitudinal section of this nucleus, the cleft above-mentioned is more distinctly seen, and at the bottom of the commissure is observed a minute prominent point, and in the axis extending from this point to the small tubercular speck at the base, there is observed a continuous line, more or less narrow, somewhat curved, more opaque and of a whiter colour than the rest of the nucleus, the principal fleshy mass being of a semicrystalline hue. This internal thickened line is what Gærtner considered to be the embryo of the seed, and the fleshy surrounding mass to be copious albumen. Choisy, Cambessèdes, and most other botanists have considered the main body of this nucleus to be two large cotyledons agglutinated into one solid mass, the line of their junction being indicated by the curved line just mentioned; while they held the nipple-shaped protuberance to be the radicle. Mr. Miers, however, concludes, from the facts above described, that the seed is enveloped in a fleshy arillus, and exhibits between it and the testa a free raphe, extending along the ventral face from the point of its attachment at the placenta, to the apex, where it penetrates the cup-shaped ring situated near the summit of the testa, through a distinct hole in the bottom of the cup, and where it is lost in the apex of the inner integument in the centre of its distinctly marked chalaza. Another

small cicatrix is observed at the opposite extremity of the testa, at a point near its attachment to the arillus and placenta, which must be considered as the micropyle. The distinct aperture in the summit of the testa through which the nourishing vessels of the raphe reach the chalaza, is called by the author the *diapyle*, in contradistinction to the micropyle observed at the opposite extremity of the testa. The diapyle, in this and many other families, forms a distinct aperture filled with soft fungous matter; in other cases it is less discernible, being closed by the osseous deposits of the testa, and is only recognizable as the point where the extremity of the raphe becomes lost in its substance. The existence of the diapyle in connexion with the raphe and chalaza of the inner integument constitutes an important feature in this inquiry. The nipple-shaped protuberance in the summit of the nucleus, hitherto taken to be the radicle, appears beyond doubt (as first shown by Richard) to be the two cotyledons of the embryo, which though small and short, are nevertheless quite distinct; and their relative position is indicated by the cleft being placed right and left of the axis, or with their commissure pointing to the raphe: the main body of the nucleus, instead of being confluent cotyledons, as hitherto supposed, must be a gigantic radicle, in the axis of which is imbedded the caulicle of the embryo (or rather what, for reasons given in the paper, Mr. Miers distinguishes as the *neorhiza*), shown in the opaque central line before mentioned, terminated at its base by the shining speck seen in the base, and at its apex by the plumule, which is seen protruding as a minute point into the space at the bottom of the cotyledonary cleft. The minute external speck seen near the base is considered by the author to be the germinating point of the *neorhiza*; it is always more or less prominent, of a green colour in the living state, and does not correspond exactly with the micropyle of the testa, but is always somewhat lateral in respect to it, and nearer the basal origin of the raphe.

The above analysis affords a good example of the general structure of the seed in the tribe *Clusiæ*, where a number of seeds are formed in each cell of the ovary, and where they are attached in a horizontal position by their base to the axile placentary column; but in the other tribes (*Tovomiteæ* and *Garcinieæ*), where only one seed is formed in each cell, and where this is fixed to the axile column in a vertical position by its ventral face, a somewhat different structure exists; and were it not for the explanation afforded by the former case, the structure of the embryo in the two latter instances would not be so easily understood. In the *Clusiæ*, the raphe enclosed

within a fleshy arillus is seen to extend from the base to the apex of the seed, and is free from the testa; in the other tribes the testa is thinner, and enveloped in a thicker fleshy, or more pulpy arillus, has a large hilum upon its ventral face, the raphe being short, less discernible, imbedded and lost amidst the numerous branching nervures conspicuously extending over its surface. The author gives as an example of this development, the analysis of the seed of *Lamprophyllum lætum*, which he examined during his residence in Brazil: this forms the type of a new genus distinct from *Garcinia*, comprising numerous South American species, among them the *Calophyllum Calaba* of Linnæus, and others heretofore associated with *Garcinia* and *Calophyllum*. Here the fruit is a small drupe containing generally two, or by abortion a single seed, about the size of a hazel-nut, which is enveloped in mucilaginous pulp: the testa is thin and brittle, marked by numerous nervures branching from a large ventral hilum, and it contains a solid fleshy nucleus, exhibiting in the apex a very minute prominent nipple in a small hollow a little below the summit of the ventral face: near the base, somewhat on the dorsal side, is seen a green shining speck, exactly like that seen in the seed of the *Clusiæ*; the body of the nucleus is solid, of a pale sulphur colour, filled with numerous ducts or cells that exude a viscous juice when cut: a slender caulicular process, like that described in the *Clusiæ*, is seen somewhat oblique with the axis, one of its extremities terminating in the nipple, the other in the basal speck just described, the latter being without doubt the germinating point of the root, the minute apical nipple being the plumule, the main body of the nucleus forming a gigantic radicle, and the cotyledons at first sight appearing to be wanting; but on examining the minute nipple-shaped process under a strong lens, this is observed to be formed of four diminutive imbricated scales, surrounding a central prominent point, which is concealed by the two inner and larger scales; the two outer decussating leaflets, thus separated from each other, are smaller, shorter, and placed right and left of the ventral face, as in the cotyledons of the *Clusiæ*; from this circumstance, and from their commissure being directed to the ventral face, the author infers from analogy, that these outer scales are the true cotyledons of the embryo, notwithstanding their minuteness. Generally, in exogenous plants, the want of cotyledons indicates the future absence of leaves in the plants produced from the growth of such seeds. In the *Clusiæ*, however, where the floral structure is of the highest order of development, belonging frequently to the largest trees of tropical forests, with copious foliage, large fleshy leaves, and rich in mucil-

luginous juices, the absence of cotyledons, or their reduction to microscopical proportions, offers an anomaly suggestive of many considerations on the nature of vegetable reproduction.

This structure was found to exist in every instance in the seeds of the *Garcinieæ* and *Tovomiteæ* examined by the author; and he quotes the descriptions of Gærtner, Plumier, Graham, Roxburgh, and Wight, in proof of the same general conformation. All existing evidence, therefore, tends to prove the constant development in the axis of the solid nucleus of the seeds in all Guttiferous plants, of that peculiar process which the author considers to be the neorhiza; for our decision upon this point will determine in a positive manner, the nature of the other parts of the seeds to which such various conclusions have been assigned by previous botanists. This determination he considers to be proved by the drawings of Dr. Roxburgh and the evidence of Dr. Wight, where the seeds of *Xanthochymus* are figured in a state of germination: in a longitudinal section of the seed in this state, as shown by these accurate observers, the same linear process in the axis of the nucleus is depicted as that above described; the basal speck is there seen throwing out a long root, while the apical nipple-shaped process has simultaneously become prolonged, carrying up with it the leaflets of the growing plumule, and from the lower part of the neck thus protruded, and beneath the two lower scales shown to be the cotyledons, a second rootlet is seen sprouting, tending first horizontally and then downwards. This fact, the author states, proves beyond doubt, that the process in question is the neorhiza; for if it were the embryo imbedded in albumen, as Gærtner affirms, it would not throw a descending shoot from the neck of the plumular extension, as well as at the base; nor would the same result follow if it were the radicle enclosed in confluent cotyledons, according to the view of Dr. Graham. The fact is altogether fatal to the conclusions of Choisy, Cambessèdes, and most modern botanists, that the great mass of the nucleus consists of two confluent cotyledons, and that the mammæform apex in the *Clusieæ* is its radicle, even if those opinions had not been disproved by the evidence offered in the preceding portion of this memoir.

This view of the constitution of the nucleus is further confirmed by an examination of its structure under the microscope, which the author minutely details.

November 7th, 1854.

Thomas Bell, Esq., President, in the Chair.

Thomas Fleming Robinson, Esq. was elected a Fellow.

Mr. Samuel Stevens, F.L.S., exhibited a cone of *Araucaria Cookii*, from New Caledonia; and the caudex, with the male and female cones, of *Stangeria paradoxa*, from Natal.

Dr. Alexander, F.L.S., exhibited a sample of Dalmatian Figs, together with specimens of vegetable fibre prepared in the Jamaica Botanic Garden from various species of *Yucca*, *Bromelia*, *Tillandsia*, *Musa*, and *Sida*; and the Secretary read extracts from two letters addressed by Mr. A. Wilson, Curator of the Botanic Garden at Bath, in the Island of Jamaica, to R. C. Alexander, M.D., F.L.S., &c., on the textile plants of the Island, native and cultivated. In the last of these letters, dated Bath, September 25, 1854, Mr. Wilson says:—"You are aware that we abound in textile plants: I have already prepared fibre from twenty different species, and perhaps I might discover twenty others. Those you mentioned, such as the *Urtica* tribe, produce excellent fibre, but not in quantity sufficient to warrant a profitable cultivation among a lazy people. I have lately been agreeably surprised to find so large a quantity of fibre from a species of *Sida* (*S. mollis*) growing in this garden. It is most admirably adapted for cultivation in any soil or situation. There is also another plant (a species of *Triumfetta*), which is a wayside nuisance, but which produces a splendid fibre. I should be obliged if you would exhibit these fibres to the next meeting of the Linnean Society; it might be the means of attracting attention to a new and profitable cultivation in this unfortunate island. It was in consequence of the transmission to London of a very few species of fibre that attention has of late been so much drawn to our textile resources, and I think it a fortunate circumstance that we have those resources to fall back upon. It has occurred to me that I might, with advantage to the island, send about twenty species of fibre to the Great French Exhibition of next year, which would be a means of extending their reputation, and perhaps of inducing the investment of capital on a large scale in their cultivation."

Read also a Memoir "On the Embryo of *Nelumbium*." By Benjamin Clarke, Esq., F.L.S., &c.

Mr. Clarke's observations were made on seeds germinated in the

Royal Gardens at Kew, in various stages of advancement. His view of the embryo is, that the plumule is enclosed within two large amygdaloid cotyledons, with well-defined margins, which are distinct down to the attachment of the base of the plumule, or very nearly so; and there is also an obvious tendency to form a radicle, so that the embryo appears to conform fully to the ordinary dicotyledonous type. Then follows the membranaceous envelope and four leaves successively, which are alternate with the cotyledons, and in most cases there is a slight attempt to produce a fifth. The membranous envelope, or proper membrane of the plumule, consists entirely of cellular tissue, and has indistinctly the appearance of a leaf alternating with the first leaf above it. The first two leaves having laminæ are elevated in the young stem of the plumule, so as to be removed to some extent from the cotyledons, while the proper membrane arises from its very base, and might be described perhaps as being attached to the line of junction between the young stem and cotyledons. It can have no connection with the first leaf of the plumule, a considerable portion of the axis intervening between them. Supposing it to be a stipule, it must be compounded of two, and those belonging to the cotyledons. This, however, the author thinks, will not be regarded as probable; he considers it without doubt as a rudimentary leaf of the plumule itself, for which opinion he gives several reasons. It is further remarkable that all the remaining four leaves of the plumule are furnished with laminæ, differing in this respect, Mr. Clarke observes, from those of the stem, where only one leaf in three ever produces a lamina. Of these four leaves of the plumule the first is without stipules; a farther proof, in Mr. Clarke's opinion, that the proper membrane is not to be regarded as a stipule. Of the three succeeding leaves, the intra-axillary stipule of each, on being laid open, is found to contain the succeeding leaf. This stipule Mr. Clarke regards as compounded of two, one originating on each side of the petiole, united by their membranous margins within the axil of the leaf, as in *Pontederia* and *Potamogeton*. As regards the foliage of the plant, Mr. Clarke states that according to his view, three leaves only are produced on each node, and are attached so nearly on a parallel, that did they not successively enclose each other, they could not be distinguished from opposite leaves; of these the two outermost of each whorl consist only of membranous scales, without any rudiments of stipules, completely surrounding the third and perfect leaf. This leaf having a lamina, should, Mr. Clarke states, in common with those in the upper part of the plumule, have a large intra-axillary stipule, enclosing the terminal bud or

growing-point, and this he finds to be obviously the regular structure. The flower appeared in one instance not to be terminal, but to be produced from the axil of the second scaly leaf, while the buds in the axils of the leaves with laminae were leaf-buds. On the subject of affinity, Mr. Clarke thinks that the Nymphæal alliance, as usually limited, has no very near relationship except with *Ranunculaceæ*; but that much analogy exists between it and some Endogenous families, and that it may also be connected with *Cryptogamæ*, through *Ceratophyllum* and *Chara*, the embryo of *Ceratophyllum* showing a difference between its second foliaceous appendages as compared with those that follow, in analogy possibly with that of *Nelumbium*.

The paper was accompanied with a series of illustrative drawings.

Read further, "Notes on *Cephalotæ* and *Belvisiaceæ*." By Benjamin Clarke, Esq., F.L.S., &c.

In these two notes Mr. Clarke gives a general account of the structure of the remarkable plants on which the families are founded. The ovule of *Cephalotus* he describes as erect, anatropal, with a dorsal raphe, and a large and somewhat two-lipped foramen at the base, on the inner side of the funiculus. The torus in the ripe fruit is described as broad and conical, almost filling the calyx; during the stage of flowering it is almost flat, the carpels appearing to be attached to the flat base of the calyx. As the fruit advances in growth the conical torus forms between the carpels, to the sides of which they are attached; and after the carpels are fallen off, it forms a rim immediately above the part to which they were attached, not unlike the expanded style of *Sarracenia* in miniature, the rim, however, being comparatively much more contracted. The rim has six angles, which alternate with the attachments of the six carpels, and from the place of attachment of the carpels, or immediately above them, are formed six small filamentous processes. Mr. Clark considers this small peltate process as analogous with the expanded termination of the style in *Sarraceniaceæ*, and consequently regards the nearest affinity of *Cephalotæ* as being with that order. In other respects he considers it as very nearly allied to *Francoaceæ* and *Ranunculaceæ*, and thinks it shows some analogy with *Aristolochiaceæ* in the glands of its calyx. It approaches *Rosaceæ* in its perigynous stamens, and in the position of its raphe, if the ovule pendulous with raphe next the placenta be regarded as an equivalent character.

In his note on *Belvisiaceæ*, Mr. Clarke describes the ovary of *Napoleona* as five-celled; the ovules as two—four in each cell, when

two suspended, when four in pairs one above the other, and (in an early stage at least) nearly horizontal; when suspended amphitropal, with the raphe dorsal and the foramen turned up nearly to the base of the ovule, so as to be distinctly under the funiculus; the style thickened, more or less hollow below, and terminated above by a broad peltate plate, forming the stigma; the stigmatic surface confined to five small elevations in the five angles of this plate, within which are five cavities opening upwards; and the stigmatic surfaces apparently opposite to the cells of the ovary. He states the principal points of structure which may be regarded as indicative of affinity to be, first, the acicular woody fibre, in which *Napoleona* agrees with *Clusiaceæ* and *Rhizophoreæ*, particularly the former; secondly, the table-shaped stigma, which he states to be almost peculiar to *Clusiaceæ* and their allies, and this character, he thinks (as well as the monadelphous extrorse stamina), separates *Belvisiaceæ* from *Myrtaceæ*; thirdly, the dorsal raphe (or at least the resupinate position of the ovules), in which they agree with *Ternstræmiaceæ* and *Barringtoniaceæ*, where the ovules are few and suspended, but differ from *Rhizophoreæ*, where the raphe is next the placenta. The balance of affinities is therefore, in Mr. Clarke's opinion, towards *Clusiaceæ* and *Ternstræmiaceæ*.

November 21st, 1854.

Thomas Bell, Esq., President, in the Chair.

Dr. Iliff, F.L.S., exhibited specimens of *Baccharis genistelloides* and a species of *Senecio* from Peru, transmitted to a German commercial house as pharmaceutical simples.

At the request of the President, Mr. Brocas exhibited numerous specimens of leaf skeletons, prepared in such a manner as to represent delineations of natural objects, portraits, &c.

Read the conclusion of Mr. Miers's "Observations on the Structure of the Seed and peculiar form of the Embryo in the *Clusiaceæ*," commenced on the 20th of June.

The author proceeds to offer some observations on the nature of the external covering of the seed, which is considered by him to be an arillus. In the *Clusiæ* this is entire, without the smallest fissure,

is fleshy, of equal substance, not very thick, and generally of a reddish-yellow or orange colour. In the *Tovomiteæ* it is slit upon the dorsal side from top to bottom, the fimbriated edges overlapping each other, so that when opened out, it appears like a flat sheet with the seed attached in its centre. In the *Garcinieæ* the arillus is much thicker, of pulpy or mucilaginous substance, generally edible, and quite entire, as in the *Clusieæ*. The nature of this outer covering in the two last tribes cannot be questioned, and it is fair to conclude that the precisely analogous development in the *Clusieæ* is also a true arillus. It is however essential to determine this point beyond cavil, because in the *Hypericaceæ*, *Marcgraaviaceæ*, and other orders, it has been held to be a thickened epidermis of the testa, while in the *Magnoliaceæ* it has been assumed to be the testa itself. In the latter family, where the seeds are suspended by long funicular threads, it forms a very conspicuous development, under the form of an entire fleshy scarlet-coloured covering, precisely like that of *Clusieæ*, and where in like manner within it, on one side, is seen proceeding from the base to the apex a flattened raphe, whose upper extremity is lost in a fungous spot filling the cavity of a distinct aperture pierced through the osseous shell, which by most botanists has been considered to be the testa, but which by some has been held to be the inner integument of the seed, called *tegmen* by Mirbel, and *endopleura* by DeCandolle. Endlicher was the first to suggest this idea, which he expresses ambiguously, stating that the seeds of the *Magnoliaceæ* have in most cases "an external fleshy integument covering a crustaceous testa, with a raphe situated between it and the testa, and terminated by a chalaza on the summit, but that sometimes there is no outer integument, the raphe in such cases existing between the testa and endopleura." Mr. Miers considers that this misapplication of the term chalaza (a name that should be confined to the peculiar thickening of the inner integument where it unites with the raphe, around the point where all farther trace of the continuation of the nourishing vessels ceases), where evidently it has been confounded with the diapyle, has probably led to the error of regarding the true testa as the *tegmen* of the seed. Dr. Asa Gray, however, in his 'Genera of the United States,' amplifies this suggestion of Endlicher in unequivocal terms, stating that in *Magnolia* the seed has no arillus, and he designates as the testa the external scarlet covering which preceding botanists call arillus, while the hard crustaceous shell called testa even by Endlicher, is there denominated *tegmen*. This he infers from the fact of having observed spiral vessels in the placentary attachment of the ovules,

which he thinks "clearly demonstrates that the baccate exterior integument of the seed is formed of the primine of the ovule, and therefore is not an arillus." Had the growth of this tunic been actually traced from the primine of the ovule, an important fact would have been established; but simply because the primine is the more exterior tunic of the ovule, and the arillus is the external coating of the seed, it does not necessarily follow that the one is the product of the other, and notwithstanding the argument of Dr. Gray, there is no reason to doubt that in *Magnolia* the scarlet envelope is due to a subsequent growth over the primine, as occurs in numerous well-known cases. Mr. Miers is confirmed in this view by observations which he made in Brazil upon living seeds of *Talauma*, a genus closely allied to *Magnolia*:—First, he found the thick outer tunic to consist of fleshy or oily matter, in distinct granules, enclosed within a thin external epidermis, which is the usual texture of arillus, not of testa. Second, the coating called tegmen by Dr. Gray, and considered by him as the innermost integument, is in reality the intermediate envelope in *Talauma*: it has a small basal hilum, a longitudinal furrow runs along its ventral face for the reception of the free raphe, and a brown fungous scar through which the raphe finds a passage to the interior, fills a distinct aperture near its apex (the diapyle), which Dr. Gray, following the example of Endlicher, considers to be the chalaza; this crustaceous envelope is thick and osseous in texture, bearing all the characters of testa, certainly not of an innermost integument of the seed. Third, the existence of an inner membranaceous integument around the albumen, and within the true testa, thickened and discoloured round its summit, where it is attached by a short neck to the fungous process that fills the diapyle, and where it unites with the raphe, is a development wholly unnoticed by Dr. Gray, by Endlicher, or by DeCandolle, although the presence of this integument is indicated by Gærtner; but it is an important feature, because it proves that the bony coating is the testa, and not the tegmen, as has been inferred. Fourth, the raphe proceeding from the hilum is wholly exterior to and free from the bony coating, and interior to the outer tunic, and this is the constant position of the raphe when it is free, in regard to arillus and testa, assuredly not in respect to testa and tegmen. Fifth, as the raphe consists of the nourishing vessels originally existing in the funiculus or placental attachment of the anatropal ovule, it could never have existed between the primine and secundine, but must have been, as Dr. Gray figures it, wholly exterior to the primine, and consequently, as we afterwards find it, outside the testa, which is a product of the

primine; hence as the raphe is found in a free state, though partially impressed in its soft substance, within the external tunic, the inference is irresistible, that the latter must be of posterior growth (therefore of the nature of an arillus), and in this manner enclosing the raphe within it. Sixth, we have thus the evidence complete of the existence of the usual and distinct envelopes around the nucleus of the seed, viz. an inner integument with its apical chalaza, an intermediate hard testa with its corresponding diapyle, through which the nourishing vessels of the more exterior raphe penetrate, and the whole included within a scarlet-coloured arillus.

From all these facts it may be inferred, that the envelope, which unquestionably is an arillus in the *Garcinieæ* and *Tovomiteæ*, must be of the same nature in the *Clusieæ*, and that which is arillus in the *Clusieæ* must be the same development in the *Magnoliaceæ*; that which is granted in the one, cannot, Mr. Miers thinks, be denied in the other. Although it be true that the several envelopes of the seeds in different families are not to be recognized alone by their consistency, which may be more or less membranaceous, ligneous, cellular, or composed of oily or resinous granules according to circumstances, yet they may always be determined by their relative position in regard to raphe, chalaza, diapyle, micropyle, hilum, &c.

Connected with this question is that of the origin and mode of growth of the arillus in seeds, which by St. Hilaire is described to be of two kinds, the true and the false arillus, the former open at its extremity, the latter entirely covering the seed. This view was afterwards modified by Dr. Planchon, who gave to the false arillus the name of arillode. Both kinds are alike in texture, form, and colour, their difference consisting in this:—the arillus, whether abbreviated or entire, always covers the micropyle of the testa, while the arillode constantly exhibits a minute or larger opening in its surface around the micropyle, which is never covered by it. He traces this distinction to their different sources of origin, attributing the growth of the true arillus over the ovule to a gradual enlargement of the funiculus, noticing its first appearance from a mere swelling of the umbilical cord to its gradual increment and ultimate development; but the arillode, he states, is derived from an enlargement of the mouth of the exostome or foramen of the ovule, its margins being reflected and produced over the primine, thus growing upon it in the form of an additional tunic. In either case, it is, therefore, clear, whether this accessory coating be arillus or arillode, that the raphe, when it is free, must necessarily be enclosed within it. In *Euphorbiaceæ* this coating is considered by many botanists, Dr.

Planchon among the number, as merely an epidermis of the testa ; but it becomes difficult to discriminate between a very thin arillus and a thick epidermis, as both appear to be of the same nature, varying in degree of thickness from one extreme to the other in different genera of that family. The most instructive and conclusive evidence of the origin and subsequent extraneous growth of the arillus over the ovule, has been adduced by Cambessèdes, who found in *Casearia* many incomplete seeds where the anatropal ovule remained in a state of complete abortion, while the arillus had grown over it to its full extent, proving that where the ovule had ceased to grow, the increment of the funiculus was not stopped in its progress of extraneous development. According to the hypothesis of Dr. Planchon, the outer tegument in the *Clusiaceæ*, as well as in the *Magnoliaceæ*, must be a true arillus.

The facts thus demonstrated will, Mr. Miers argues, necessarily change our views of the affinities of the *Clusiaceæ*, serving to bring the order into close proximity with the *Rhizobolaceæ*, a relationship long ago pointed out by Cambessèdes, founded upon their floral structure, but now rendered more evident by the great similarity observable in their extraordinary embryonal development. The latter family exhibits likewise an embryo with a gigantic radicle, and exceedingly small cotyledons, but here these are separated from the radicular body by a slender free caulicle or neck ; now if we imagine the suppression of this caulicular extension, and the close approximation of the minute cotyledons to its monstrous radicle, there would be little or no difference in the structure of the embryo in the two families. While these circumstances tend also to draw closer the affinity of the *Clusiaceæ* to the *Hypericaceæ* and *Marcgraaviaceæ*, they tend to remove them far from the *Ternstræmiaceæ*, with which order they have been hitherto considered to be most intimately related. The farther consideration of the real affinities of the *Clusiaceæ* will be more fully examined by the author, who intends on a future occasion to treat of the organography, floral structure, and generic features of the whole family, restricted within the limits he proposes.

December 5th, 1854.

William Yarrell, Esq., V.P., in the Chair.

Mr. Ward, F.L.S., exhibited two sets of specimens of *Asplenium*

lanceolatum, from Jersey, both found growing on disintegrated sandstone, exhibiting a striking difference between the growth of the same species on an open sunny bank and in dense shade.

Mr. John Hogg, F.R.S., F.L.S., exhibited some scales, and a piece of the scaly covering which was cut from the back of a large fish found in the river Tees, in September of this year. He stated that two fishermen observed a great fish—such as they had never before seen—left by the tide on a sand-bank, in the estuary of the river Tees. They described it as having the head of a salmon, with the back-fin like that of a perch, erect, and somewhat spiny, and the tail spreading and much curved. The colour they did not mention, except that of the back, which was represented as being of a purplish-black. They likewise particularly observed some large scales on the front of the fish near the gill-covers, one of which Mr. J. Hogg also exhibited, and which is of a very strong bony texture. From the account of this fish so given, Mr. Hogg conceived that it could only have been a large Tunny (*Thynnus vulgaris* of Cuvier), which had been stranded whilst in pursuit of herrings or other small fishes. MM. Cuvier and Valenciennes in their ‘Hist. Nat. des Poissons,’ tom. viii. p. 57, separated the Tunnies from the Mackerels (*Scomber*), in consequence of the “remarkable disposition of the scales on the thorax, which are larger and more unpolished than the others, and form around that part a sort of corselet?” They also describe the corselet of the Common Tunny thus:—“Le corselet, c’est-à-dire cette portion du tronc couverte d’écailles plus grandes et moins absorbées dans la peau, est considérable.” (p. 62.) This, however, would seem to lead to an incorrect view of the smaller scales on the back, which are, as it were, enclosed between two skins, and are placed in a somewhat imbricated manner, resembling the arrangement of the slates upon a roof, and cannot properly be termed “absorbées dans la peau.” Mr. Hogg showed the nature of the piece of the external covering which the fishermen had cut off the back; the outside skin being of a dark, or nearly black colour, and of a coriaceous substance. The white scales, imbedded in it, are similar to those forming the corselet near the gill-covers, but they are much smaller, and so closely placed by one overlapping the other, that they constitute a perfect defence against nearly every kind of danger. The piece so cut off the back of the fish, which was done with some difficulty, resembling a portion of a shield, would seem to be (from the close disposition of the osseous plates or scales enclosed between two skins) proof against large shot, or

even a ball from a musket. Both the external large plate-like scales forming the corslet, and those, arranged in a slate-like manner, between the skins, are of an irregular, but somewhat round, or oval, shape. When seen from the outside of the external black skin, the plain parts between the extremities of four scales, present, by the overlapping of their edges, a somewhat regular appearance, and are of a nearly uniform size, viz. about half an inch in length, by a little more than one-eighth of an inch in width, and they thus exhibit much of a diamond pattern.

Mr. Hogg observed, that ichthyologists seem not to have described this remarkable protection, presented by the thick skins, and strong bony interlaminated scales, which is evidently a beautiful provision of Nature to defend these fishes from the attacks of their enemies, and especially those of their greatest foe, the sword-fish.

Read a paper "On *Decaisnea*, a remarkable new genus of the tribe *Lardizabaleæ*," by J. D. Hooker, Esq., M.D., F.R.S., F.L.S., and Thomas Thomson, Esq., M.D., F.L.S.

The small family of *Lardizabaleæ*, which was first instituted many years ago by Mr. Brown, and characterized by the distribution of the ovules over the whole surface of the ovary, was afterwards admirably illustrated by M. Decaisne in a memoir in the 'Archives du Muséum.' Though the peculiar distribution of the ovules has always been justly regarded as the most striking characteristic of *Lardizabaleæ*, it is by no means the only peculiarity of the order which may be distinguished from all its near allies by a considerable number of very striking characters, sufficiently proving the distinctness of the order even where the prominent characters of the insertion of the ovules and the digitate leaves are absent. This is remarkably the case in the plant to which the authors of this paper called the attention of the Society, and of which a figure was placed on the table.

This interesting plant, which was originally discovered in Bhotan, by Mr. Griffith, is briefly referred to in his 'Itinerary Notes,' under the name of *Slackia insignis*, a name evidently imposed on a conviction that the many striking characters which it presents warranted the establishment of a new genus, to which, however, no characters were assigned. That name having (before the publication of these 'Itinerary Notes,' in which it was only a manuscript designation,) been applied by Griffith himself, in his 'Essay on Palms,' to a genus of that order, the authors proposed to designate the plant now described, *Decaisnea*, after the distinguished monographist of the group

to which it belongs, as the two genera of *Orchideæ* which have been so called have both proved to have had earlier names.

DECAISNEA, *Hf. & Thoms.*

Sepala 6, lineari-subulata. *Petala* 0. *Stamina* in flore masculino monadelphica, in hermaphrodito parva libera. *Ovaria* 3, lineari-oblonga. *Ovula* placentis 2 filiformibus parallelis, suturæ ventrali approximatis sed ab eâ discretis, inserta, indefinita, anatropa. *Folliculi* pulpâ repleti. *Semina* indefinita, compressa; testâ lævi, nitidâ, crustaceâ, atrofuscâ.

Frutex *Himalaicus erectus*; foliis *alternis, pinnatis*; inflorescentiâ *racemosâ, terminali*; floribus *pallidè viridescentibus*.

Decaisnea insignis is a native of the temperate parts of the Eastern Himalaya, at elevations between 8000 and 10,000 feet. As mentioned above, it was first discovered in Bhotan by Griffith. Dr. Hooker's specimens are from the interior of Sikkim. It is an erect shrub, with large simply pinnated leaves, and a nearly simple trunk, marked by large scars after the leaves fall away, as in many *Araliaceæ*. The nearest analogy is no doubt with the section *Mahonia*, of the genus *Berberis*, but the leaves of *Decaisnea* are soft and thin, not rigid and prickly as in *Berberis*. The flowers are arranged in elongated racemes, and closely resemble those of other *Lardizabaleæ*. Their colour is pale green, slightly tinged with purple towards the apex. The sepals are elongated to a subulate point, and there are no petals. The stamens on the male flower are monadelphous, and very like those of *Stauntonia* or *Parvatia*. In the fertile flower the stamens are free and very small, but the anthers always contain pollen, so that the flowers are rather polygamous than dioicous. The most remarkable character is exhibited by the ovaries, which, though externally not unlike those of *Hollböllia*, have the ovules arranged in a double series along two elevated lines, one on each side of the ventral suture, and not scattered over the whole surface of the ovary as in all the other genera. The same arrangement is preserved in the ripe fruit, which consists of three large follicles full of an agreeably-flavoured solid pulp, dehiscing along the ventral suture, so as to expose to view the numerous shining black seeds, in structure like those of *Hollböllia*.

The characters of this remarkable plant are so striking that no lengthened detail is necessary. It will suffice to call attention to its importance, as affording an indication of the value of characters in the class of plants to which it belongs. An inspection of the figure (which is intended to form one of the plates of Dr. Hooker's 'Illus-

trations of Himalayan Plants' now in preparation) shows that, notwithstanding its remarkable alteration from the character which has hitherto been considered as most essential to *Lardizabaleæ*, it is an undoubted member of that group. At the same time it illustrates, by many points of structure, the relationship of that tribe to all the surrounding orders. The proof which it affords that the apparently very aberrant structure of fruit in which the ovules are scattered over the whole surface of the ovarium, is compatible in the same order with the normal structure, and is therefore reducible to it, and as it were only a modification of it, is especially interesting, and sufficiently, the authors trust, justify them in bringing the plate just completed to the notice of the Society.

Read also observations "On the Identity of *Pinus hirtella* and *Pinus religiosa* of Humboldt, Bonpland, and Kunth." By Berthold Seemann, Esq., Ph.D., F.L.S.

Dr. Seemann states that a short time ago, when determining the *Coniferae* gathered by himself in the western parts of Mexico, he was glad to find that he had amongst them specimens of the *Pinus* (*Abies*) *hirtella*; but on comparing them with those named *Pinus* (*Abies*) *religiosa* in the herbaria of Sir W. J. Hooker and Mr. Bentham, he observed that the latter too, without exception, had *hirtellous* branches; and again, on examining specimens of *P. religiosa* growing in the Royal Botanic Gardens of Kew, as well as at various other horticultural establishments, he found that they did not differ in any way from those of *hirtella* collected by himself. As the only difference between *P. religiosa* and *P. hirtella* insisted upon by writers on *Coniferae* consists in the former having glabrous, the latter *hirtellous* branches, he was forced to conclude that all the specimens of *P. religiosa* which he had seen in this country ought to be called *P. hirtella*, unless it could be shown that *P. religiosa* had (notwithstanding Humboldt's, Bonpland's, and Kunth's description) *hirtellous* branches. In order to ascertain this point, he addressed a letter on the subject to Mr. George Gordon, at the Horticultural Society's Gardens at Chiswick, a gentleman of great practical experience, who, in a letter dated Chiswick, Nov. 11, 1854, kindly replied, that "having taken a good deal of interest and pains in the matter, when Mr. Hartweg was collecting in Mexico, and begged him to examine minutely Humboldt's and Bonpland's localities, and see what their *A. hirtella* was, he did so, and could discover no other species than the 'Oyamel,' or *Abies religiosa*. He found *Abies religiosa*, and carefully examined the same in various places

between 15° and 22° S. Lat.; but its chief range was about 19° and at an elevation of 9000 feet. He found it on the 'Campanario,' the highest point of the mountains of Angangués, 5 or 6 feet in diameter, and 150 feet high; at other places very much smaller and stunted, but still the same species; and I have, as well as Hartweg, after carefully examining all these facts, come to the decided conclusion that both names, *P. hirtella* and *P. religiosa*, belong to the same species; and that the error arose from describing imperfect specimens, and not having cones of *A. hirtella* to compare with the 'Oyamel' of the Mexicans."

Finding that Mr. Gordon's opinion coincided so entirely with his own, in order to settle the point definitively, Dr. Seemann requested his friend Dr. Charles Bolle, at Berlin, to examine Humboldt and Bonpland's original specimens of *P. religiosa*, and to ascertain whether they had glabrous or hirtellous branches. In a letter just received from that botanist, dated Berlin, Nov. 24, he says,—“I congratulate you upon your power of divination, for the authentic specimens of *P. religiosa* in the Royal Herbarium have certainly hirtellous branches.” We may therefore conclude that *P. religiosa* and *P. hirtella* are identical, and consider the difference thought to exist between them as entirely attributable to imperfect descriptions. As the names were both given at the same time, it becomes a question which of the two ought to be adopted. The name *hirtella* might appear the most appropriate, as indicating a botanical character; but as that of *religiosa* is so much more diffused, and as the plant is used in Mexico, on account of its elegant branches, for ornamental purposes on religious festivities, Dr. Seemann determines in favour of the name *P. religiosa*.

Read further “Remarks on Fossil Palms.” By Dr. Göppert, Professor of Botany in the University of Breslau. Translated from the German and communicated by Berthold Seemann, Esq., Ph.D., F.L.S.

These remarks are the result of a letter addressed by Dr. Seemann to Dr. Göppert, requesting to be favoured with a brief summary of all that is known of fossil Palms, and they have appeared to Dr. Seemann of so much interest as to induce him to lay them before the Linnean Society. They are as follows:—

“During the last, and even the first quarter of the present century,” says Dr. Göppert, “so little was known of the structure of Palms, and all that was known appeared so abnormal to the scientific men of those days, that they were only too readily inclined to class with

the Palms almost all fossil plants presenting strange and anomalous forms. This remark applies with full force to *Sigillaria* and *Lepidodendron*, genera belonging to the Palæozoic formation; and startling as it may be, it cannot be very surprising to us, when we consider that even in our own times notions equally erroneous prevail to an almost incredible extent. For instance, a principal share in the formation of coal is still ascribed by the generality of geologists to the *Ferns*, although it has been proved by me, by a series of careful observations on numerous carboniferous formations, that such can be claimed only for the *Sigillarias* and *Stigmarias*; that a subordinate share only is due to the *Araucarias* and *Calamites*, contained in the anthracite coal; and a still less significant portion to the *Lepidodendrons*, the *Ferns*, and the remaining members of the flora of the Carboniferous period.

“A diligent study of the extinct flora has demonstrated that the Palms occur more *rarely* than was thought in the transition rocks and the Carboniferous formation, and more *frequently* than was believed in more recent formations. Generally speaking, we know at present only trunks, leaves (both fan-shaped and pinnatisect), and a few fruits of fossil Palms; flowers have as yet not been discovered, and the spathes collected have hitherto not been satisfactorily proved to belong to the natural order under consideration. These fragments, remnants of members of former creations, have been distributed under nine genera and seventy-eight species. For the trunks, there have been adopted the genera *Palmacites*, Brongn., and *Fasciculites*; for the leaves, *Flabellaria*, Sternb., *Zeugophyllites*, Brongn., *Phænicites*, Brongn., and *Amesoneuron*, Göpp.; for the spathes, *Palæospatha*, Unger (founded, as has been stated, upon doubtful materials); for the fruits, *Baccites*, Zenk, and *Castellinia*, Massal. The genus *Burtinia* of Endlicher, placed by Unger among Palms, belongs without a doubt to *Pandaneæ*, and is identical with *Nipadites*.

“Although our present imperfect knowledge of fossil plants renders it an almost useless task to speak of the proportion which the number of Palms bears to that of the other members of the extinct flora, yet it may be remarked that, if the number of species of the fossil flora is assumed to be 4000,—there are actually 3945 described,—Palms constitute about the eighty-fourth part of the whole. In the transition rocks no remnants of Palms have as yet been discovered; in the Carboniferous formation five species have been noticed; in ‘Kupfersandstein,’ or the Permian formation, only two species have been collected; in the secondary class of

rocks which succeeds (Keuper, Bunter-Sandstein, Muschelkalk, Lias-Jura, and Wealden formation), none have been collected except three species in the Cretaceous formation, especially in Quadersandstein. The greatest number has been found in the Tertiary class of rocks, viz. sixty; twenty-nine of which belong to the Eocene system, and thirty-one to the Miocene formation. The habitat of nine species is unknown.

“It will be seen from this synopsis that there was a geological period when Palms were entirely wanting in the extinct flora, or when, after their first appearance on the globe, they vanished again, and after a lapse of time reappeared; a state of things, which if confirmed by future investigations, would certainly be highly curious, and is one never before observed in a like manner in any large group of plants. No species is common to two formations. Several species show a remarkable degree of resemblance with those of the flora now existing, especially some of those collected by Junghuhn in Java, as for instance, *Amesoneuron calyptro-calyx*, Göpp., *A. dracophyllum*, Göpp., *A. fagifolium*, Göpp., and *A. anceps*, Göpp. But it would be rather bold, perhaps injudicious, to attempt identifying them, from the fragments hitherto collected, with those of the present flora. The results hitherto obtained only entitle us to say,—Palms make no exception to the rule generally received, that the laws governing the vegetable kingdom were the same in all periods of our earth’s history when plants existed; and that the species of Palms have a very local geological, as they have a very local geographical distribution.”

Read also, Extracts from a Letter addressed to Sir W. J. Hooker, F.R.S., F.L.S. &c. By Richard Spruce, Esq. Dated St. Carlos de Rio Negro, Venezuela, March 19, 1854. This letter is intended for publication in Sir W. J. Hooker’s ‘Journal of Botany.’

December 19, 1854.

Thomas Bell, Esq., President, in the Chair.

Isaac Newton Loomis, Esq., M.D., was elected a Fellow.

Read a Memoir “On the Food of certain Gregarious Fishes.” By Robert Knox, Esq., M.D. Communicated by William Yarrell, Esq., V.P.L.S.

Dr. Knox’s inquiries were commenced about thirty years ago, and

the results then arrived at were communicated to the Royal Society of Edinburgh, in whose 'Transactions' a notice of the paper was published. Since that period the observations have been repeated on many occasions, and the author does not find it necessary to alter or modify the statements which he originally made. His attention was first directed to the fact, that in the stomachs of Salmon, fresh from the recesses of the ocean, nothing is ever found except a small quantity of a peculiar reddish substance, unlike anything known to possess life. Practical fishermen agreed in the opinion, that the food of the Salmon, while resident in the ocean, was altogether unknown; neither could they give any satisfactory account of that of the Herring. Having learned accidentally, that in a lake or lakes near Lochmaben there existed in great abundance a small fish (the Vendace) which could not be tempted by any bait, and whose food was entirely unknown, he determined to visit Lochmaben, and make this fish, so easily procured, the subject of his researches. Dozens of Vendace were taken in nets, and immediately opened; and their stomachs were found crammed with thousands of *Entomostraca*, which were immediately recognized on placing a portion of the contents of the stomach under a strong lens. The species first discovered belonged to the genus *Lynceus*; but several other genera were subsequently observed; and in winter, that is to say, on the 14th of December 1832, several species of *Cyclops*, Müll., most abounded. The notion that the Vendace dies immediately on being taken out of the water, Dr. Knox found to be quite erroneous. It is by no means a very delicate fish, and could easily be transplanted to other lakes; but its good qualities have been much exaggerated.

The author next enters into some detail on the distinctive characters of a number of Vendace, both males and females, caught partly in the Castle Loch and partly in the Mill Loch, and which were carefully examined by his brother with a view to their supposed specific distinction. He treats as a delusion the idea that the males live apart from the females in deeper water, for a single draw of the net in the Castle Loch, in the presence of Mr. Murray and himself, was found to produce nine females and six males, although of forty taken in the Mill Loch at one time only two were males.

Dr. Knox then turned his attention to the food of the Char, of which some fine specimens were obtained from Windermere; and the food of these, which also proved to consist of *Entomostraca*, was exhibited to the Royal Society of Edinburgh. The Char is a gregarious, deep-swimming fish, and shy of taking any bait; but nevertheless it will rise to a fly, and the common food of the Trout may

be found in its stomach, although the author has not himself met with it. It does not seem to feed so exclusively on *Entomostraca*, although these unquestionably form the larger portion of its natural food. The observations on this fish were several times repeated, and always with the same results.

The Early-spring or Grey Trout of Lochleven form the subject of the next series of observations. Dr. Knox had many years ago remarked a distinction, which he is still disposed to believe may be specific, although anatomical investigation has not hitherto confirmed it, between the ordinary Trout of the lake and this, which is in the highest condition at the end of December, and in the months of January, February and March, a period in which all other descriptions of Trout are worthless as food for man. On an examination of these Trout in the month of January, they were found to be filled with *Entomostraca*, which the author has always found to constitute the food of the early spring Trout of Lochleven. During the remainder of the year, the ordinary Lochleven Trout live on the *Buccinum* and the common food of Trout, with which the lake abounds; they rise readily to a fly, and may be taken with worms or minnows, or any of the ordinary bait used for Trout.

In regard to the Herring, which next formed the subject of Dr. Knox's investigations, the great difficulty was to obtain specimens from the deep sea in fine order, and as remote as possible from the spawning condition, inasmuch as when found near the coast the Herring is either about to spawn or has already spawned; and in these states it is more or less of a foul fish, and the food taken by it at these times is not to be regarded as its natural food in the ordinary state. Of the hundreds and hundreds of deep-sea Herrings examined with this view, the author remembers only three in whose stomachs anything was found excepting *Entomostraca* of various species. Of these three, one had been feeding on sand-eels, another on what appeared to be small herrings, and the third on a small shell-fish, apparently a *Buccinum*. When near the coast, and before spawning, the Herring is frequently not feeding. The stomachs of a great number of Herrings taken in the Frith of Forth in January and February 1834, were found quite empty. After spawning, and while still close to the shores, they seem to take to other food, such as sand-eels and shrimps. This was the case with Herrings taken off Dunbar in June 1831, at which time the stomach and intestines were loaded with putrescence, and the fish worthless and insipid. The author's own repeated observations and those of his brother confirm the fact, already well ascertained by practical men, that

shore-fisheries of fish whose habitat is the deep sea, seldom produce the fish in prime condition. Of this truth the deep-sea fisheries of Cod and Haddock, as compared with those caught high in estuaries, also afford good examples. A long series of observations, establishing this position in regard to the Herring, are then given. And lastly, Dr. Knox states that his friend and former pupil, Mr. H. D. Goodsir, one of the enterprising companions of Sir John Franklin in his last fatal expedition, having been requested by him to push the inquiry to the utmost, that lamented naturalist undertook a series of excursions in the fishing-boats, not only in the Frith of Forth, but also to the fishing-ground near the Isle of May, and in the open sea. The author transcribes one of Mr. Goodsir's letters, dated "Anstruther, June 15, 1843," in which he states, first, that "the *Entomostraca* are at certain seasons the almost exclusive food of the Herring. There can be no doubt that they follow shoals of these *Crustacea* to prey upon them, for it is only when the latter make their appearance on this coast that the former are seen, and when the food is most plentiful the Herrings are in best condition. It is during the summer months also that we find the larvæ of the more common species of *Decapoda*, along with those of *Balani*, and occasionally a minute shell-fish, among the contents of the stomach. Secondly, it appears to be chiefly during the winter and spring months that the Herrings take other kinds of food than the *Entomostraca*; during these months we find the stomach oftener empty, and only occasionally filled with *Crustacea*, such as shrimps, &c.; in other cases with *Entomostraca*. Thirdly, as to *Entomostraca* being the partial or exclusive food of other fish besides the Herring, there can be no doubt that during the summer months, when the shoals of *Entomostraca*, or what our fishermen term *Maidre*, are in great abundance, they form the food of a great number of other animals besides the Herring. The common Coal-fish is particularly the species which, next to the Herring, preys on the *Maidre*. It appears to me also that the shoals of *Cetacea*, which make their appearance in the Frith during the Herring season, are in pursuit of the *Maidre*, and not of the Herring, as is most generally thought." To these facts, thus confirmed, Dr. Knox would especially call the attention of M. Valenciennes; they are most important to man in regard to the Herring-fisheries, and explain certain æconomic statistics bearing on the great fisheries of Holland, otherwise wholly unintelligible. The naval power of the ancient Republic of Holland was connected with, and based on, a deep-sea Herring-fishery; while the modern Herring-fisheries of France and England and the Scan-

dinavian States are shore- and boat-fisheries, of little value as a food-producing employment, and of no value whatever in a naval point of view. Dr. Knox concludes this branch of the subject with extracts from the works of Sir Gilbert Blane, Dr. McCulloch, and Leeuwenhoek, showing the total obscurity in which the food of the Herring was involved prior to the time when he first communicated the result of his observations.

Lastly, the author proceeds to examine the question as regards the Salmon. From about midsummer, but more especially with the autumnal floods, Salmon and Sea Trout of various sizes begin to rush up the freshwater streams and rivers, their object being clearly to make their way to the place of their birth, there to provide for the propagation of their species. From the time the Salmon enters the fresh water it ceases to feed, properly speaking, although it may occasionally rise to a fly, or be tempted to attack a worm or minnow, in accordance seemingly with its original habits as a smolt. But after first descending to the ocean and tasting its marine food, it never again resorts to its infantile food as a constant mode of nourishment. This great fact, well understood by fishermen and anglers, has been placed by Mr. Young of Invershaw beyond all doubt. Nothing is ever found in the stomach or intestines of the fresh sea Salmon but a little reddish substance, and this Dr. Knox, after a careful microscopic examination, concluded to be the ova of some species of *Echinodermata*. Of the Salmon, while in the sea, this is therefore the sole and constant food. Sea Trout also live on it, but they readily take to other food even in the sea, such as sand-eels, herring-fry, &c. The absence of this kind of food forms an insurmountable obstacle to the preservation of Salmon and of some kinds of Sea Trout in freshwater lakes. M. Valenciennes describes the Salmon as voracious, and states that its food consists of fishes—*Anmodytes Tobianus*; but Dr. Knox maintains that there exists not a single fact in the history of British Salmon to support this opinion. He refers to various fanciful theories suggested by fishermen and others in regard to the marine food of the Salmon; and concludes by stating that in spring, as the spawn fish are descending with the smolts, they may occasionally be tempted with an artificial fly or lob-worm, but as to their feeding regularly in rivers, Mr. Young's experiments have negatived the assumption beyond all doubt.

With regard to the *Entomostraca* themselves, they are abundant in the sea as well as in freshwater lakes; and it is easy to see by their remains in the limestone of Burdiehouse and of other quarters

that they played an important, perhaps the same, part in the œconomy of the ancient world as they do in this, serving as food namely to countless shoals of gregarious fishes, which abounded then as now in fresh and in marine waters. The *Entomostraca* of the Southern Hemisphere differ seemingly from those of the Northern; that they serve there also as the food of gregarious fishes was proved by the author's brother many years ago in respect of the so-called Herring of the Bay of Islands. They vary considerably in size, and seem to extend from pole to pole, consuming the organic remains, which but for them might speedily infect the ocean itself.

The paper was accompanied by magnified drawings of the species of *Entomostraca* found in the stomachs of the Vendace and of the Herring.

January 16, 1855.

Thomas Bell, Esq., President, in the Chair.

Read, an extract from a Letter, addressed by the Rev. William Henry Hawker to the President, dated "Horndean, Hants, Dec. 11, 1854." After referring to his previous discovery of *Asplenium fontanum* in the neighbourhood of his place of residence, Mr. Hawker proceeds as follows:—

"My discoveries of the past year are not altogether without interest. Last year I paid a visit to the English Lakes, and had the good fortune to find *Polystichum Lonchitis* growing near Ulleswater. I brought away one plant and sent a frond to Newman, who, however, does not mention it in his new Edition. This year (in July) I went to the Lakes again and had the pleasure of confirming the above discovery; and, moreover, on my mentioning it to other collectors, a search was instituted, which has resulted in its turning up in several new localities in that district, *e. g.* Helvellyn, Fairfield, &c. This fern has never before, I believe, been found in the Lake country. Whilst there this year I went a few days' botanical ramble with Mr. Clowes of Windermere, and on one of these days, whilst clambering on a terrific precipice, I had the delight to find *Aspl. septentrionale* growing in such quantity, that I took away I suppose between 60 and 70 plants and left more than 100, and here right amongst them I found 2 plants of *Asplenium germanicum*!

A guide was with me, who found close by *Woodsia Ilvensis* growing in some quantity. Three good things were they not, to be growing on a spot only a few yards square? It was on an outcrop of iron ore, which seems to me always to be a good 'matrix' (?) for ferns. This took place not many miles from Scaw Fell, though not on it. It was of course plain that the locality had never been before visited by a botanist. Mr. Clowes found *Euphorbia Cyparissias* growing on Whitbarrow Fells in great quantity. I have gathered it on the mountain limestone of Somersetshire near Wells, and I should think it will prove to be a true native; on the continent it is the commonest of weeds, especially where there is limestone. I followed your advice about keeping the *Helix Pomatia* till the spring, when I fed them up and kept them till impregnated, and then turned them out. The dry summer was rather against them, but I dare say they are all right, though I have not searched for them since. I have found another rare shell in the Ashford woods, *Clausilia Rolphii*—I think about its fifth or sixth locality in England.

"Last September and October I took a rapid run on the continent up the Rhine,—Heidelberg, Baden Baden, Basle, Soleure, Bern, Interlaken, the Simmenthal, Vevay, Geneva, over the Jura to Dijon, Fontainebleau, Paris, and home. The season was late; flowers mostly over, and deciduous ferns killed down, so that on the Alps I did not gather *Woodsia alpina* as I wished. I found on the Jura in one spot my favourite *Aspl. fontanum*. In the Pine forests of the Alps and Jura, *Polystichum Lonchitis* grows in the most wonderful luxuriance; I have dried some fronds 22 inches long! Its appearance is quite beautiful; I dried a good deal and brought away some live roots. *Aspl. septentrionale* too abounded on the alpine rocks. I found *Helix obvoluta* at Heidelberg at the foot of the walls of the Castle amongst grass, and also at Thun in a wood. *Helix Pomatia* was very common and abundant everywhere."

Read also a Letter addressed to the Secretary by John Hogg, Esq., F.R.S., F.L.S. &c., dated "Stockton-on-Tees, December 27th, 1854," of which the following is an extract:—

"Since my return home, I have had an opportunity of learning more particularly respecting the large fish which was stranded last September in the Tees Bay; and I have now not the least doubt that it was a common Tunny, and that too of a large size. One of the fishermen who had seen the fish, on cutting it said—the flesh looked like highly salted bacon, *i. e.* red with salt or saltpetre. He described it in size as 'being pretty well on to 60 stone,' which at

8 lbs. to the stone (meat weight) would give 480 lbs. The only freshly killed Tunny I ever saw was at Palermo; it was a good-sized fish and was carried on the shoulders of two strong fishermen, the one walking a few feet before the other. Pennant describes in his 'Brit. Zool.' (edit. 1812), vol. iii. p. 362, one which was caught at Inverary in 1769, as weighing 460 lbs. This then would probably be somewhat less than the Tees fish; and this is further shown by the following fact.—Pennant says the tail 'measured 2 feet 7 inches between tip and tip' of its crescent-form. I yesterday measured the tail of the Tees fish, which gave 2 ft. $8\frac{1}{4}$ inches from tip to tip, thus having $1\frac{1}{4}$ inch more in the width of the crescent-tail than Pennant's, and consequently most likely it was the larger of the two. The fisherman had well preserved the tail, and it presents a beautiful specimen of a crescent, and very perfect, each half corresponding in a very accurate manner with the other. It is covered with a thick, nearly black skin, and quite smooth. I counted the caudal rays, and at first I made nineteen on one side and eighteen on the other; but on re-counting them I am more satisfied that they are equal, *i. e.* eighteen on each side or in each half. Between them I noticed most distinctly 'a cartilaginous keel between the sides of the tail,' as described by Cuvier in his generic characters of his genus *Thynnus*. Moreover, the fisherman (who is a very sensible man and a good bird-stuffer) on being shown Mr. Yarrell's figure of the Common Tunny, immediately recognized it and pronounced it at once to be the same fish."

Read further, the Introductory part of a paper, entitled "New *Proteaceæ* of Australia." By Dr. C. F. Meisner. Communicated by the Secretary, and intended for publication in Sir W. J. Hooker's 'Journal of Botany.'

Read, in conclusion, an "Extract from a Memoir on the Origin and Development of Vessels in Monocotyledonous and Dicotyledonous Plants." By Dr. Francisco Freire Allemão of Rio de Janeiro, translated and communicated by John Miers, Esq., F.R.S., F.L.S. &c.

Dr. Allemão states that in 1849 he commenced a series of microscopical observations on several points of vegetable anatomy, and in particular on the origin and development of vessels in the roots of plants. In 1851 he read before the Vellozian Society of Rio de Janeiro a memoir in which the most important facts observed by him were shortly stated, which memoir he revised and published in 1852, as the third of his "Botanical Exercises," in the 'Trabalhos da So-

cidade Velloziana,' p. 101. In the following year he pursued his investigations into the growth of vessels in germinating seeds, and extended them to the next stage in the development both of dicotyledonous and monocotyledonous plants. This inquiry is not yet completed, but Dr. Allemão transmits the extract communicated by Mr. Miers, together with a portion of the illustrative drawings, with the view of ascertaining whether his observations are really, as he believes them to be, new to science, and whether they are sufficiently exact.

The drawings represent first, a young plant of *Sida carpinifolia*, but little developed, showing the epigeal cotyledons still enveloped in their seminal integuments. The caulicle (radicle) is linear and without ramification. Seen under the microscope the nervures of the cotyledons are found to be composed solely of tracheal vessels, two of which constituting the midrib are continuous with those of the caulicle, which are four in number, distinct, entire, straight, parallel, and equidistant, descending more than half the length of the caulicle, the lower portion of which does not yet exhibit any vessels, nor does its radicular bulb show any tendency to form roots. In a somewhat more developed stage, the nervures of the cotyledons have their tracheæ considerably increased; the gemmule is seen under the form of a cellular tumour without vessels; the four tracheæ of the stem descend parallel to each other as far as the radicular bulb, and thus constitute the medullary sheath; no rootlets are yet observable. A further stage of development exhibits the same plant after the formation of rootlets, and the development of one of the leaves of the gemmule. In this stage the cotyledons have acquired a larger number of nervures; the nervures of the primordial leaf consist only of tracheæ, two of which forming the midrib descend by the stem to meet the four cotyledonary tracheæ; in the stem or primary merithal (radicle of authors) these tracheæ are as yet solitary for two-thirds of the upper portion of their length, but in the lower third they are accompanied and invested externally by dotted ducts. At the limit between stem and root where the rootlets are given off, the tracheæ of the stem terminate, and we see the commencement of the dotted or ligneous vessels, which begin to ascend in bundles through the stem outside the tracheæ and to descend, unaccompanied by tracheæ, through the roots and their ramifications.

From his investigations Dr. Allemão infers, first, that the tracheæ, which are the first vessels formed, derive their origin in the stem from the vital point in which the leaves originate, whence they ascend,

forming bundles in the leaves, of which they constitute the nervures, and whence they descend through the stem to form the medullary sheath. Secondly, that roots do not exist in the embryo, but are formed in the young plant when, freed from its seminal envelopes, it penetrates the earth. [This is, however, subject to some exceptions in cases where the roots begin to sprout while contained within the seed.] The radicular bulb which is destined to produce them bears some analogy with the gemmule, and may be considered as a primary spongiole, through which the plant absorbs nutriment prior to the production of roots. Thirdly, that the fibrous, ligneous or reticulated vessels are formed posteriorly to the appearance of the tracheæ, their origin being at the vital point from which the roots proceed, whence they ascend in bundles through the stem until they reach the extremity of the nervures of the leaves, being always external to the tracheæ, and whence they descend through the root as far as the extremities of its ramifications, leaving almost always in its centre a kind of canal filled with cellular tissue, which is a true pith, and communicates with the herbaceous envelope by means of medullary rays, but is not enclosed by tracheæ in dicotyledonous plants. Tracheæ are to be found, however, in the roots of nearly all monocotyledonous plants, or if absent, their place is supplied by mixed or scalariform vessels. In this exposition of his views Dr. Allemão has gone beyond what appears on the face of the drawings sent, and has, he is aware, repeated several well-known facts: what he believes to be new in them is the extension of two vascular systems in opposite directions, and their increment at their respective extremities; in other words, the projection upwards and downwards of fibres or vascular bundles. Fourthly, that the radicular branches, as appendicular or radiated organs, are in their origin perpendicular to the fibres of the stem, and not continuous with them, contrary to the theory maintained by Gaudichaud.

The same facts are demonstrated in monocotyledonous plants by microscopical observations on the young rooting bulbs of *Fourcroya gigantea*. A longitudinal section passing through the centre of the bulb shows, on repeated and careful dissection, that the bulbous mass is formed of rather dense cellular tissue filled with a viscous lymph, the cells of which contain much fecula and a large quantity of raphides or solitary prisms. Of the numerous sheathing and concentric leaves, the central one, in its earliest development, is composed only of very fine cellular tissue; the one next in succession outwards is still cellular, but beginning to receive tracheal ramifications, which are the upper extremities of numerous simple tracheæ

forming a crown around the vital point which Dr. Allemão regards as the limit between stem and leaves. These tracheæ are very slender, vermicular or fusiform, with a curvature in the middle, the convexities of which look towards the centre; extending upwards they penetrate the leaves in great number running parallel to each other, and passing downwards they cross and become external to the interior bundles taking a flexuose direction. In the succeeding leaves there are no simple tracheæ, but numerous tracheæ form bundles running parallel to each other as far as the extremities of the leaves, and giving off lateral and transverse branches which anastomose in a very beautiful manner. These vascular bundles also descend as far as the base of the bulb. Above they are formed entirely of tracheæ; lower down the tracheæ are accompanied on the outer side by dotted vessels, which extend upwards to penetrate the leaves and downwards to communicate with the root. In the roots the vascular system is composed of a certain number of bundles, parallelly disposed with admirable symmetry, among which are seen dotted and scalariform vessels, but no true tracheæ. A great number of microscopical observations made on various plants under different circumstances have confirmed these views, which Dr. Allemão considers unquestionable.

The paper was accompanied by a series of notes by Mr. Miers, in which, from his knowledge of his antecedent researches, published in the Proceedings of the Vellozian Society, he states it to have been the object of Dr. Allemão to test the validity of the theory first propounded by Du Petit-Thouars, and more recently modified and supported by Gaudichaud, which maintains, contrary to the views of Mirbel and others, that all the woody fibres of the stem proceed from the nascent leaf-buds and thence descend to the radicular extremity of plants. Dr. Allemão believes that his observations in no degree tend to support this theory. He takes as an example the *Cucurbita Pepo*, in which the dotted vessels are extremely large and conspicuous. In this plant no reticulated vessels are found in the last-formed leaves or in the internodes near the termination of the stem, although they exist in the lower and older leaves. He observed spiral vessels only in the stems and leaves as low as the 9th or 10th axil from the extremity of each branchlet; from that point as low as the 14th and 15th axils, other vessels are observed in the stem only; but below this point he found them in the stem, and more especially in the leaves, proving, as he believes, that all reticulated and dotted vessels ascend through the stem before they find their way into the leaves, in the progress of their growth upwards.

He thinks that the formation of a circular tumour in the trunk of dicotyledonous plants above the line of a ligature tightly tied around it may be accounted for by reasoning on the facts which he conceives himself to have established, viz. that in the development of the vascular fibres of the stem, there always exists a vital centre from which they extend themselves in two opposite directions. This vital centre may be fixed, moveable, or accidental; fixed in woody fibres, moveable in tracheæ, and accidental in all adventitious formations. If, for instance, we take a cutting of any young branchlet, in which no natural bud is distinguishable, and plant half of it in the ground, several adventitious vital points make their appearance, the lowermost of which give out rootlets, and the uppermost leaf-buds. In this case, vital points or centres make their appearance in the vital zone of the cutting, which would never have existed in the natural condition of the branch. Applying this fact to the case of the ligature, he thinks it evident that the cambium or elaborated sap, or whatever may be the source of the tumour deposited between the wood and the bark, must assuredly proceed from the leaves towards the root, and meeting with this obstacle, becomes accumulated there; its tendency to organize itself not being distributed, a zone of adventitious or occasional vital centres soon appears in that point, whose two forces are quickly manifested; the ascending fibres continue to extend themselves without impediment, while those which should have descended, unable to overcome the impediment presented to their further progress, continue to grow, twisting and interlacing themselves, so as to form a tumour.

Mr. Miers then refers to the differences which Dr. Allemão believes to exist between his theory of the evolution of each fibre in opposite directions upwards and downwards, and that of Gaudichaud, in respect to which he thinks there must be either a misprint or a complete misapprehension of the views of Gaudichaud, who clearly traces the source of each bud, not from the point of external growth (as Dr. Allemão seems to infer), but from the seat of its origin around the medullary sheath, at the *nœud vital* or point of departure of each independent ascending and descending system of vascular fibre. The origin of numerous distinct bud-formations around the medullary sheath, and the extension of ascending spiral vessels and of corresponding descending dotted vessels from each of these separately, are maintained throughout by Gaudichaud in his "Recherches Générales" as an essential part of his theory, and minutely demonstrated in his figures, both in monocotyledonous and dicotyledonous plants. He even forcibly quotes the same circum-

stances of the intumescence of a stem produced by a ligature, and the germination of an apparently budless stem, in support of his views; between which and those of Dr. Allemão, Mr. Miers is consequently unable to perceive any essential difference.

Mr. Miers further quotes, from early works of Mirbel, the proof that, as long ago as 1802 and 1809, he accurately depicted and described the origin and formation of similar vessels in germinating seeds of *Nelumbo* and of the Common Haricot; and refers to plates by him in the 5th and 13th volumes of the 'Annales du Muséum,' showing the ascending system of spiral vessels in the plumule and cotyledons, and the descending system of dotted vessels in the radicle.

Dr. Allemão further states, that although the "bolbo radicular" is always the chief growing point of the radicle, he observed, in *Euphorbiaceæ*, four other cruciform branches, on the same horizontal plane, proceeding from this radicle. The same fact was described more than forty years ago by Auguste de St. Hilaire (Ann. du Mus. xix. p. 467) in the germination of a Ranunculaceous plant (*Ceratocephalus*). In this, besides the main shoot, growing in the same way as an ordinary exorhizal root, five other branching rootlets are shown to be produced on one plane, from the collar of the young root, which make their appearance through lacerations of the external coat. Their earliest indication is in the form of tubercles, through the investing covering of which these rootlets burst a passage, in all respects similar to the coleorhiza in the germinating embryos of Monocotyledonous plants. The coleorhiza is sometimes extended to some distance along the rootlet, but in other cases it forms merely a swelling round its base. The same appearance, although far from general, was observed by St. Hilaire in the germinating embryos of numerous other exorhizal plants, as *Myosurus*, *Plantago*, *Valerianella*, *Urtica*, *Senecio*, *Sonchus*, *Calendula*, *Matricaria*, *Veronica*, *Phaseolus*, *Medicago*, &c. In *Tropæolum* the radicle, although exorhizal, exhibits a kind of valve-like opening for the exit of the plumule, which has been called a coleorhiza: and a somewhat similar appearance is said to occur in the germination of the seed of *Viscum album*; this, however, Mr. Miers apprehends can refer only to the coleorhizal mode of bursting of the attenuated expansion of the thin covering of the albumen which is spread over the growing radicle.

Dr. Allemão, Mr. Miers adds, here considers the radicle of the embryo as forming part of the caulicle or stem, and the root as originating in the subsequent growth of the embryo, after it is released

from its integuments, and produced by the expansion of the obtuse extremity of the radicle, which he calls the "gommo;" and Gaudichaud the *radicular bulb*. This view was taken by Turpin nearly twenty years ago, and represented by him, in the germination of *Solanum tuberosum* (Mém. Mus. xix. p. 19. t. 1), where all the radicular portion of the embryo is referred to the *tigelle* or ascending system, while the true root is represented as beginning from its sprouting point in the radicular bulb. It has not, however, been generally countenanced, and Mr. Miers states that he cannot perceive that it has any advantages over the more generally received theory which regards the radicle as an elementary root, commencing from the point of union of the cotyledons and their junction with the plumule. On the contrary, it is disproved by numberless facts, and more especially by one to which he lately called the attention of the Society, in the germination of the embryo of *Xanthochymus*, as figured by Dr. Roxburgh; in which (in addition to the principal root thrown out at the base of the seed, at the point which Dr. Allemão would call the radicular bulb) another secondary root is seen proceeding from the summit of the nucleus out of the ascending collar or *tigelle*, immediately below the scales, which appear to be minute cotyledons, showing that the main body of the nucleus or radicle belongs to the descending system of the root. It is more natural, Mr. Miers thinks, to conclude, in the case cited by Dr. Allemão, that the main descending shoot, growing out of the radicular bulb, and also the subsequent coleorhizal rootlets, are productions of that axile portion of the radicle, which Mr. Miers has called the *neorhiza*; and under this point of view he considers it easy to account for the coleorhizal character of the secondary rootlets in the germination of *Ceratocephalus*, as described by St. Hilaire. A very singular example of this sort of production is shown by Klotzsch, in the germination of the seeds of *Pistia* (Ueber *Pistia*, Berl. 1853, plate 1. f. C.D.E), where the many secondary rootlets, or branches of the *neorhiza*, force their way through the epirhizal covering of the main root, extending it as a coleorhiza, in the form of a long cylindrical tube, which at length breaks away, leaving a long sheath in the form of a thimble, covering the extremity of each growing rootlet, and which probably thus performs the functions of a spongiole.

February 6.

Thomas Bell, Esq., President, in the Chair.

William Freeman Daniell, Esq., M.D., and William Gourlie, Esq., were elected Fellows.

Mr. Westwood, F.L.S., exhibited some cocoons and living chrysalides of the Eria Silk-worm of India, which feeds on the castor-oil plant, which he had received from the Governor of Malta through Dr. Templeton; this being the species, the introduction and cultivation of which in Malta, Italy, and the South of Europe was now attracting so much attention in those countries, as proved by the numerous communications presented within the last few months to the Académie des Sciences at Paris by Marshal Vaillant, French Minister of War, and by MM. Milne-Edwards, Guérin-Méneville, Isidore Geoffroy Saint-Hilaire, Duméril, Montagne, &c. An extract was read, communicated by Major-General Hearsey, from the "Journal of the Asiatic Society," on the peculiarities of the silk of this species, the natural history of which, as well as of the Tusseh Silk-moth of India, formed the subject of an excellent memoir by Dr. Roxburgh in the "Transactions of the Linnean Society," vol. vii. On examining the cocoons, Mr. Westwood had observed, that, unlike those of the common Silk-worm and most other moths which were of an entire, oval form, these cocoons were open at one end, which was protected by a series of converging elastic threads (like the mouth of a rat-trap), a peculiarity which had been long observed in the cocoons of the common Emperor Moth, *Saturnia pavonia minor*. This peculiarity, which had also been noticed by M. Duméril, had been supposed to have for its object the introduction of air to the interior of the cocoon, and also the prevention of the ingress of parasitic *Ichneumonidæ*, &c. Neither of these hypotheses were however considered by Mr. Westwood as conclusive; he thought rather that it was connected with the discharge of the fluid which most insects emit immediately after arriving at the perfect state. The circumstance is however of some practical importance in the Eria Moth, as it allows the egress of the perfect insect without injuring the thread of the cocoon, as is the case when the common Silk-worm Moth of the mulberry is allowed to escape from its cocoon. It is not, however, of so great a practical importance as might be at first supposed, as

the silk-growers never allow the cocoons intended for winding to produce the moth; still those cocoons, which were set aside in order to obtain the perfect insects for breeding from, would also remain uninjured after the escape of the moths.

Read the commencement of a memoir "On the Structure and Affinities of the Natural Order of *Balanophoreæ*." By J. D. Hooker, Esq., M.D., F.R.S., F.L.S. &c.

February 20.

Thomas Bell, Esq., President, in the Chair.

Read a Letter addressed to the Secretary by Mr. E. D. Lockwood of Haileybury College, mentioning the occurrence in that neighbourhood, during the late severe weather, of several rare birds, and among them a fine specimen of the Red-throated Diver and the little Auk, both killed between Ware and Hertford. Hawfinches, Mr. Lockwood adds, have been very common in the neighbourhood.

Read also a continuation of Dr. Hooker's memoir "On the Structure and Affinities of the Natural Order *Balanophoreæ*," commenced at the last Meeting.

March 6.

Thomas Bell, Esq., President, in the Chair.

Mr. Syme, F.L.S., exhibited specimens of *Ophioglossum vulgatum*, L., from Swanbister, Orkney, together with a large series of specimens from other localities; and comparing them with an extensive series of specimens of *Oph. Lusitanicum* from various distant localities, came to the conclusion, in common with several recent botanical writers, that these two supposed species are in reality merely varieties of one and the same specific type.

Mr. N. B. Ward, F.L.S., exhibited on the part of Mr. Maxwell T. Masters, Sub-Curator of the Fielding Herbarium at Oxford, an

abnormal stem of a species of *Dipsacus*, on which the following observations, by Mr. Masters, were read :—

“ The specimen was received from Mr. Smith of Witney in Oxfordshire, to whom it had been given by a blanket manufacturer of that town. From the presence of some small prickles on the remains of the leaves, Mr. Baxter, jun., the Curator of the Oxford Botanic Garden, suggested that it might be the stem of a *Dipsacus*. Great as is the dissimilarity between this abnormal specimen and the natural appearance of a Teazel-stem, the subsequent testimony of the donor confirms Mr. Baxter’s opinion. Moreover, if the explanation here offered be correct, there is little difficulty in supposing it really to have been a Teazel-stem. It has unfortunately been broken, but its general appearance, when it came into our possession, is shown in the accompanying sketch. It then measured about 21 inches in length, and as the specimen seems to have been broken off pretty close to the ground, its original height must have been much less than that of an ordinary Teazel. At the base it is of a cylindrical form ; soon, however, the stem becomes, as it were, twisted on itself, and is then flattened out laterally. A cross section of it at this point would therefore be ovoidal in outline. This portion of the stem is hollow : traces of the pith adhere to its inner surface. The greatest breadth is about $2\frac{1}{2}$ inches ; the breadth, however, gradually diminishes towards the upper part, where the cylindrical form is resumed. The branches, or flower-stalks, are placed one over the other in a line following the spiral curvature of the stem. Some of the branches have been broken off, and indications of several abortive branches are plainly visible. Remains of leaves occur at the base of one or two of the upper branches, and on these are small prickles, such as are found on a Teazel-leaf. The epidermis has for the most part peeled off, showing the course of the woody fibres in a spiral direction all the way up the main stem, but taking an opposite direction from that formed by the line of branches. In the lateral branches the course of the fibres is straight. The obliquity of the spiral is greatest in the lower part of the stem, diminishing as the stem expands laterally, and again increasing towards the upper part, where the stem resumes its cylindrical form. When the course of the fibres is traced from the base of any of the branches, the spiral will be found to terminate about the base of the second branch above that from which the line started. If each turn of the spiral, in this abnormal specimen, be considered to represent an internode, then the opposite and alternate arrangement of the branches of a *Dipsacus* would seem to be indicated. Should this view be correct,

it would have an important bearing on that theory which ascribes the opposition of leaves to the absence or non-development of internodes, for here, where the internodes are developed, the arrangement is alternate. The position of all the branches in a line one over the other is accounted for by the spiral course of the fibres of the stem. And thus, if we conceive the fibres of this specimen untwisted and made to assume a vertical direction, and at the same time imagine the absence of internodes, the result will be the opposition of the branches and the alternate position of the pairs of branches as regards the side of the axis from which they proceed. At the dilated portion of the stem the growth was probably much more rapid than at the lower part, which, from its more solid and firmer structure, may be conceived to have offered some resistance to the lateral expansion of the stem. In so doing it may have been the cause of that twisting of the stem upon itself, which, it will be observed, begins at the point where the change of form also commences."

The communication was accompanied by a sketch of the monstrosity described in it.

Read the commencement of a memoir entitled "Remarks on the Botany of Madeira and Teneriffe." By C. J. F. Bunbury, Esq., F.R.S., F.L.S. &c.

March 20.

Thomas Bell, Esq., President, in the Chair.

Dr. Daniell, F.L.S., exhibited a specimen of Kino, the produce of *Pterocarpus erinaceus*, Lam., from Nyami, on the Upper Gambia; and also specimens of preserved vegetables, reduced by powerful pressure into very small compass, and intended for use during long voyages, of which large quantities have lately been forwarded to the army in the Crimea.

Mr. S. Stevens, F.L.S., exhibited specimens of two species of *Euchirus*, one recently brought from Amboyna by Madame Pfeiffer, the other from India.

Mr. N. B. Ward, F.L.S., exhibited a number of Autograph Letters written by Sir John Franklin, Capt. Matthew Flinders, Sir Joseph Banks, Tournefort, Antoine de Jussieu, Bernard de Jussieu, Antoine-Laurent de Jussieu and Adrien de Jussieu.

Read a "Description of *Peachia hastata*, a new genus and species of the Class *Zoophyta*; with observations on the Family *Actiniadæ*." By Philip Henry Gosse, Esq., A.L.S.

The specimens on which Mr. Gosse founds his new genus, *Peachia*, were discovered by the Rev. Charles Kingsley in the months of January and March 1854, in the vicinity of Torquay. Mr. Gosse gives an elaborate description of the animal, both in reference to its external and internal structure, together with a particular account of its habits, derived from the communications of Mr. Kingsley as well as from his own observations. He considers that the possession of an excretory orifice to the body is a character of sufficient importance to separate it from *Actinia*, and to constitute a new genus, for which he proposes the name of *Peachia*, as a tribute to the zeal, industry and success with which marine zoology has been studied by Mr. Charles W. Peach. He is also led to this selection of a name, because he thinks it probable that a minute species, described by Mr. Peach under the name of *Actinia chrysanthellum*, may belong to the same genus. The following are the characters, generic and specific, of the animals in question:—

PEACHIA, Gosse.

Corpus elongatum, subcylindricum, pyriforme, v. fusiforme, ditrematum, liberum; *tentaculis* paucis, brevibus (disci diametrum haud superantibus), crassis, conicis, uniseriatis; *oviductu* in tuberculum papillosum desinente.

1. PEACHIA HASTATA, corpore roseo lineis æqualibus pallidis, tentaculis 12 albo-hyalinis seriebus 2 parallelis macularum sagittatarum brunnearum notatis, disco circulis duobus macularum brunnearum V-formium cineto, oviductûs papillis numerosis aggregatis.

2? P.? CHRYSANTHELLUM, corpore cylindrico albido lineis inæqualiter latis, tentaculis brunneo-annulatis.

Mr. Gosse considers the principal interest of this form to consist in the decided approach which it makes to a higher type than that of *Actinodermata*, assisting, together with the genus *Edwardsia* of M. Quatrefages, to diminish the interval between the *Actiniæ* and *Holothuridæ*. Of the genus *Edwardsia* he observes that there are

two British species, one of which was described and figured by himself, in the 'Annals of Natural History' for Sept. 1853, under the name of *Scolanthus callimorphus*, which genus he is now convinced ought to be abolished; and the other, described in a letter from Mr. Kingsley, appears to be identical with *Edwardsia Beautempsii*, Quatr.

The author then proceeds to remark on the importance of still further dividing the large remainder of species, which, even after the separation of the genera already constructed from it, still remain united under the name of *Actinia*. After discussing the principles on which he conceives that this division may be most properly founded, he goes on to establish the following generic types, adding after each the names of the British, and of some of the exotic species belonging to it.

SAGARTIA, Gosse.

Actiniæ basi adhærentes; *tentaculis* conicis faciliè retractilibus; *sphæruis* marginalibus nullis. *Corpus* everrucosum, *filamenta capsulifera* e poris emittens; *filis urticantibus* brevibus, pilorum fasciculo densè armatis.
Sp. Brit.—*Act. viduata* (=anguicomæ, Price), *Troglodytes*, *Aurora*, *candida*, *rosea*, *nivea*, *venusta*, *parasitica*, *Bellis*, *Dianthus*; fortè etiam *A. aurantiaca* et *pulchella*, Jord.

The following exotic species, figured by Mr. Dana in the Zoophytes of the American Exploring Expedition, seem to be referable to this genus, viz. *A. Primula*; the beautiful *decorata* and *Fuegensis*, both allied to our *Bellis*; and *Achates*, *reticulata* and *Paumotensis*, which are evidently allied to *Dianthus*.

BUNODES, Gosse.

Actiniæ sphæruis marginalibus nullis; *corpus* verrucosum; *cute* coriaceâ, *filamentis* missilibus nullis; *filis urticantibus* longis simplicibus; *tentaculis* plerumque crassis, conicis, obtusis.
Sp. Brit.—*A. gemmacea*, *Thallia*, *clavata*, *crassicornis*, *monile* (fortè *crassicornis* junior)? *Chrysoplenium*?, *alba*?, *miniata*?

Of exotic species *A. Diadema*, *pluvia*, *Gemma*, *Artemisia* of Dana's Zoophytes, probably belong to this genus.

ACTINIA, L. (pars).

Sphæru læ capsulifera ad disci marginem seriata; *corpus* everrucosum, *poris filamentisque missilibus* destitutum; *cute* lævi.
Sp. Brit.—*A. Mesembryanthemum*, *margaritifera*, *Chiococca*.

Of exotic species *A. Tabella* and *graminea* of Dana are here referable.

The following British species are of doubtful position, viz. *A. coccinea*, *intestinalis*, *biserialis* and *vermicularis*. The very curious *A. biserialis* has a close parallel in Dana's *Rhodora*; and these may perhaps form together another genus when more is known about them. *A. intestinalis* and *Vermiculum* show, in their slender lengthened form, an approach to the free condition of *Peachia*, &c.

Mr. Gosse next exhibits in a tabular manner one of the modes in which the British non-coralligenous *Actiniadæ* may be artificially distributed; and under the head of each genus comments on its structure, limits, and affinities, concluding his paper with a diagram intended to express, as nearly as such a representation can, the varied consanguinities and cross-alliances of the group.

The paper was illustrated by figures of *Peachia hastata*; and by magnified representations of the thread-cells and threads of several species of *Sagartia*.

April 3.

T. Bell, Esq., President, in the Chair.

The following letters were read:—

“DEAR SIR,

“12 South Frederick Street, Glasgow,
22nd March, 1855.

“At Dr. Hooker's suggestion I send you, for the herbarium, two specimens of a rare British plant (*Hierochloë borealis*), which, after having been erased from the list, was rediscovered near Thurso by Mr. Robert Dick, who states that it flowers so early in the year as May and the beginning of June, disappearing soon afterwards; so that there was no wonder I and others could not find it in Don's station, Glen Kella, Angusshire, as botanists seldom go there before the end of July.

“I am, dear Sir, yours truly,

“R. Kippist, Esq.”

“WM. GOURLIE.”

The specimens forwarded with this letter were marked as gathered by Mr. Robert Dick, at “Thurso, Caithness, May 1854.”

“MY DEAR SIR,

“Cedar Terrace, Henwick, Worcester,
March 21st, 1855.

“In the account of the Meetings of the Linnean Society which

have met my view, I have seen no notice of a very interesting addition to the British Flora which was made in 1854 in this neighbourhood, on the confines of Worcestershire and Herefordshire, though strictly within the latter county. The plant I allude to (a specimen of which I enclose for the inspection of the Society) is the pretty little Orchid, *Epipogium aphyllum*, which was never before, that I am aware of, met with in England, and has not been alluded to as a probable native in any of our local or general floras.

“It was first noticed in July of last year (1854), by Mrs. Anderton Smith, then staying at Tedstone Rectory, and other specimens were afterwards gathered by her husband, who communicated with me on the subject, and indicated the place where Mrs. Smith first gathered the plant. The locality has quite a subalpine aspect, the Sapey brook there running in a deep glen shadowed on all sides by lofty trees, and near the spot a little water-fall gurgles over the massive sandstone rocks. It was the felling of some of these trees that brought the plant to light. I have also to mention another locality for the *Neottia* or *Spiranthes æstivalis*, hitherto, I believe, only found in England in the New Forest, Hampshire; but the last autumn a specimen of the *Spiranthes æstivalis* was shown to me, which was gathered by Mr. George Jordan of Bewdley, on the confines of the great bog in Wyne Forest, Worcestershire. I have been careful to examine the plant gathered by Mr. Jordan, and to visit the spot where it was found, so that the information may be relied on, and thus the range of the *Spiranthes æstivalis* is extended in England. This it may be interesting to note.

“The enclosed specimen can be exhibited at the next Meeting of the Society, if the plant has not been previously brought before their notice as a native of Britain. It is the only one I at present possess; but if the Linnean Society has not a British specimen in their collection and you think it may be any way advantageous to botanical science, or be useful for metropolitan botanists to examine, I will with pleasure permit the retention of it for the Society. Otherwise please return it to me at your leisure after it has been examined.

“I remain, my dear Sir, yours very truly.

“R. Kippist, Esq.”

“EDWIN LEES.”

The specimen of *Epipogium*, which (in compliance with Mr. Lees' kind permission) has been placed in the herbarium of the Society, is stated on the ticket to have been “gathered in a woody dingle on the banks of Sapey Brook, Tedstone, Herefordshire, about a

mile and a half south of Clifton-on-Teme, Worcestershire ; July 1854.”

Read the conclusion of Mr. Bunbury's memoir “On the Flora of Madeira and Teneriffe,” which will be printed entire in a subsequent part of the ‘Proceedings.’

April 17.

T. Bell, Esq., President, in the Chair.

Edward Hart Vinen, Esq., M.D., and Thomas Williams, Esq., M.D., were elected Fellows.

Read, a paper “On the Homologies of the Carapace and on the Structure and Functions of the Antennæ in the *Crustacea*.” By Charles Spence Bate, Esq., F.L.S. &c.

First, the author's object, was, by tracing the limits of the anterior rings in the higher *Crustacea*, to define the number and position of those which enter into the structure of the carapace.

The ring which carries the eyes, he demonstrated, from its position in *Squilla* and the larva of the genus *Cancer*, as well as from its connection with the nervous ganglia, to be the most anterior. In the *Brachyura* it is arched over and enclosed by the ring next succeeding, but with which it is never united.

In the higher tribes, except the aberrant family of the *Diastylidæ*, Say, which includes the genus *Cuma* of M. Milne-Edwards, the eyes are borne on moveable pedicles. The ring which bears them is covered by and not fused with the rest of the testaceous skeleton, and therefore takes no part in the development of the carapace of *Crustacea*: the internal antennæ succeed the eyes and (with the exception of the genus *Squilla*) the ring which supports them is always fused with the succeeding, the external antennæ; these two form a closely associated part in the structure of the anterior portion of *Crustacea*, and (together) complete the whole of that portion of the carapace which is in advance of the cervical suture; which, according to the author's showing, forms almost the whole of the

carapace in *Brachyura*, half the same in *Macroura*, and lessens in importance as the animal descends in the scale of nervous development.

In *Diastylis* and *Cuma*, the eye (for in this family the two coalesce and form but one) is nearly in the centre of the carapace; this position is the result of the great development of the lateral angles of the posterior portion of the carapace, which meet in front and form what appears to be a rostrum, yet never unite, but continue distinctly separate, through the median line of the so-called rostrum, which separation is persistent on each side as far back as the posterior portion of the third ring, and then continues in the line of fusion across the back where the two meet*, which line homologizes with that which Milne-Edwards has named the cervical suture in the *Macroura*.

The constant relative position of this suture in all *Crustacea* must be the same; it forms a line of demarcation between the third and fourth (that is the posterior antennal and the mandibular) rings. The posterior antenna, anchylosed as it is with the dermal skeleton in all the *Brachyura*, still holds the same relative position as in the pupa stage; therefore by inversion, since the ring folds over so as to form the orbit, the anterior limit of the cervical suture must be beneath and on the inner side of the posterior antenna. Such a suture is plainly demonstrable in most of the *Brachyura*, but it extends posteriorly to the extreme limits of the carapace, forming as it were two wings or side pieces, the epimera of Milne-Edwards†; this line, according to the author's opinion, homologizes with the cervical suture in the *Macroura*, the portion anterior to which is most developed when centralization of the nervous system is most perfect, and *vice versá*. Centralization decreases as the posterior portion of the carapace increases. In the *Brachyura*, this line of union is more or less perfectly fused, but sometimes splits when the animal throws off the *exuviae*. Here the mandibular ring or portion posterior to the cervical suture is at its minimum, and the antennal ring or anterior portion is at its maximum.

In *Macroura*, where the nervous centre commences its first tendency to separate into distinct ganglia, we find the anterior portion

* The figures of *Cuma Rathkei*, in Kroyer's great work on Scandinavia, agree with those given with this paper; a circumstance, of which the author was not aware until he had perfected his own researches.

† That the epimera of Milne-Edwards homologize with the mandibular ring, has been previously stated by Dana, a fact of which the author was not aware until the day on which the paper was communicated to the Society.

decrease in a relative degree to the rest of the carapace. This, which is apparent in *Macroura*, is carried to the greatest extent in the *Diastylidæ*, where the carapace is almost wholly constructed of the mandibular ring, leaving but a small area in the centre as representative of the antennal rings.

Lower in the scale we find that the same law still prevails, and the author identifies the first ring in the *Amphipoda* with the mandibular ring in the *Podophthalma*; the anterior three rings being so diminished in importance and absorbed within the fourth, that they are recognized by their appendages only.

Secondly, the object of the author was to show, in this portion of his paper, the functions with which each antenna is separately endowed; this was done by a relative comparison of the external character of each with its internal structure.

On removing one of the superior antennæ from its position, and examining the basal articulation, which is largely developed in the whole of the *Brachyura*, the author found that the chamber formed by the integumentary walls was occupied by a still smaller chamber or cell, having calcareous walls of a more delicate character; this internal chamber bears a strong similitude to a true but low kind of cochlea, which the author believed it to represent.

This supposed cochlea is attached to the walls of the cavity farthest from the median line of the Crab. It presents a tendency to a spiral form, but passes not beyond a single turn; it is supplied by the third pair of nerves from the cephalic ganglion.

In consequence of the presence of this internal cell in the base of the internal antennæ of the *Brachyura*, together with the constant presence of fine membranous cilia upon the prolonged filament, the author associates the sense analogous to hearing with these antennæ rather than with the external, to which it has been attributed by Dr. Farre and Prof. Milne-Edwards, and which the present state of science admits. But the author feels assured, from a careful examination of the external antenna, that it is not adapted for the purpose of conveying sound. The organ of hearing is always so placed that it may catch the first sound of approaching danger; but the organ in the lower antenna, described by Dr. Farre from the *Macroura*, is in the *Brachyura* protected by a calcareous operculum, and is moreover covered by the supplying organs of the mouth—two circumstances which destroy its efficiency as an organ of hearing; whereas its close proximity to the mouth may, by testing the character of the passing material before taken as food, render its position valuable for an organ of smell, which sense the author has been led

by long continued researches to regard as being connected with the external antennæ.

The paper was accompanied with many carefully made drawings, illustrative of Crustacean structure generally.

May 1.

Thomas Bell, Esq., President, in the Chair.

Francis Tagart, Esq., was elected a Fellow; and Prof. Gœppert, M. Hofmeister, and M. Planchon, were elected Foreign Members.

Read a paper entitled, "Notes on the White Secretion of the *Flata limbata*, and on its relation to the Insect White Wax of China." By Dr. Charles Murchison, formerly of the Bengal Medical Service; communicated by J. D. Hooker, M.D., F.R.S., F.L.S. &c.

The author's observations were drawn from an insect which he had found in the month of April 1854, in the jungles in the neighbourhood of Rangoon, specimens of which were exhibited to the Society. This insect was observed adhering in clusters to the leaves and twigs of various species of plants in the jungles, imparting to them a beautiful snow-white appearance. On endeavouring to secure one of the leaves with the adhering insects, a number of perfect hemipterous insects furnished with four wings, and a little larger than a common house-fly, were observed to spring by sudden jerks in various directions, leaving the white matter still adhering to the leaf. On close inspection, this white matter was found to consist of a number of insect-cases, each furnished with six legs, and with a dense tuft of white pectinated appendages adhering to the dorsal and lateral aspects of the posterior segments. These appendages were about two-thirds of an inch in length, and in the fresh state spread out in all directions from the tail, some of them curving upwards and forwards towards the head. They were extremely fragile, the slightest touch reducing them to a fine white powder, with which the whole body of the insect was thickly bestrewed. Distinct from these there were on each insect two smaller tufts of straight white filaments, exhibiting under the microscope the ordinary characters of the hairy appendages found

upon insects, with a tendency to split up at their distal extremities. These insect-cases were evidently the remains of the *pupal* stage of the more perfect insect which had sprung away. The author then proceeded to show the identity of this insect with *Flata limbata*, originally described and figured by Sir George Staunton in his account of Lord Macartney's 'Embassy to China' (vol. i. p. 353), as the source of the Chinese Insect-wax, and afterwards by Mr. Westwood in his edition of Donovan's 'Insects of China' (p. 40. pl. 17), and in the 'Gardener's Chronicle' for July 1853.

After considering the importance of the Chinese Insect-wax, in an economical point of view, and enumerating the several uses, medicinal and economical, to which it has been applied in this country and in China, the author proceeded to mention the various sources to which the substance had been attributed. He quoted the statements of Sir G. Staunton and others already alluded to, which referred it to the white secretion of the *Flata limbata*. He then alluded to the detailed observations on the subject which have been recorded by Capt. Hutton of the Bengal Service in the Asiatic Society's Transactions (1843), in which that gentleman had endeavoured to prove, that the substance formed by the *Flata limbata* presented very different properties from those of the Chinese wax. He showed, however, that Capt. Hutton had confounded the viscid excretion of the insect with the white secretion originally described by Sir George Staunton, and which in its properties is really almost identical with the Chinese wax.

He then observed, that in the Reports of the Juries of the Great Exhibition of 1851, the Chinese Insect-wax was said to be the produce of the male *Coccus ceriferus*. This insect, however, had been shown by Dr. James Anderson to yield the "white lac" of Madras, a substance which presented very different chemical relations from those of the Chinese wax, being, as shown by Dr. Pearson, soluble in alcohol and æther, and of higher specific gravity than water.

The author then reviewed the elaborate paper on the subject of the Insect-wax published in the 'Pharmaceutical Journal' (April 1853) by Mr. D. Hanbury, in which that gentleman had endeavoured to show that the substance was the production of a species of *Coccus* hitherto undescribed. His conclusions were drawn from specimens of the crude wax, as scraped from the tree, transmitted to him by William Lockhart, Esq. of Shanghai, in which were a number of full-grown bodies of a female *Coccus*, as well as pieces of stick incrustated with wax, and with the insects still *in situ*. This insect

had been named by Mr. Westwood *Coccus sinensis*, and afterwards *Coccus Pela*. Mr. Hanbury's description and figures were shown to agree for the most part with the accounts and figures given by Chinese authors of the mode of production of the Insect-wax of China, and which had been translated into French by Du Halde and M. Stanislas Julien. Mr. Hanbury, however, apparently misled by the arguments of Capt. Hutton, concluded that the *Flata limbata* could not produce the Chinese wax.

The author then proceeded to consider the physical characters and chemical properties of the Chinese wax of commerce, and to compare with them those of the waxy matter of the *Coccus Pela*, described by Mr. Hanbury, and of the white secretion of the *Flata limbata*, exhibited to the Society.

1. The physical and chemical properties of the wax of commerce were shown to have been ably investigated by Mr. B. C. Brodie, Mr. Ure, and Dr. Maskelyne of Oxford. It was described as occurring in circular cakes of various dimensions, often about a foot in diameter, 3 or 4 inches thick, and perforated in the centre. In structure it closely resembled spermaceti, being of a brilliant white, and of a sparkling, highly crystalline appearance. It differed, however, from spermaceti in being harder, more brittle and pulverizable, and presenting a more fibrous character of crystallization. Under a low magnifying power it was seen to consist of a mass of irregularly shaped crystalline tabular scales. Its specific gravity was $\cdot 965$, and its melting-point had been stated by Mr. Brodie to be $181^{\circ}\cdot 4$ Fahr., and by Mr. Ure to be 196° , the melting-point of pure white wax being only 155° Fahr. When melted, it became transparent and colourless, and again opaque white upon cooling, and was then seen to consist of acicular crystals for the most part arranged in a stellate manner. It was but very sparingly soluble in either alcohol or sulphuric æther, and did not saponify with the solution of caustic alkali. It dissolved, however, with great facility in naphtha, out of which fluid it might be crystallized. It was combustible and made good candles, for which purpose it was largely used in China, and to a smaller extent had been employed in this country by Mr. Samuel Childs. The investigations of Mr. Brodie relative to the proximate and absolute analysis of the Chinese wax, as published in the 'Transactions of the Royal Society' (1848), were then considered.

2. The characters of the crude wax furnished by the *Coccus Pela* were then enumerated. As forwarded to Mr. Hanbury by Mr. Lockhart of Shanghai, it consisted of the crude wax as scraped from the tree, along with a number of full-grown bodies of the *Coccus Pela*,

as well as pieces of stick incrustated with the wax, and with the insects still *in situ*. The crude wax itself formed around the branch a white, soft, fibrous, velvety coating of from one- to two-tenths of an inch in thickness, and when scraped off, occurred in whitish, flattened, curled, or generally irregular masses, the largest pieces about half an inch in length. These masses exhibited no crystalline structure, but were fibrous-looking, and so soft as to retain the impression of the finger. It presented peculiar microscopic characters, which had been described and figured by Mr. Quekett in an appendix to Mr. Hanbury's paper published in the 'Pharmaceutical Journal.' When examined with a power of 250 diameters linear, it was "found to consist of a series of short filaments or cylinders, some of which are straight, but others more or less curved; within each cylinder is a tubular cavity, extending throughout its whole length. The diameter of the cylinders is on an average $\frac{1}{4000}$ th of an inch, whilst that of the tube within varies from $\frac{1}{7500}$ th to $\frac{1}{8000}$ th." Mr. Quekett had found similar tubular filaments in the cocoons of the Cochineal insect. The specific gravity of the crude wax had not been ascertained, but the melting-point of a purified wax obtained from the crude substance had been shown by Mr. Hanbury to be $182^{\circ}75$ Fahr. It did not dissolve, or at all events but very sparingly in alcohol, æther, or solution of caustic alkali, but it dissolved readily in naphtha and vegetable oils, uniting with the latter to form a solid white mass. When melted, it formed a clear, colourless liquid, which became opaque white on cooling, and was then found to have lost its tubular structure, and to be composed of acicular crystals arranged in stellate masses, like those produced by the commercial wax when similarly treated. From these characters, as well as the evidence of Mr. Lockhart of Shanghae, Dr Murchison thought that there was good reason for coinciding with the conclusion arrived at by Mr. Hanbury, that the *Coccus Pela* is a source of the commercial wax.

3. The characters of the white appendages of the *Flata limbata* were then considered. Close inspection showed that these appendages were of two sorts. First, there was on each insect a small tuft or brush of minute white hairs, adhering firmly to either side of the insect's body, and distinguished from the great bulk of the white appendages by their smaller size, greater slenderness, less opacity, and greater strength, admitting³² of being handled with perfect impunity. These filaments under the microscope presented the ordinary characters of the hairy appendages often found on insects, with a remarkable tendency to split up at their distal extremities. The greater bulk of the white appendages were thicker, longer, and

more opaque than the preceding. They were but loosely attached to the surface of the insect's body, and extremely delicate and fragile, so that the slightest touch with the point of the finger reduced them to a fine white powder, and hence was explained the fact, that the leaves and branches upon which these insects occur, become completely whitened by a white powdery substance in the manner described by Sir G. Staunton. On microscopic examination they presented a beautiful appearance of spiral structure. When one of the appendages was compressed with care between two glass plates, and examined under a power of 250 diameters, it was found to consist of a mass of spiral threads, with their long axes running in the same direction. The slightest friction of the surfaces of the glass plates broke up these threads into fragments more or less minute, and if the friction was continued, they were almost entirely converted into granular matter. The threads differed from the cylinders found in the crude wax of the *Coccus Pelu* in not being tubular, and in their diameter measuring on an average only $\frac{1}{80000}$ th of an inch, or about one-half. Attempts were made to trace the mode of connexion of these filaments with the insect's body, but owing to their extreme delicacy and fragility this was found impossible. The integument, however, to which they were attached was found to be perforated by a number of circular openings, having a distinct double outline, the diameter of the inner circle exactly corresponding with that of one of the filaments. Hence it seemed probable that the spiral threads, which were evidently a secretion, had issued from these circular openings. What was the chemical nature of this white secretion? A small portion, placed on a glass slide and melted over the flame of a spirit-lamp, became a transparent, colourless drop, which on cooling became opaque white, and was then found to have lost its original structure and to have become crystalline. The crystals consisted partly of irregularly-shaped fragments, and also contained, especially when the cooling had been conducted slowly, acicular crystals arranged in stellate masses as in the case of the two substances already described. The melting-point, as far as could be ascertained with the small quantities experimented on, was between 190° and 200° Fahr. The substance floated in water, and was perfectly insoluble in this fluid, and but sparingly, if at all, soluble in alcohol, sulphuric æther, or solution of caustic alkali, whereas in naphtha it dissolved readily, as also in vegetable oils, forming with the latter a white solid substance. From these characters there could be little doubt that the white secretion of the *Flata limbata* was of a waxy nature, and also very similar in its properties to the Chinese Insect-wax of commerce.

The author concluded as follows :—

“The *Flata limbata* occurs in great abundance in China, and also in some parts of India, and I believe, from the facts above stated, that there is nothing improbable in the original statement of Sir George Staunton, that it may be a source of the Insect-wax of commerce. That it is the sole source, as was once believed, I think is disproved by the arguments which Mr. Hanbury has brought forward in favour of the *Coccus Pela*. That it is one source, however, of the Insect-wax employed for economical purposes by the Chinese, I think is rendered highly probable by the following considerations :—

“1. We have seen that the *Flata limbata* secretes a waxy matter in considerable quantity.

“2. This waxy matter resembles closely in its characters and chemical relations the Chinese insect-wax of commerce.

“3. The *Flata limbata* is known to be very common in many parts of China.

“4. Sir George Staunton, when travelling in Cochin China, found that it was generally believed that the white matter secreted by the *Flata limbata* formed the white wax of the East, and he adds, ‘It is asserted on the spot, to have the property, by a particular manipulation, of giving in certain proportions with vegetable oil such solidity to the composition, as to render the whole equally capable of being moulded into candles.’ The truth of this statement I have myself verified.

“5. It has been stated by Dr. Macgowan (Journal of Horticult. Soc. of India, vol. vii. p. 164), that the annual produce of the Insect-wax in China is not far from £400,000; and when we consider the very small quantity yielded by an individual insect, whether the *Coccus Pela* or the *Flata limbata*, it would appear probable that the substance may be obtained from several insects, of which no doubt the *Coccus Pela* is one, and probably the *Flata limbata* is another.”

The paper was illustrated by specimens of the insect in its natural state adhering to the leaf, and also by numerous preparations, illustrative of the microscopic appearances and chemical relations, of the waxy matter both of the *Coccus Pela* and *Flata limbata*. The specimens of the *Flata limbata* adhering to the leaf have since been deposited in the Museum of the Royal Gardens at Kew. Microscopical delineations of appearances seen in the secretions both of *Flata limbata* and of *Coccus Pela*, and of the spiral threads and white hairs of the pupa of *Flata limbata*, also accompanied the paper.

May 24.

Anniversary Meeting.

Thomas Bell, Esq., President, in the Chair.

This day, the Anniversary of the birth of Linnæus, and that appointed by the Charter for the election of Council and Officers, the President opened the business of the Meeting with the following Address :—

GENTLEMEN,

At the last Anniversary Meeting of the Society, I stated my intention on the present occasion, to take a brief review of the progress which has been made during the intervening year in the general interests of Natural History. It is not my purpose, in endeavouring to carry out this intention, to enter into any detail of the various discoveries, more or less important, which may have characterized that period; and still less to analyse the contents of books or other publications on these subjects. These are of course known to the cultivators of every branch of the science respectively; and I conceive that I shall more usefully employ the short time allotted to this duty, by taking, as it were, a bird's-eye view of its present state with reference to the past, and considering some of the means by which the future interests of natural science, and the welfare of the Linnean Society in particular, may be best promoted.

As regards the present state of the Society, I think I may safely congratulate the Members on the fact, that notwithstanding public difficulties, unparalleled during the last half-century, notwithstanding the heavy demands upon every one's income, the depression and sadness of spirit which have well nigh weighed down every heart in the nation, and the concentration of the popular mind upon the harrowing events which have been daily transacting around us, our funds have increased, our Meetings have not fallen off either in numbers or interest, and the communications which have been read at them will not suffer, in point of variety or importance, in comparison with those of any former period.

Many losses we have indeed sustained both by retirement and by death, and there are some vacancies which it is no disparagement to living excellence to mourn as not likely soon to be filled up. These

are the painful features in our annual retrospect ; and as time goes on and some of us have to look back upon the recurrence of many of those periods, at each of which some congenial spirit, some respected associate in our pursuits had been taken from us, the sadness of each successive stage seems to increase, and we are warned that ere long we too must give up our place to others, to be missed, we hope, and lamented in our turn. In contemplating the list of those who have been taken from amongst us by death during the past year, I had not intended to offer on my own part any anticipation of the obituary notices which Mr. Bennett will presently read to you ; but there is one name in that sad list, which my own personal regrets and the irreparable loss to science occasioned by his removal will not suffer me to pass over without a brief allusion. Had I indeed been called upon to select the individual in our Society, whom, for the variety and extent of his acquirements, the versatility of his genius, the soundness of his judgment, the certainty and depth of his knowledge, the cheerful kindness of his temper, the singleness and simplicity of his heart, his purity and unselfishness of purpose—science and his friends could least have spared, I know not whom I could have named as uniting in himself all these qualities in such harmonious and equally balanced proportion as EDWARD FORBES ; and when we recollect that he had only arrived at that period of life when the mental powers become matured and the judgment ripe,—when too we saw him just raised to that desired position, the very culminating point of his ambition, where all his extraordinary qualities would have had full scope for independent exercise, uncontrolled but by his own cautious and intelligent judgment,—it is impossible not to feel that one has fallen whom we may scarcely hope to replace, and that science has sustained a loss, the depth of which, from the suddenness of the shock, we are only now beginning to realize.

Amongst the circumstances of the Society which call for particular notice at this time, one of the most interesting is the aspect which it presents with reference to its foreign relations. We have every reason to be assured, from the manner in which our choice of Foreign Members last year was received by those distinguished naturalists on whom that honour was conferred, that this distinction was never more highly appreciated than at present ; and, as this phase of our Society must always be especially important to us, as determining its prestige amongst the most celebrated naturalists abroad, I have thought it desirable to state briefly, as I did at the

last Anniversary, the grounds on which the Council recommended the same honour to be conferred upon those eminent persons whom you have recently elected to fill the vacancies which had occurred since that period. Those vacancies having been all produced by the decease of botanists, three persons were selected to succeed them, who were distinguished for their attainments in that branch of natural history.

M. Hofmeister's contributions to botanical science are confined to physiological researches, and these are of the highest interest and value, having been always conducted with the greatest skill and judgment, and illustrating the most difficult and obscure facts in vegetable embryogeny. The results of these observations are so well known in this country through the correct translations of Professor Henfrey, published in the 'Annals of Natural History,' and the Reports of the British Association, that I need do no more than allude to them here. The most elaborate and important is his work on the Reproductive Organs of *Lycopodiaceæ*, and on the Embryogeny of *Coniferæ*, published at Leipsic, a quarto volume, illustrated by 33 beautifully executed plates. M. Hofmeister has also published Essays on the Fecundation of *Ænothera*, and on the Reproductive Organs of *Equisetum* and of the Ferns, in the Proceedings of the Royal Society of Science of Saxony, and others on the Embryo of Phænogams, &c. Besides throwing great light on these subjects and developing many new facts, M. Hofmeister has displayed, in all his researches, a thorough knowledge of his subject, and a rare delicacy and skill in microscopical investigation, which have, in comparatively few years, raised him to the rank of a proficient in physiological botany.

M. Planchon is the "Aide" Professor of Botany at Montpellier. He commenced the study of this science under Professor Dunal of that place, and in 1844 published his first essay on the Origin and Development of *Arilli*, and on the Ovules of *Veronica* and *Avicennia*. This treatise, which I believe was his inaugural dissertation on presenting himself for the degree of Doctor in Science at the University where he now holds his Professorship, at once established for him at a very early age, the reputation of a talented and promising botanist. But M. Planchon may be said to have a peculiar claim upon our sympathy and good will, as he ten years since accepted the office of Curator of Sir William Hooker's Herbarium at Kew, where he devoted himself for five years indefatigably to the study of systematic botany. A series of most important memoirs have from time to time proceeded from his pen, consisting for the most part of monographs of little-known genera and small families of plants contained in

the Hookerian herbarium. These all display remarkable sagacity and talent, together with a great amount of original research, an extensive acquaintance with the literature of botany, skill in the discrimination of genera and species, and above all a rare and comprehensive knowledge of the structure and affinities of the natural orders of plants:—a wide range of attainments this, which entitle M. Planchon to be considered one of the first systematic botanists of the day. Amongst his more important botanical papers are those on the Natural Order *Meliantheæ*, published in our Transactions; on *Lineæ*, *Ternstræmiaceæ*, *Simarubeæ*, *Saurureæ*, and many others, in Hooker's 'Journal of Botany;' and on *Droseraceæ* and *Nymphaeaceæ* in the 'Annales des Sciences Naturelles;' besides minor contributions to these and other journals.

Heinrich Robert Göppert, Professor in the University of Breslau, is highly distinguished for his labours in vegetable physiology, and particularly in fossil botany. The following list of his principal works will show how extensive and important have been his contributions to botanical science, and especially to our knowledge of fossil botany:—"On the Condition in which Fossil Plants are found, and on the process of Lapidification." This paper gives an account of some curious experiments in producing imitations of fossils, by placing recent ferns, &c., previously steeped in a solution of sulphate of iron, between layers of soft clay, which, after having been dried in the shade, were gradually heated till they became red-hot. By this means exact counterparts of fossil plants were produced, some of which, Mr. Kippist informs me, were exhibited at one of our meetings many years ago. His 'Systema Filicum Fossilium' occupies an entire supplemental volume of the *Acta Acad. Naturæ Curiosorum*, and is beautifully illustrated with plates of the fossils themselves and comparative figures of their analogues amongst recent forms. 'De Floribus in Statu Fossili Commentatio;' 'Flora of the Tertiary Period;' 'Flora Fossilis Formationis Transitionis;' 'Account of Fossil Woods collected during Middendorff's Siberian Travels;' 'On Fossil Plants found in Amber;'—these are amongst his extensive publications on fossil botany; and in addition to these he has published several papers on vegetable physiology; for instance, "On the Development of Heat in the Living Plant;" "On the Time of Flowering of Plants," &c., and two papers on the *Balanophoreæ*. This brief account of the labours of the three distinguished men whom you have recently elected upon your Foreign list, will, it is believed, afford a satisfactory justification of your choice.

In considering the means by which the study of Natural History may be most extensively and effectually advanced, it is impossible not to turn with the most anxious anticipations to our great seats of learning, the Universities of Oxford and Cambridge. It is not for me to criticise the course of education, which, established by the wisdom of our ancestors and hallowed by the long list of great men whom it has formed, has been corrected and expanded by successive ages of accumulative experience, and accommodated, in some degree at least, to the spread of knowledge and the increasing requirements of advanced civilization. Nor am I disposed to join in the cry which has been got up against the great importance which is attached to the study of the exact sciences in the one, or to the acquisition of classical literature in the other. The severe mental discipline and logical exactitude ensured by the former, and the essential application of the course of study involved in it to astronomical and physical science, are considerations so important as scarcely to admit of an over-estimate; and, on the other hand, amidst many minor though very material advantages derived from the critical study of classical literature, it must never be forgotten that upon it depends the permanent preservation, in their purity and integrity, of the “*ipsisima verba*” of the Holy Scriptures. Far be it then from us to depreciate the graver studies which have so long been identified with those great schools, whilst we claim and earnestly demand some degree of their patronage, for those not less interesting and scarcely less important pursuits, to which our attention is especially directed.

One of the most important and delightful objects in connection with the spread of natural knowledge, is the genial and elevating effect which an acquaintance with natural phænomena must produce upon the heart and intellect of a population so generally addicted as ours to the drudgery of business, and so subject to the narrowing influence which its exclusive pursuit is calculated to exercise on the mind. And this is not less applicable to the rich than to the poor—to the merchant or the manufacturer who counts his wealth by hundreds of thousands, than to the humble labourer the sweat of whose brow procures his daily pittance. But where are we to look for the sources from whence this blessing to the common mind of our country is to flow? Where but to the higher and influential classes of society, whose example as well as patronage seems to be necessary to any wide and systematic extension of this unspeakable good. And yet how few comparatively of the nobility, the landed gentry, the wealthy merchants or manufacturers, on whom the masses are mostly dependent, possess even the most superficial acquaintance

with these branches of knowledge, or evince the slightest indication that they are aware of the enjoyment which they lose for themselves, and of which, by their indifference or opposition, they are depriving others! Is it not true that, as a general rule, these studies are confined for the most part to men engaged in the incessant duties of one or other of the learned professions, and especially, from the very nature of their professional education, to the practitioners of medicine; or to those who, though engaged in business or in rural occupations, have from early associations or from a refined and pure taste, sought their relaxation from toil in these calm and tranquilizing pursuits?

If then the masses are ever to be influenced in that direction, the question recurs, from whence is the impulse to be given, by whom is the influence to be sustained? Doubtless in a great degree by those who have received their education in the great national Universities;—in a word, by the representatives of our aristocracy, and still more immediately and extensively by the clergy of the church, who, it must be remembered, are intimately connected with education in every rank of life, as the professors of colleges, the masters of public and private schools, and the managers and directors of every national school in the country. It is this consideration which has induced me to dwell with what may perhaps be felt by some a tedious prolixity, upon the importance of the Universities as the great prospective sources of a general extension of the knowledge of natural history. Not that I am disposed to underrate the value of other appliances concurring to the same great end, but that the importance of this means is so obviously paramount, that it forces itself upon our primary consideration.

The changes which have recently taken place in the constitution of the University of Oxford, and those which are in contemplation in that of the sister University, are, I humbly conceive, entirely out of the sphere of my present object, but I have thought that a few remarks on the progress which natural science is making there may not be wholly uninteresting or useless.

It is generally known, (and I now speak from the authority of one whose position gives him the best means of correct information,) that within the last few years, the facilities for studying natural history at Oxford have greatly increased by the acquisition of several very important collections in various branches both of botany and zoology. I may particularize the splendid collection of insects and other zoological specimens presented a few years since by Mr. Hope, the collections of shells received from Lady Harvey and Sir Walter

Trevelyan, the extensive herbarium collected by Mr. Fielding, and made over to the University by his widow, the vast accumulation of geological specimens brought together by Dr. Buckland, and the minerals presented by Dr. Simmons: the care also bestowed upon the arrangement of the old Ashmolean Museum by Mr. Philip Duncan and his deceased brother is worthy of especial notice.

Such collections as these demanded from the authorities the erection of a museum commensurate with their extent and value; and it is most gratifying to be able to state that the University has determined to apply no less a sum than £30,000 to the erection of such a building, in which the greater part of these collections, together with appropriate lecture-rooms, may be brought into connection with each other. This design has lately been finally resolved upon, and it is intended to proceed at once with its accomplishment. Here then are means and appliances for the study of natural history in many of its branches, which, although not yet completed, may be looked upon as constituting a great and important step towards the speedy establishment of a most extensive and efficient school in those sciences.

But this is not the only advance made by the University in this direction. It has also introduced certain changes into its system, intended to favour the study of these branches of knowledge. Formerly, as is well known, physical science, together with the branches of natural history dependent upon it, was virtually ignored; for although lectures were delivered on these subjects, no student was obliged or even encouraged to attend them. Now, however, an attendance upon the lectures of the Professors, and a certain acquaintance with some branches of knowledge besides the classics, are required for a Degree. The *new* branches at present insisted upon must be two or more, either of them connected with Physics, or with History or Law, or with Mathematics. Thus, it will be observed, a knowledge of Physics still continues merely optional at Oxford; but it is even now to a certain extent encouraged by the award of honorary distinctions to a proficiency in any of its branches, and the same boon extends also to Natural History. This, Gentlemen, may be accepted as an instalment, but only as such. In order to attach to these sciences that degree of attention at Oxford to which their importance unequivocally entitles them, some portion of the endowments which are at present devoted exclusively to the encouragement of the classics and mathematics, must be given to those who have attained a proficiency in the studies in question. One who is better acquainted with the statistics of that great and rich

University than I am, assures me that, after rewarding with Fellowships all those persons who had distinguished themselves as scholars and mathematicians, and who are in circumstances to require any such assistance, there would remain ample means for the encouragement of all the other studies which the University by its recent regulations has acknowledged as important. This change (I quote from the same authority) it might be difficult in all cases for the Colleges themselves to effect without infringing upon their statutes; but as a Commission is now sitting, composed of persons exempt from those oaths which shackle the *existing* members of the different Colleges, and constituted expressly for the purpose of bringing about those useful changes which the latter feel themselves prohibited from undertaking, it is earnestly to be hoped that the appropriation of a portion of the revenues of the Colleges for the more direct encouragement of Physical Science and Natural History may be, as it assuredly ought to be, one of the first measures that will engage their attention. There is, I am confident, an increasing interest and desire in the minds of the educated portion of the community to cultivate an acquaintance with these branches of knowledge. It is for the authorities at Oxford and at every other great seat of learning to take care that this interest should not be discouraged, that this desire should not be repressed. The prospect is at present bright,—let us hope it will not again be clouded. I should be unjust were I not here to express my sincere appreciation of the continued and successful exertions of our esteemed Fellow, Dr. Daubeny, in promoting the changes to which I have alluded. Not only have those exertions been unremitting and judicious, but they have been followed up by a step which manifests the earnestness and singleness of purpose by which he has been actuated, in resigning one of the professorships which he held, that of Chemistry, in order that he may devote his time and talents the more exclusively to the promotion of his own particular branch of natural science.

That the interests of Natural History will as far as is possible be promoted by the Professors themselves at both the Universities, we may be well assured from the character of those who now hold the Chairs in connexion with these branches of science; and whatever may be the eventual state of Cambridge as regards these objects, the well-known zeal, intelligence and attainments of the Professors are a sufficient guarantee that if there be a deficiency in the teaching, it will not be from any failure in the teachers. We have, however, the satisfaction of knowing that a movement has taken place there also,

which promises at some future, and I trust not very remote period, to effect a great and lasting improvement. On this subject I have again sought information from one who is most competent from his position to speak authoritatively, and I feel that I cannot do justice to his most interesting communication but by giving it to you in his own words:—"There has been a vast improvement effected, in abandoning the old garden of three acres, situate in a smoky locality, with old-fashioned plant-houses, for a scientifically-arranged new garden of twenty acres, half a mile from the town, with some portions of a projected range of handsome plant-houses completed and filled; the rest (more than two-thirds of the whole) to be erected whenever sufficient funds shall have been found for the purpose. I hear, on all sides, of the growing interest taken in this establishment, and of the willingness on the part of the majority of the Senate to appropriate as much from the scanty funds in the University chest, as our necessities may justify. A plan has lately been devised for building lecture-rooms and museums on the excellent site afforded by the old Botanic Garden. Here the Professor of Botany will enjoy the opportunity of displaying properly prepared specimens, as in the great national establishment at Kew. Here will be deposited the valuable herbarium bequeathed by the late Dr. Lemann, rendered doubly valuable from containing 30,000 species whose names will be authenticated by Mr. Bentham, from comparison with those in his own most extensive herbarium, so munificently presented by him to the nation, and recently removed to the Royal Gardens at Kew. A subscription has been commenced on the part of some of the Colleges for the purpose of defraying the expense of erecting those buildings; and the Vice-Chancellor informs me that he has already heard of offers to the amount of £10,000, although a few Colleges decline rendering any assistance. So far then as these outward demonstrations may enable us to judge, these are doubtless symptoms of decided progress. But, I regret to add, the scheme devised four or five years ago, for slightly connecting the natural sciences with one portion of our University Curriculum, has proved to be of little service as an educational measure. A few of our non-reading men have been induced to turn their attention to some branch of natural history, who otherwise might not have thought of taking up any such pursuit. I believe some of these have become attached to natural science, and, having quitted the University, are likely, in due time, to take no inconspicuous rank among naturalists. I have just had the satisfaction of signing the recommendation of one for admission to the Linnean Society, and I

hope to see more exhibited in the same good cause. Those who go out in mathematical and classical honours are not compelled (like non-reading men, as all others are called) to attend Professorial lectures, and very few of them who remain after taking their B.A. degree, attempt to take honours in the Natural Sciences Tripos. Not without several meritorious exceptions, those who become Fellows or Tutors of Colleges pay very little or no attention to the natural sciences. Entirely ignorant of the position which these deservedly occupy in the estimation of all who have learnt to comprehend their bearing upon the highest interests of mankind, they are too apt to think and speak contemptuously of them. They are no judges whatever how far they are calculated to discipline the mind, in common with the other instruments ordinarily employed in a just and liberal *education*. It would, perhaps, be out of place to enter into details, and revert to various causes which have operated in diminishing the hopes of those who have been desirous of seeing the Natural Sciences assume the position to which they would be found justly entitled as fruitful branches, when fairly engrafted upon a general scheme of sound University education; but I will just allude to two obvious causes why the candidates for honours in the Natural Sciences Tripos have hitherto been so few, scarcely amounting to half a dozen annually. *First*, the examination is not conducted on the plan so worthily adopted in regard to those who compete for honours in Mathematics and Classics. If a board of examiners or advisers appointed by the Senate, were to determine the extent to which they consider candidates, whether for a pass examination or for honours, ought to have become acquainted with any particular science, which may be too vast in its general bearing to be grasped within the limited period allotted to its culture, something like a definite standard for ascertaining the comparative merit of students in each subject might be derived, and the different Professors would be better prepared to instruct their classes, up to such standard. It might then also be left as much or more to others as to themselves to determine how far they had succeeded in doing this. *Secondly*, the Natural Sciences Tripos will be little attractive to many men of ability, until proficiency in Natural History shall be allowed some weight as well as proficiency in Mathematics and Classics, towards obtaining University rewards, whether Prizes in Books or Medals, or in Scholarships and Fellowships. I may add, that until our Professorships shall have been properly endowed, the University is not likely to command the life-long services of a body of men, proficient in their respective departments, and devoting their

undivided attention to the duties of their respective offices. These duties, I strenuously assert, ought not to be restricted to the mere delivery of short elementary courses of lectures; but they should include the exertions necessary for promoting original discovery, to the general advantage of the country and the special reputation of the University."

At neither of the Universities is there a Professor of Zoology. At Oxford the only means for studying this important subject are the Lectures on Comparative Anatomy and Physiology, which the Reader in Anatomy may in his own zeal and judgment be led to volunteer. That Dr. Acland will do this to the utmost of his means, and with all the earnestness and talent for which he is so conspicuous, we are well assured; but it still remains a lamentable defect in the regime of so great and rich a University that there is no special provision for teaching this science.

At Cambridge there is, though to a less extent, the same want, and there is also a similar collateral and voluntary supply. There is a Chair of Comparative Anatomy and Physiology filled by one possessed of very high attainments, who notwithstanding his clerical duties and the time and labour which his Professorship of Anatomy demands, still keeps himself *au niveau* with the science of the day, and, as far as is practicable, supplies the deficiency to which I have alluded. This gentleman thus expresses himself on this subject in a letter with which he has lately favoured me.—“It is much to be regretted that we have no Professorship of Zoology. Not that I suppose, if we had such a chair, the lectures given would be at once largely attended, but because it is a proof, amongst many other indications, how little zoological science is cared for in England, as a means and an element of education.” In Comparative Anatomy there is an annual course of fifty lectures given by the excellent person to whom I have just referred, between October and Easter. “They are,” says Dr. Clark, “thinly attended, but scarcely a year passes without several of the attendants showing peculiar taste and talent for the subject of them.” A translation of Van der Hoeven’s ‘Handbook of Zoology,’ from the Dutch, is being printed at Cambridge under Dr. Clark’s auspices, with the view of rendering a taste for an acquaintance with Zoology and Comparative Anatomy more general amongst the students there.

It is true that at Cambridge the Senate has also endeavoured to provide the means necessary for the study of Zoology and Comparative Anatomy, by obtaining and keeping up good collections of specimens when they have been offered; and the acquisition of

Mr. Swainson's birds and other specimens has increased these means. The British Birds of the late Mr. Morgan, and the collection of Fishes of Mr. Jenyns, as well as a good cabinet of Insects in the Cambridge Philosophical Society, also afford considerable assistance. I cannot but believe that where there is such a gathering of young men of good education, and we should hope generally of cultivated taste, were there a stated Professorship of Zoology, and inducements in the form of University rewards for proficiency, there would be no want of a class. That the means and inducements are wanting is little creditable to the University, and little honourable to such a country as ours.

The centre, however, from which, in this unsatisfactory state of official and recognized teaching at Cambridge, a love for Zoology must principally emanate, is probably the Ray Club, which appears to be in a very active working condition, and consists of every class and degree of University men, from Professors and Fellows to Undergraduates.

Such, Gentlemen, is the statement which I have thought it right to lay before you, of the existing condition and future prospects of the sciences which we cultivate, in the two great Universities of the nation. Would that this frank, but, I trust, respectful appeal might have some influence in promoting a more worthy appreciation of their importance, by those in whom is vested the power of carrying out the suggestions which are thus offered! "Le bon temps viendra;"—how soon, must depend upon higher influences than ours.

Although I am not generally disposed to anticipate such marvellous results from the free opening to the public of the great national collections of art, of antiquities and of science, as it is now the fashion to do, I cannot but view with much satisfaction the greatly increased facilities which are everywhere given to the examination and study of such objects by those who are competent to appreciate them. To expect that the mere permission afforded to the uneducated classes to wander through our galleries of art and our museums of natural history, is to result in imbuing them with a rational appreciation of the beauty and interest of what they behold, without the advantage of a previous educational preparation, appears to me merely visionary and utopian; and there are no facts hitherto elicited which are in any degree calculated to remove this conviction. This however is no reason why we should fail duly and reasonably to appreciate the real advantages which may be anticipated from encouraging and gratifying, as far as possible, the public inclination

to visit, and admire, and study such objects. I am led to these observations by an important step recently taken by the Trustees of the British Museum, in the publication of full, and in most cases illustrated monographs of the different groups of animals, including not only those species which are to be found within its precincts, but all which are hitherto known. The compilation of these monographs has been confided to naturalists who have respectively studied the various groups which are thus catalogued; and these gentlemen have availed themselves of the opportunities allowed them of examining and comparing various zoological collections, such for instance as the typical collections belonging to this Society, to the Entomological and the Zoological Societies, those of the Honourable East India Company, of Haslar Hospital, and the extensive private cabinets of Mr. W. Wilson Saunders, Mr. Baly, and others.

Dr. Gray has in this manner published a Monograph of the Ungulated, the Cetaceous, and the Phocine MAMMALIA, describing all the known species, illustrated with plates of the crania of all the genera; also similar monographs of the Cartilaginous Fishes, the Lizards, Tortoises, Crocodiles, Amphibæniæ, all the Snakes excepting the Colubridæ, which is now in the course of publication, and of the Tailed Batrachia; the latter illustrated with figures of the cranium and teeth of each genus. Among the MOLLUSCA the same distinguished naturalist has published similar monographs of the *Cephalopoda Antepedia*, the *Pteropoda*, the *Brachiopoda*, *Ancylopoda*, and the families *Placunadæ* and *Anomiadæ*. That of the *Brachiopoda* is illustrated with representations of all the genera: in this work Dr. Gray was assisted by Mr. S. P. Woodward, and it contains the fossil as well as the recent species. Amongst the RADIATA he has also published a Monograph of the irregular *Echinidæ*, illustrated with figures of the new genera and species.

In the Entomological department a similar activity has been displayed. Mr. George Robert Gray has published a Catalogue of the *Papilionidæ*, illustrated with coloured figures of all the new species, in thirteen quarto plates.

Mr. Francis Walker has produced monographs of *Diptera*, occupying seven volumes; of the *Homoptera* and *Neuroptera*, in eight volumes; and of the *Lepidoptera Heterocera*, in two volumes.

Mr. W. S. Dallas has published the first and second parts of a Monograph of the Hemipterous Insects, illustrated also with plates of the genera.

From Mr. Frederick Smith we have monographs of the *Andrenidæ*, *Apidæ*, and fossorial *Hymenoptera*, similarly illustrated; also of the

British species of Bees, and of the family *Passalidæ* amongst the *Coleoptera*.

Mr. Adam White has contributed, with illustrations, the *Cleridæ*, and the first part of the *Longicornia*.

In the MOLLUSCA, Dr. Louis Pfeiffer has given monographs of the *Phaneroneumata* and the first part of the *Pulmonata*. In this work the shells are described by the author, the systematic arrangement of the species being revised and the animals described by Dr. Gray.

Dr. Baird has produced the Catalogue of the *Entozoa*, with plates of the new species; and to the pen of Mr. Busk we are indebted for an admirable Monograph of the Marine *Polyzoa*, with characters and figures of all the species of this most interesting group.

As these catalogues contain an immense number of new species, the Museum thus becomes a storehouse, so to speak, of type specimens, such as is perhaps scarcely to be found in any other museum in Europe; and I believe the greatest care is taken so to mark the specimens, as to avoid all future ambiguity in their identification.

Whilst I am on the subject of the British Museum, I may state, and I do so with great satisfaction, that Mr. Wollaston has transferred his matchless collection of the Insects of Madeira to the national collection; and his splendid work thus becomes a typical catalogue of that portion of the Museum.

The type specimens of all the MAMMALIA described by Mr. Gould in his work on the Mammals of Australia, are also there; and a very important addition has been made to the Ichthyology by the recent purchase of the collection of Fishes of the late Dr. Lawrence Theodore Gronov, accompanied by MS. descriptions from his pen, illustrated with figures of the more important species. This work, which the Trustees have also printed, forms a very interesting contribution to this too much neglected department of Zoology.

These results of the energy and zeal of the principal zoologist to the Museum, Dr. Gray, will not fail to be appreciated by every one who desires to avail himself of the facilities afforded for studying zoology at that great emporium; whilst the catalogues, so complete and extensive, are of the greatest value to the students of natural history generally, even without reference to the Museum itself.

Such are the results of the well-applied liberality of Government as regards the science of zoology; and it is most gratifying to find that a similar liberality has been shown to the sister science, in the patronage which has been manifested towards the Royal Gardens at Kew. Here, under the direction of Sir William Hooker, the Ben-

thamian Herbarium and Library, the munificent donation of which to the nation I had the satisfaction of announcing at the last anniversary, have been arranged in perfect working order; and Her Majesty's Commissioners of Woods and Forests have further provided a liberal sum for their maintenance and increase during the ensuing year.

In the Gardens themselves many important improvements have been effected. The Arboretum, now the finest in the world, and occupying 370 acres of ground, has been completed, and the trees and shrubs accurately named. Large and important additions have been made to that valuable department, the Museum of Economic Botany, of which a popular history is in preparation, whilst a more detailed scientific account of its contents is in the course of publication in the 'London Journal of Botany.'

A sum of £1200 has been granted by the Treasury for building a new conservatory 200 feet long; and £3000 for the construction of a handsome building to contain the museum, herbarium and library.

The director of this unrivalled establishment must view with peculiar gratification the results of his zealous and judicious management, in the yearly increasing interest taken in it, and profit derived from it by the public. Whilst in 1841 the number of visitors was but 9000, during the past year 340,000 persons visited the museum and garden; and the Guide Book to the latter has reached a thirteenth edition of 1000 copies each; and it is a most important fact, in connexion with this department in particular, that merchants and manufacturers, in search of information, weekly resort to the museum, whilst artists from the schools of design are seen drawing in the houses and grounds. Several of the most distinguished botanists of Europe have also availed themselves of the scientific riches of the herbarium and library, some of whom have resided at Kew for several months for the purposes of study.

From the naturalists employed under Government, Mr. MacGillivray, in H.M.S. Herald, under the command of Captain Denham, and his assistant Mr. Milne, important collections have been received, especially from Tristan d'Acunha, the Island of St. Paul's, and the Feejees. The veteran botanist, Mr. Drummond, of Swan River, has been appointed by the Colonial Office to accompany an exploring expedition into North-west Australia; and Dr. Müller, the indefatigable and talented Government Botanist at Victoria, has extended his researches to the loftiest alps of Australia, 7000 to 8000 feet above the level of the sea. From that elevation he has procured, besides some European plants, hitherto unknown in the southern continent, many types of the floras of other distant countries.

The arctic expeditions have brought some gleanings from the inhospitable shores of the Polar American Sea; and Dr. Lyall's collections, made during Captain Sir Edward Belcher's voyage, are worthy of particular notice, being rich in Cryptogamia, and especially in Algæ, a tribe that had hitherto been much neglected in those regions. These, and the collections made during the expeditions of Rae, M'Clure, M'Clintock, Collinson, &c., are now, I understand, being worked out by Dr. Hooker, who is engaged in drawing up a *Flora Polaris*, from the combined materials brought home from all the arctic voyages.

Amongst the results of Government patronage, I must mention that Dr. Seemann's '*Botany of the Voyage of the Herald*,' the expenses of which are defrayed by the Admiralty, has reached its sixth part, which completes the *Flora of Panama*, whence 1200 species are enumerated. This work is accompanied by forty-eight plates, drawn by Mr. Fitch. The continuation will, I am informed, be devoted to the Floras of North-west Mexico and of South China.

To the same department of Government we are indebted for the '*Botany of the Antarctic Voyage of H.M.S. Erebus and Terror*.' Of this the second part has been completed during the past year, namely Dr. Hooker's '*Flora of New Zealand*.' This is, I believe, the only complete flora of any of our numerous colonial possessions, and contains descriptions of 2000 species, and plates of upwards of 300 plants, also executed by Mr. Fitch. This is to be followed by a *Flora of Van Diemen's Land*, the compilation of which is far advanced.

In Ceylon, our Fellow, Mr. Thwaites, has been indefatigable in the prosecution of his duties as Superintendent of the Royal Botanic Gardens there, and has added much to our knowledge of the botany of the island.

Time will not allow me to enumerate all the additions to botanical science which have emanated from the direct patronage of Government; and I am wholly restricted, by the same cause, from even alluding to the results of private enterprise and talent, or the patronage of other great administrative bodies. The labours of Thomson and Hooker, of Harvey, and many others abroad and at home, deserve especial notice; but I am necessitated to proceed towards the conclusion of my Address.

My object has been to show, that both with regard to the Universities and the Government, and I might worthily add, the Honourable East India Company, much has been recently done to promote the advance of natural history, and that we may look forward with confidence to the continued influence of the same sources of improvement.

I forbear even to name the papers which have been read at the Meetings of the Linnean Society ; nor have I time to advert particularly to any of the subjects contained in them. I must however state, that in consequence of a resolution of the Council some time past, considerable progress has been made in arranging and naming our own herbaria ; and the thanks of the Society are especially due to Dr. Alexander, for his able and indefatigable exertions in this important work.

In this attempt to pass in review the occurrences of the past year which have been calculated to exercise a favourable influence on the spread of a taste for natural history, I cannot avoid noticing the admirable manner in which our respected Fellow, Mr. Ward, has availed himself of his Presidency of the Society of Apothecaries, to bring together a large number of persons, including the most eminent naturalists and physical philosophers, with many who are more or less attached to similar studies, and others who, having as yet no particular participation in the interest belonging to those pursuits, had yet presented to their observation innumerable subjects of the greatest beauty and attraction. Most who now hear me were present at the two *soirées* given by that gentleman in his hall, where nearly one hundred of the finest microscopes in the world, supplied with objects illustrating every department of natural history, and exhibited by many of our first microscopists, were displayed in one room, the walls of which were covered with diagrams and other drawings of the most interesting natural objects. I cannot but believe that the fruits of such a gathering of an average of 500 or 600 persons on each night, must by and by appear in the conversion, if I may so express myself, of many who came only from curiosity, into active cultivators of the science from higher motives.

I must not pass over, also, the graceful termination of this unexampled entertainment, by the admission of about 400 ladies on the morning after the second *soirée*, to see and enjoy the same beautiful objects. I am confident that every person who was present on those occasions will agree with me, that the thanks of all the cultivators of natural science are due to Mr. Ward for this liberal and successful exposition.

Before I conclude this Address, I wish to make a few observations on a subject of very great moment to the future welfare of the Society, and on which, I believe, you will all expect some information from the Chair.

Although I would not in any degree disparage the importance of our ordinary Meetings, nor undervalue the interest which attaches to a full attendance at, and an earnest and animated spirit pervading them, it must be admitted that the very staple of our prosperity as a Society, that element which will contribute most to our usefulness and to our reputation at home and abroad, is our published Transactions. The marked improvement in the regularity of their appearance during the last few years was received as an earnest of further progress; and the Part, which, I trust, will appear upon your table at the commencement of the next session, will, both by its extent and the value of its contents, show that there was no permanent falling off in either of these respects. Still it has been felt by many, and those amongst the most eminent and valued of our Members, that some modification had become necessary in the form of our publications, and in the rapidity and regularity of their issue. This subject was so important in all its bearings, and presented so many difficulties in its execution, that the most serious consideration was necessary in order, on the one hand, to avoid any infringement, either in letter or spirit, of the constitution of the Society, or any compromise of the prestige of its character; and, on the other, to provide for all the requirements which the spread of its influence and the anticipated increase of its communications should demand. It was felt, and I assure you by no one more strongly than myself, that a new impetus would be given to the Society, and through its means to natural science in general, if facilities were afforded for the rapid and regular transmission to its Members, and to naturalists throughout the world, of such papers as required early publication, and in respect to which the quarto form of our Transactions was either unnecessary or undesirable. It was also considered that our country Members, to whom the Society affords no other tangible advantages than the acquisition of its publications, would be greatly benefited, and their interest in, and, so to speak, their communion with the Society increased, by the regular reception of such a publication, without trouble on their part, and without any increase to the expenses of their fellowship. The fact that exactly at this juncture the legislature introduced an Act, by which the greatest facilities would be afforded for the transmission of such publications by the post at a merely nominal expense, concurred strongly in rendering the scheme practicable, and appeared to afford an unmistakeable sanction to its being at once attempted. I need not say that your Council gravely and earnestly considered the proposed plan in all its bearings; and I have the greatest satisfaction in now

announcing that they adopted, by a unanimous vote, the following Resolutions:—

“That the quarto ‘Transactions’ be published regularly on the first Meeting of the Session in November of each year, and contain all such papers, read during the previous Session, as the Council shall direct.

“That the ‘Proceedings’ contain, as at present, abstracts of all the papers read before the Society (and not inserted in the ‘Proceedings’ themselves), and notices of all communications made to the ordinary Meetings, of sufficient importance to be recorded.

“That papers communicated expressly for insertion in the ‘Proceedings’ be, if so directed by the Council, printed entire.

“That the ‘Proceedings’ be published periodically (say four times in the year, on the 1st of February, the 1st of April, the 1st of June, and the 1st of August), each number being made up to as late a period as possible.

“That the numbers be issued in printed covers, and the work be registered as a periodical publication, to entitle it to the privilege of transmission by post under a penny stamp applied to the cover.

“That a copy of each number be transmitted gratuitously to each Fellow, resident in the United Kingdom, not in arrear, whose address shall be known, and delivered to the written order of every such Fellow residing abroad.

“That a copy of each number be presented to such societies at home and abroad as the Council shall direct; and that copies shall be sold to the public at an annual subscription, to be hereafter determined, including transmission by post to any part of the United Kingdom.

“That the ‘Proceedings’ be separately paged for Zoology and Botany, and each division be issued separately to purchasers who may so desire them, at a smaller annual subscription.”

Such is the plan to which the Council has determined to give a full and fair trial. It will require much energy as well as judgment to carry it into effect; but I cannot doubt the hearty cooperation of the Fellows, to assist, by their individual exertions, in obtaining all the advantages which are hoped for from its adoption. The scheme may possibly appear, in the opinion of some, to be not sufficiently comprehensive; whilst others may deem that the change is even more considerable than was called for or expedient. I must however state my own conviction, that the Council has secured, what it is often so difficult to obtain, the “*aurea mediocritas* ;” and I cannot, I think, better close this subject, together with my Address, than

with the dictum of a great constitutional writer, that "if a resolution must at last be taken, there is none so likely to be supported with firmness as that which has been adopted with moderation."

The Secretary then proceeded to read the following Obituary Notices of deceased Fellows:—

Golding Bird, Esq., M.D., was born in 1815, at Downham in Norfolk. His early education was conducted in the family of a clergyman at Wallingford, with whom he remained till his twelfth year. He was then removed to a private school in London. In spite of discouragement from his instructor, he here manifested a very decided taste for chemistry and botany. In 1829 he left school, and was apprenticed to Mr. Pretty, a respectable medical practitioner in London. In 1832 he entered at Guy's Hospital. His talents and industry soon attracted notice; one striking proof of this is afforded in his having been requested by Sir A. Cooper to aid him in the chemical portion of his great work on 'Diseases of the Breast.' During his medical studies, he continued to work hard at chemistry and botany, and gained the prize for the latter given by the Apothecaries' Company. When he passed his Examination at the Hall of Apothecaries, the Examiners took the unusual course of specially recommending him to the authorities of the Hospital. In 1836 Dr. Bird was appointed Lecturer in Natural Philosophy to the Guy's Hospital School of Medicine; and before he was twenty-three he laid the foundation of his 'Elements of Natural Philosophy,' one of our best manuals, which has subsequently passed through four editions, in preparing the last of which he had the valuable assistance of Mr. Charles Brooke. He afterwards lectured on Medical Botany and Chemical Pathology. Out of the latter lectures grew his work on the 'Urinary Deposits,' the book on which his reputation as a medical writer will rest, which has passed rapidly through three editions. In 1838 Dr. Bird graduated (at St. Andrews) A.M. and M.D., and was immediately elected Physician to the Finsbury Dispensary. In 1840 he was admitted Licentiate, and in 1844 Fellow, of the College of Physicians in London, having been appointed in 1843, when only twenty-eight years of age, Assistant Physician to Guy's Hospital. From this time his practice increased rapidly, soon becoming one of the most extensive in London; and probably few men ever more completely acquired the love and respect of their patients. In 1848 he published a paper on the Diseases of Children in the Guy's Hospital 'Reports;' and from 1847 to 1849 delivered lectures before the College of Physicians on *Materia Medica* and Organic Chemistry.

About the same time he lectured on the physiological relations of Electricity and Galvanism. Amid a very absorbing practice, he never lost sight of science, nor of opportunities of adding to his stock of scientific knowledge. He became a Fellow of our Society in 1836; and subsequently of the Geological and Royal Societies. In the welfare of the Linnean he took a special interest; and in 1846 communicated a paper "On the Siliceous Armour of *Equisetum hyemale*, L., and on its Stomatic Apparatus," an abstract of which is given in the 'Proceedings,' vol. i. p. 290-292. In 1848-49 symptoms of disease of the heart manifested themselves; and in 1852 and 1853 he took lengthened holidays at Tenby, where he ardently indulged in the pursuits of natural history, in spite of an amount of disease that would in most men have been the plea for total inactivity. Some of the fruits of these investigations appeared in a paper in the Microscopical Society's Transactions, "On the Zoophytes of Tenby, and the best mode of mounting them." In June 1854 the state of his health compelled him to relinquish London practice, and he settled at Tunbridge Wells. Up to September he improved considerably; but symptoms then supervened which showed that life was near its close, and terminated his existence on the 27th of October, 1854. Had Dr. Bird's profession been a less engrossing one, there can be no doubt that natural history would have owed him much more. He was a keen, accurate and enthusiastic observer; but the duties of a London physician left but little time for studies not strictly connected with his profession. Still his knowledge of natural history was varied and extensive, if not profound; and he was ever ready to assist those less informed than himself, by placing his own stores of knowledge, in the most unreserved manner, at their command.

Sir Edward Thomas Ffrench Bromhead, Bart., M.A., F.R.S. L. & E., F.S.A. &c., High Steward of Lincoln, the second baronet of his family, was born in Dublin on the 26th of March 1789, and succeeded to the title on the death of his father in 1822. He was a Member of Gonville and Caius College; and was called to the bar by the Hon. Society of the Inner Temple in 1813. Prior to an attack of blindness, with which he had been for some years afflicted, he attached himself to the study of Ecclesiastical Architecture, and also published various sketches of natural classifications, both zoological and botanical. The first of his botanical arrangements appeared in the 'Edinburgh Journal' for April 1836; it was afterwards frequently revised by him, with a view to adapt it to recent discoveries; and only a few weeks before his death, under date of February 8th, 1855, he distributed a printed sheet containing his

latest corrections. In the 'Magazine of Natural History' for August and September 1838 will be found, under the title of "Remarks on Zoological Classification," an outline of the principles on which he proceeded in forming his tables. In 1817 he became a Fellow of the Royal Society, to which he had the year before contributed a paper "On the Fluents of Irrational Fractions;" and in 1844 he was elected into the Linnean Society. He died at his residence, Thurlby Hall, Newark, in the county of Lincoln, on the 14th of March in the present year, at the age of 66.

Richard Cartwright, Esq., formerly of Bloomsbury Square, and for many years one of the Surgeons of the Middlesex Hospital, died at Winwick, in Lancashire, on the 22nd of June 1854, at the age of 86. He was elected into the Linnean Society in 1799, and had consequently been a Fellow for the long period of fifty-five years.

Sir Henry Thomas De la Beche, Knt., C.B., F.R.S., F.G.S., Correspondent of the Academy of Sciences of the Institute of France, Director-General of the Geological Survey of the United Kingdom, Director of the Museum of Practical Geology and of the Government School of Mines, and a Member of the Health of Towns' Commission, was born in London in the year 1796. His father was Thomas De la Beche, Esq., of Halse Hall, Clarendon, Jamaica, a colonel in the army; and he claimed descent from the Barons De la Beche, of Aldworth, Berks, in the time of Edward the Third. He received his early education at the school of Ottery St. Mary, and in 1810 was admitted into the Royal Military College of Great Marlow, subsequently removed to Sandhurst. He served for a short time in the army, but soon retired; and settling with his family in Dorsetshire, a district rich in geological indications and in fossil remains, he imbibed that taste for geology which directed the current of his after life. Into the study of that science he entered at once with uncommon ardour. At the age of twenty-one he became a Fellow of the Geological Society; and his investigations were for the next few years divided between the Continent and the counties of Dorset, Devon and Pembroke. In 1818 he married Letitia, daughter of Captain Charles White, of Loughbrickland, Co. Down, who died in 1844, leaving one daughter. One of his earliest papers, "On the Temperature and Depth of the Lake of Geneva," appeared in the 'Edinburgh Philosophical Journal' for 1820, and was reprinted at Geneva in 1827. This, and other papers, soon after published, such as a "Catalogue of Birds, and of Terrestrial and Fluvial Mollusca found in the vicinity of Geneva," and "Notes on the Habits of a *Caryophyllia* from Torbay," both in the 'Zoological Journal,' show that he did

not at this period limit his investigations to purely geological subjects. His first paper in the 'Transactions of the Geological Society,' written in conjunction with Mr. Conybeare, is entitled "On the Discovery of a new Fossil Animal [*Plesiosaurus*], forming a link between the *Ichthyosaurus* and Crocodile, together with general remarks on the Osteology of the *Ichthyosaurus*;" and this was followed by a long series of important communications, among which papers on the Geology "Of the South Coast of England, from Bridport Harbour, Dorset, to Babbicombe Bay, Devon;" "Of the Coast of France from Fécamp to St. Vaast;" "Of Southern Pembroke-shire;" "Of Jamaica;" "Of the Environs of Nice;" "On the Lias of the Coast in the vicinity of Lyme Regis;" and "On the Chalk and Greensand" of the same vicinity, are the most remarkable. Between 1826 and 1830 he also communicated several papers to the 'Annals of Philosophy' and to the 'Philosophical Magazine.' His first separate publication was a "Selection of Geological Memoirs from the 'Annales des Mines,' with a Table of Equivalent Formations," &c., 8vo. London, 1824; and this was succeeded in 1830 by 'Geological Notes,' and in the following year by a 'Geological Manual,' which speedily ran through three editions, and was immediately translated both into French and German. Two other works, published in 1834 and 1835, 'Researches in Theoretical Geology,' and 'How to observe in Geology,' were also translated into both languages; and the latter grew, fifteen years later, into a ponderous volume of 850 pages, under the title of 'The Geological Observer,' of which a second edition was published in 1853, and which is universally regarded as one of the most valuable elementary works on the science. Having inherited a family estate in the island of Jamaica, which he visited in the year 1824, Mr. De la Beche was enabled to attach himself entirely to his favourite pursuit. He associated himself with the officers of the Trigonometrical Survey, then engaged in surveying the three western counties, and for several years, almost entirely at his own expense, devoted himself to the task of laying down the geological features of those counties on the Ordnance Maps. In 1832 he first brought under the notice of the Government the important advantages that would accrue to the public from connecting a Geological Survey with the Geographical; and in 1835 he suggested the formation of an illustrative Collection. Both suggestions were adopted, and he became the Director of the Geological Survey, and also of the small Collection temporarily placed in Craig's Court, which subsequently expanded into the extensive establishment, the Museum of Practical Geology, now located

in Jermyn Street. In 1819 Mr. De la Beche became a Fellow of the Royal Society, and in 1821 of the Linnean. In 1831 he filled the office of Secretary to the Geological Society, and from 1835 to 1846 he was its Foreign Secretary. In 1847 and 1848 he became its President, and his Addresses to the Society in 1848 and 1849 are published in the 4th and 5th volumes of its 'Journal.' At the Anniversary of the Society in 1854, he received the Wollaston Palladium Medal. He was knighted in 1848, and in 1851 he took a prominent part in the management of the Geological Department of the Great Exhibition. His services to Geology were highly appreciated in foreign countries; he was elected in 1853 a Correspondent of the Academy of Sciences of Paris, and about the same time he received the Order of Leopold of Belgium, and was created a Knight of the Danish Order of Dannebrog. Paralysis had for some time been making slow but certain advances over his frame; but the labours of the Geological Survey and the business of the Museum occupied his attention almost to the last hour of his life. He died on the 13th of April in the present year, at the age of 59; and was buried on the 19th of the same month in the Cemetery of Kensal Green. Of his scientific merits, and of the energy and success with which his plans for the advancement of Geology were carried out, the records of his life bear ample witness; he possessed besides a large amount of general knowledge, he excelled in accurate observation, he wrote with facility and clearness, and had, moreover, great skill in rapid delineation, whether of scientific subjects, of landscape scenery, or of characteristic sketches. His cheerful disposition, pleasing manners, and fund of humour rendered him an agreeable companion; and his tact in availing himself of circumstances contributed greatly to the influence which he exercised in the cause of science, both with individuals and with members of the Government.

Edward Forbes, Esq., F.R.S., F.G.S. &c., Regius Professor of Natural History in the University of Edinburgh, was the son of a banker in the Isle of Man, and born at Douglas on the 12th of February 1815. His propensity to Natural History dated from his earliest childhood. At seven years old he had formed a small collection of natural objects; at twelve he had studied Buckland's 'Reliquiæ Diluvianæ,' Parkinson's 'Organic Remains,' and Conybeare's 'Geology of England,' and had compiled for himself a Manual of British Natural History in all its branches. His talent for drawing was also early developed; and at the close of his school education, and at the age of seventeen, when the choice of a profession lay before him, he decided in favour of Art, and became in the spring of 1832 a pupil of

the late Mr. Sasse. By the persuasion of his friends, however, after six months' training, he gave up the idea of becoming an artist by profession; and in the autumn of the same year he entered the University of Edinburgh as a medical student. For three years he attended the usual routine of classes, but never succeeded in conquering his dislike to medicine as a profession, and greatly preferred the lectures and excursions of the Natural-History Professors, Graham and Jameson, with both of whom he soon became a favourite pupil. His dislike to the medical profession increasing, he declined the examination for a degree, and quitted Edinburgh for a time to make a tour in the South of France, which he extended to Algiers, passing the winter of 1836-37 in Paris, where he attended the lectures of the Professors of the Jardin des Plantes and of the Sorbonne. He had previously, in 1833, visited Norway, and published "Notes" of his 'Tour in the 'Magazine of Natural History.' The winter of 1837-38 was spent in Edinburgh, and the summers of 1838 and 1839 were chiefly devoted to the extension of his knowledge of Marine Zoology by dredging excursions in company with his friend Mr. Goodsir, not confined to the eastern coast of Scotland, but extended to the Orkney and Shetland Islands, and to the Hebrides. In 1838 he also published his first separate work, 'Malacologia Monensis, or Catalogue of the Mollusca inhabiting the Isle of Man and the neighbouring Sea;' which was followed, in 1840-41, by his 'History of British Starfishes,' forming part of Mr. Van Voorst's series of works on British Natural History. In the spring of 1841, at the invitation of Captain Graves, he joined, as Naturalist, H.M.S. *Beacon*, which was then engaged in a Survey of the Islands of the Greek Archipelago, and was afterwards commissioned to bring home the remains of Lycian Antiquities discovered by Sir Charles Fellowes. During an absence of nearly two years in the Levant, he made excellent use of the opportunities afforded him for carrying out his dredging operations, and adding to the large stock of information which he already possessed in relation to the theory of distribution in depth of marine life, on which some of his most remarkable speculations were afterwards founded. He also made two excursions into Lycia, the first in company with Mr. Hoskyn, and the second with Mr. Daniel and Lieut. Spratt, both fruitful in antiquarian discovery, an account of which was subsequently published by him in conjunction with Lieut. Spratt, under the title of 'Travels in Lycia,' 8vo, 1847. In the course of this latter tour Mr. Daniel died of a malignant fever, and Forbes himself had nearly fallen a victim to the same disease, from the consequences of which he seems never to have perfectly

recovered. The result of his dredging operations was communicated to the Meeting of the British Association at Cork, in a "Report on the Mollusca and Radiata of the Ægean Sea, and on their Distribution, considered as bearing on Geology." Before his return to England, he had been appointed to succeed Mr. Don as Professor of Botany in King's College, London; and about the same time he also became Curator of the Museum of the Geological Society. Both these appointments he regarded as of high importance in reference to the career which he proposed to himself,—the first, as affording him an excellent opportunity of cultivating his talent for oral instruction; and the second, as furnishing the means of study in the department of Palæontology, to which he attached himself with so much ardour and success, that in 1845 he had well qualified himself to exchange his Curatorship for the office of Palæontologist to the Geological Survey, and Lecturer on Natural History in the Government School of Mines, posts which he worthily filled for nearly the whole remainder of his life. He became a Fellow of the Linnean Society in 1843, and of the Royal Society in 1845; and communicated to our 'Transactions' a memoir "On the *Radiata* of the Eastern Mediterranean," published in the 19th volume, as well as several short notices to our 'Proceedings,' the last of which, read in 1848, is "On some *Peloria* varieties of *Viola canina*." The principal separate works on which he was engaged during this period are his 'Monograph on the British Naked-eyed Medusæ,' fol. 1848, published by the Ray Society; and his 'Natural History of the British Mollusca,' 4 vols. 8vo, written in conjunction with Mr. Sylvanus Hanley. But by far the greater part of his labours, and those which contributed most to extend his scientific reputation, are contained in the 'Reports of the British Association,' the 'Memoirs of the Geological Survey,' the 'Journal of the Geological Society,' the 'Annals of Natural History,' the 'Edinburgh New Philosophical Journal,' and other periodical publications. Of his works, including these separate papers, no fewer than seventy-nine are enumerated in the 'Bibliographia Zoologiæ et Geologiæ' of the Ray Society, and the list might have been considerably extended. From the period of his appointment as Palæontologist to the Geological Survey, he devoted much of his time to the arrangement of the fossil collection now so advantageously displayed in the Museum in Jermyn Street. He also took an active part in the Great Exhibition of 1851, and contributed greatly to the interest of the Natural-History department of the new Crystal Palace at Sydenham. In 1848 he married the youngest daughter of the late General Sir C.

Ashworth, and in 1853 he was elected President of the Geological Society. But although his residence in London might have been considered as most advantageous in reference both to his position and his pursuits, his aspirations were constantly directed to the Chair of Natural History in the University of Edinburgh, and a vacancy occurring by the death of Prof. Jameson, he unhesitatingly abandoned the metropolis, with all its allurements, official and otherwise, and felt that he had arrived at the summit of his wishes when he was eagerly welcomed as the successor to the vacant Chair. He had formed magnificent schemes for the future, with reference both to lectures and museum, and his inaugural discourse, delivered on the 15th of May 1854, filled to overflowing the largest class-room of the University, with an auditory almost as enthusiastic as himself. At the subsequent meeting of the British Association in Liverpool, he was elected President of the Geological Section, but unfortunately on his way thither he had contracted a severe attack of cold, the consequence of walking and driving for four hours, after being thoroughly wetted through by a heavy shower of rain. This brought on a renewed attack of the remittent fever which he had formerly caught in Greece. He commenced, however, his winter course of lectures, which he continued up to the 9th of November, when he was compelled to suspend them; and notwithstanding the unintermitting attention of his warmly attached medical friends, he died on the 18th of that month, in the 40th year of his age. The cause of death was afterwards ascertained to be a chronic abscess of the left kidney, occasioning extensive abdominal disease, and baffling all the resources of medical art. He bequeathed his scientific papers to R. Godwin-Austen, Esq., Secretary of the Geological Society, and his collections of natural history to the University of Edinburgh. His unwearied activity is evidenced not only by the amount of his actual publications, but by the accumulated mass of unpublished materials which he has left behind him. His rapid facility in drawing gave him great advantages in the illustration both of his facts and of his views regarding them. His speculative turn of mind is evinced by numerous theoretical views, many of which, such as his comparison of the morphology of Sertularian zoophytes with that of flowering plants, his observations on the distribution of marine animals as bearing on geology, his theory of bathymetrical distribution, and his ideas on the connexion between the distribution of the existing fauna and flora of the British Isles, and the geological changes which have affected their area, have been worked out with great ingenuity. His genial disposition made him the centre of a large body of attached

friends, and enabled him to pass through life almost without an enemy.

George Bellas Greenough, Esq., F.R.S. &c., one of the founders and first President of the Geological Society, was educated first at Peter House, Cambridge, and subsequently at the University of Göttingen. In his youth he was ambitious of political distinction, and deriving from his father an ample fortune, he purchased a seat in parliament for the borough of Gatton, for which he sat from 1807 to 1812. But he soon abandoned politics and attached himself wholly to science, devoting the remainder of his life to geological and geographical studies, which he cultivated in close combination with each other. In the year 1807, in conjunction with Mr. Charles Greville, Sir John St. Aubyn and Sir Abraham Hume, each of whom possessed a splendid mineralogical collection (for the arrangement and enlargement of which they were all mainly indebted to the mineralogical knowledge of Count Bournon), and with Dr. Wollaston, Dr. Babington, Mr. Arthur Aikin, Mr. William Phillips, Mr. Leonard Horner, Dr. Roget and others, he took a leading part in forming an association for the cultivation of mineralogical and geological science, which subsequently took the name of the Geological Society, and of which he was named the first President. This office he subsequently again filled on several occasions, and although he has written (or rather published) little, yet his time, his money and his talents continued to be actively employed in the promotion of geological knowledge. His first substantive work, 'A critical Examination of the First Principles of Geology,' appeared in 1819, and was two years afterwards translated into German. The principles of this work have been described as having now become "antiquated;" but this result was fully anticipated by the author himself, "being satisfied," as he states at the end of his preface, "that if geological science continues to advance at the rate it has done lately, the essays now submitted to the public will, before many years have elapsed, be found to contain as many errors as they presume to correct." In the same year he gave to the world his 'Geological Map of England and Wales, in six sheets, with an accompanying Memoir,' compiled from an extensive collection of maps and surveys, and enriched with much original matter, contributed both by himself and his numerous geological friends. A second edition, greatly improved by the materials collected during the interval of twenty years, was published in 1839. He occupied himself continually in increasing his collection of maps, and in noting upon them all the geological data which he could obtain either from books or from the

communications of scientific travellers, and was thus enabled to lay before the Asiatic Society, in illustration of a memoir read by him in 1852, a series of maps of Hindostan, defining all the important elements of the ten water-basins of that Peninsula. And at the last meeting of the British Association in Liverpool, he exhibited a physical and geographical map of all India, on a large scale, which has since been published under the title of 'General Sketch of the Physical Features of British India.' Mr. Greenough became a Fellow of the Royal Society in 1807, and of the Linnean Society in 1811. He was for two years (1840-41) President of the Geographical Society, and his extensive collection of maps is, by his will, directed to be shared between that Society and the Geological, each receiving those more especially connected with its object, and in addition a bequest of £500 for their arrangement and preservation. Besides the publications mentioned above, his Presidential addresses from the Chairs of these two Societies are the only printed memorials of his scientific acquirements, which were accompanied by extreme caution in the adoption of novel theories, and by a singularly methodical habit of minute arrangement. For some years past his health had been much broken: he passed the last winter at Naples, for the benefit of a milder climate; but dropsy having supervened on a debilitated state of body, he died in that city on the 2nd of April in the present year, at the age of 77.

John Harwood, Esq., M.D., F.R.S. &c., was elected a Fellow of the Linnean Society in 1820. In 1826 he became Professor of Natural History in the Royal Institution, and in the spring of that year delivered a course of lectures "On the Natural History of the Animal Kingdom, comprehending a survey of the Classes Mammalia and Birds, and of their most remarkable extinct Fossil Genera." In the same year he read before the Institution an "Essay on the Natural History of the Elephant genus;" and in the following year delivered a discourse "On the Structure and Habits of the Seal," outlines of which are given in the 21st and 23rd volumes of the 'Journal of the Royal Institution.' In 1827 he communicated to the Linnean Society "An account of a pair of hinder hands of an Orang-Otang, deposited in the collection of the Trinity House, Hull," which is published in the 15th volume of our 'Transactions;' and to the Royal Society a memoir "On a newly discovered Genus of Serpentine Fishes (*Ophiognathus*)," published in the 'Philosophical Transactions' for that year, in the course of which he also became a Fellow of the Royal Society. Soon after this period he settled as a practising Physician at St. Leonard's-on-Sea,

in the neighbourhood of Hastings, where our excellent Treasurer, Mr. Yarrell, had frequent occasions of seeing him while collecting materials for his work on 'British Fishes' in the years 1834, 1835 and 1836, and where he was much esteemed as a man of gentlemanly and amiable manners and extensive information. He died at St. Leonard's on the 7th of September 1854.

Sir Robert Heron, Bart., was born at Newark-upon-Trent on the 27th of November 1765, and succeeded to the baronetcy on the death of his uncle, the Rt. Hon. Sir Richard Heron, formerly Chief Secretary for Ireland, on whom the title had been conferred. He was a warm politician of the Whig school, and first entered Parliament in 1812 as member for East Grimsby, for which place, and afterwards for Peterborough, he continued to sit until the dissolution in 1852, when he was reluctantly persuaded to retire from political life at the age of 86. He married in 1792, but had no issue, and the title has consequently become extinct. His death took place suddenly on the 26th of May last year, in the 89th year of his age, at his residence, Stubton, in the county of Lincoln; and so quietly did he pass away, while sitting in his library, that his death became known only when he was asked if he wished to retire to bed. He was fond of zoology, and had a large fund of anecdote connected with animals and their habits. His menagerie at Stubton contained at one time many rare species, and he was particularly successful in breeding them. His election into the Linnean Society took place in 1821; and he was from the date of its foundation an active Fellow of the Zoological Society, to which he contributed not only specimens for the menagerie, but also occasional notices for its 'Proceedings.'

Duncan MacArthur, Esq., M.D., a naval surgeon of considerable repute, became a Fellow of the Linnean Society in 1810, and died at Walmer, in Kent, where he had long resided, on the 16th of January in the present year, at the age of 82. He was a Companion of the Bath, Physician to the Fleet, and for many years Physician to the Royal Naval Hospital at Deal.

William Rashleigh, Esq., F.R.S. &c., the head of an ancient family, long seated at Menabilly House, near Fowey, in the county of Cornwall, many of whose members have represented the county in Parliament from the reign of Elizabeth down to the present time, was elected into the Linnean Society in 1813, and into the Royal Society in 1814. He was a Vice-President of the Royal Cornwall Polytechnic Society, and the possessor of a fine collection of minerals. He died at Menabilly on the 14th of the present month, in the 79th year of his age.

John Ridout, Esq., was a successful general practitioner in medicine. He was admitted a Member of the Society of Apothecaries in 1805, and was afterwards elected into the Board of Examiners, and became in due course Master of the Company. He was elected into the Linnean Society in 1832, and in 1843 was nominated one of the Fellows of the Royal College of Surgeons. He was likewise a Fellow and Member of the Senate of the University of London, and one of its Board of Examiners. He died on the 26th of April in the present year, at his residence in Montagu Street, Russell Square.

George Brettingham Sowerby, Esq., was the second son of James Sowerby, a well-informed naturalist, a distinguished botanical artist, the possessor of a considerable natural-history museum, and an early member of the Linnean Society. His son George was born at his residence, Mead Place, Lambeth, on the 12th of August 1788, was educated at home under private masters, and assisted in the collection and arrangement of the museum, acting also as his father's amanuensis. Until his marriage, which took place in 1811, entomology was his favourite study, as is shown by "An Account of a new *Scarabeus*, and Observations on two other rare Insects," published in 1812 in the 'Transactions of the Entomological Society of London;' but afterwards, from a persuasion that its pursuit was attended with cruelty, he abandoned it for mineralogy and conchology, a knowledge of both of which branches of science, but especially of conchology, he assiduously cultivated with a view to turning it to pecuniary profit. For that purpose he made several journeys on the Continent, going once to Vienna and frequently to Paris, in which city he studied the nomenclature of Lamarck, and made himself many friends. The knowledge thus acquired enabled him to conduct his business with much profit both to himself and to his customers. It induced him also to speculate largely: in one year he purchased both the celebrated Tankerville collection of shells, and the immense stock of minerals and shells left by Mr. George Humphreys, at the cost together of about £6000. This speculation, however, proved to be ill-timed; for immediately after the conclusion of his bargain, the import duty on subjects of natural history was repealed, and the market price, of shells especially, fell very considerably in consequence of the large numbers imported. He became a Fellow of the Linnean Society in 1811, and in 1818 communicated a paper, entitled "Remarks on the genera *Orbicula* and *Crania* of Lamarck, with descriptions of two species of each genus, and some observations proving the *Patella distorta* of Montagu to

be a species of *Crania*," which is printed in the 13th volume of our 'Transactions.' His principal work was 'The Genera of Recent and Fossil Shells,' with illustrations by his elder brother, James De Carle Sowerby, commenced in 1820, of which upwards of forty numbers appeared, but which was never completed. This work contributed most essentially to the introduction into England of the views of Lamarck and his followers in regard to the classification of shells. In 1824, he established, with the assistance of several leading naturalists, a quarterly periodical entitled 'The Zoological Journal,' which was continued for four years, and contains many important memoirs by himself and others. 'A Catalogue of the Tankerville Collection of Shells, with descriptions of many new species,' appeared in 1825. In 1830 he published the first part of what was intended to be a general 'Species Conchyliorum,' but although a second part was prepared, the publication was dropped for want of encouragement. He also described a great number of new shells, chiefly from the collection of Mr. Cuming, in the 'Proceedings of the Zoological Society;' and communicated several papers to the 'Magazine of Natural History' and to the 'Reports of the British Association.' He traded largely in shells and minerals, and with good reputation both for fair dealing and for knowledge of his business. On this account he was frequently consulted on questions of value, and his opinions justly carried great weight. But for many years his health had been greatly enfeebled, the lingering illness which eventually terminated his existence having commenced before his marriage in an inflammation of the lungs, the effect of lying down to rest upon cold grass when heated with violent exercise. He died on the 26th of July 1854, having nearly completed his 66th year, at his residence in the Hornsey Road, leaving behind him a large family all more or less engaged in natural-history pursuits.

John Ellerton Stocks, M.D., was born in the neighbourhood of Hull, and acquired his medical education at University College, London, where he distinguished himself by his love of botany, which afterwards became his favourite pursuit. He obtained an appointment in the Bombay Medical Service, and in the course of his duties, first as Vaccinator, and afterwards as Inspector of Forests in Scinde, he made frequent and extensive excursions through the provinces of Scinde and Beloochistan, by means of which he was enabled to accumulate a large and well-prepared collection of plants, together with an extensive series of drawings executed by native artists, under his own immediate inspection. On Dr. Gibson's quitting India some four years ago on a visit to England, Dr. Stocks was appointed

during his absence Conservator of Forests and Superintendent of Botanic Gardens in Bombay, and thus obtained further opportunity of extending his botanical researches, both personally and by means of collectors. In the beginning of 1854 he returned to England on furlough, bringing with him his collections, and took up his residence at Kew, where he occupied himself for some months in the arrangement of his materials, and in comparing them with those amassed by Sir William Hooker and by Drs. Hooker and Thomson, to whose 'Indian Flora' he would in all probability have largely contributed. But unfortunately, although to all appearance a strong and healthy man, his constitution had been undermined by his labours in the unhealthy climate of Scinde: he was subject to intense neuralgic pains in the head and neck; and a change of air being deemed advisable, he spent first a few weeks with some relations in the Isle of Man, and then proceeded on a visit to another relative, Samuel Watson, Esq., of Cottingham, near Hull. On his way to this place he caught a cold, succeeded by fits of apoplexy, which in a very few days put a period to his existence, on the 30th of August last, at the early age of 34. He became a Fellow of the Linnean Society in 1848. Had he lived, much might have been expected from his contributions to botanical science. Those already published are chiefly (if not wholly) contained in Sir W. J. Hooker's 'London Journal of Botany' and 'Kew Garden Miscellany,' and consist of the following papers:—Notes on the "Botany (chiefly economic) of Scinde," descriptive of specimens presented to the Kew Garden Museum; "Notes written during a short Botanical Excursion to Shah Bilawul;" "On two Balsam-trees (*Balsamodendron*) of Scinde, *B. mukul* and *B. pubescens*;" "Sketch of the Botany of Beloochistan;" "Descriptions and Figures of two new Plants of Scinde;" "Notes on Beloochistan Plants;" and "Notes on the Botany and on the Government Gardens of Bombay." He had also brought with him to England materials, in a forward state of preparation, for a general work on the Natural History, Manners, Customs, Arts, Manufactures and Commerce, Agriculture, &c. &c. of Scinde, which it is hoped may yet be published. It is described as written in a lively and agreeable style, and rendered doubly valuable from the amount of scientific knowledge which has been brought to bear upon it.

William Edward Wing, Esq., an entomologist of considerable promise, and a zoological artist of distinguished merit, was early employed by Dr. Gray in illustrating several of the Catalogues of the Zoological Department of the British Museum. He thus became generally known as a skilful draughtsman, and his pencil was em-

ployed in the illustration of numerous important works. The beautiful plates which he contributed to our own 'Transactions,' and to those of the Royal Society in connexion with the papers of his friend Mr. Newport, must be familiar to most of our Members; and not less deserving of notice are those given in Mr. Stainton's 'Insecta Britannica,' accompanying various papers in the 'Transactions of the Entomological Society,' and illustrating the *Crustacea* of the 'Zoology of the Voyage of H.M.S. Samarang.' One of the principal ingredients of his success as an artist was undoubtedly the interest which he took in the objects delineated by him, and which led him to attach himself especially to the study of entomology. In 1847 he became a Member of the Entomological Society, and for several years previous to his death filled the office of one of its Secretaries. To its 'Transactions' he contributed "Descriptions of some Hermaphrodite British Lepidoptera, with figures of the Insects," printed in the fifth volume; and he was also author of "Characters of three new genera and species of Lepidoptera," in the 'Proceedings of the Zoological Society' for 1854. He was elected into the Linnean Society in 1852, with every promise of a long and useful life; but a latent tendency to consumption, called into action by one of those wasting diseases so frequently attendant on that disposition, was soon afterwards developed, and he died on the 9th of January in the present year, at the early age of 27.

James Edward Winterbottom, Esq., was the son of the late Dr. Winterbottom of Reading, and was born on the 7th of April 1803. After acquiring the rudiments of education at several private schools, he was induced by his parents to abandon his own choice of the military profession, and to enter the University of Oxford, with a view to the study of medicine. He became a Commoner of St. John's College, Oxford, in 1821, and took successively his degrees of B.A., M.A., and B.M., which last was obtained in 1833. In the intervals of University attendance he became a student of St. Bartholomew's Hospital, the practice of which, as well as the Lectures connected with it, he diligently attended for two years, commencing in 1827. He never, however, practised the profession; but from the period of taking his degree, occupied his leisure with frequent tours, which enabled him to gratify his taste, not only for natural history, but also for architecture, sculpture, painting and engraving. Thus, in 1834-35 he travelled through Northern Italy, extending his tour to Rome and Naples, and returning by Switzerland and the Rhine. The ten following years were spent in visiting different parts of the United Kingdom, including two visits to Ireland and two or three

to Scotland. In the early part of 1846 he quitted England with the view of making a tour through some of the Northern Provinces of India, but finding himself on his arrival at Bombay too late in the season for crossing the plains to the Himalaya, he spent the remainder of the year in visiting Java and the coast of China, returning by Singapore and Calcutta to Lahore. From this city he made excursions to Cashmere, Little Thibet and Nepaul; and having joined Capt Richard Strachey, then engaged in a survey of the portions of the Himalaya bordering on Kumaon and Thibet, travelled in his company to the Lakes which form the sources of the Indus and the Sutlej. During this and other journeys the two companions made extensive botanical collections, which they brought with them to England in 1849; and for nearly two years they occupied the same house, engaged in arranging, naming and distributing their joint collections, to which a peculiar value is attached from the great attention paid to noting the heights at which the several species were found. On his return to his residence at Woodhay in Hampshire, Mr. Winterbottom began the formation there of an Arboretum, principally of *Coniferae*. But his active disposition did not allow him long to remain stationary at home. In 1852 he again visited Ireland; and at the commencement of 1854 he started for a second visit to Egypt (where he had previously spent some time on his return from India), and ascended the Nile as far as Aboo-Simbul. He subsequently visited nearly every place of interest in Syria, and was on his way in an Austrian steamer from Beyrout to Smyrna, with the intention of proceeding to Constantinople, when it was found necessary to put him on shore at Rhodes, on account of a severe attack of diarrhoea, to which he fell a victim on the 4th of July 1854, in the 52nd year of his age. Mr. Winterbottom became a Fellow of the Linnean Society in March 1830, and of the Geological Society in the same year: he was also a Member of the Geographical Society, and when in London a frequent attendant at all their Meetings; he thus became known to many among us as an amiable man, of a retiring disposition, possessed of a large store of general information, as well as strongly attached to natural science, and in particular imbued with a devoted love of botany and an ardent desire of extending his knowledge by both home and foreign travel.

Three of our *Foreign Members* have died during the year.

Friedrich Ernst Ludwig von Fischer was born on the 20th of February 1782, at Halberstadt in the Hartz, where his father was

Rector of the Martini School and Preacher in the Church of the Holy Ghost. Under the eyes of his father, a distinguished writer, well known for his learning, he received a careful education, until he was of an age to enter the University of Halle; shortly before which, however, he had the misfortune to lose both his parents within fourteen days of each other. The love of natural history, with which he was early imbued, determined him to apply himself at Halle to the study of medicine, and in the year 1804 he obtained his doctor's degree, his dissertation on which occasion was entitled: "Specimen de Vegetabilium imprimis Filicum propagatione." But as he had no great inclination to the practice of physic, he joyfully accepted an offer made to him in the same year to superintend the botanic garden of Count Razumoffsky, then Minister of Public Instruction in Russia, situated at Gorenki, in the neighbourhood of Moscow. Several papers from his pen soon after appeared in the 'Mémoires de la Société Impériale des Naturalistes de Moscou;' such as "Description d'une nouvelle espèce d'*Elymus*;" "Revision du Genre *Geum*;" "Notice sur une Plante de la Famille des Succulentes;" "Descriptiones Plantarum rariorum Sibiriae;" and "Genera Plantarum duo [*Adenophora* and *Guldenstadtia*]." In 1808 he published a 'Catalogue du Jardin des Plantes du Comte Alexis de Razumoffsky à Gorenki près de Moscou;' in 1812, a second edition of the same; and in the same year at Zurich, 'Beitrag zur botanischen Systematik, die Existenz der Monokotyledonen und der Polykotyledonen betreffend.' In the year 1821 he travelled in France, England and Germany, making the acquaintance of many scientific men, and establishing a correspondence with them, by means of which the botanical treasures of his patron were largely increased. But Count Razumoffsky dying shortly afterwards, the Emperor Alexander, through the then Minister of the Interior, Count Kotschubei, appointed him in 1823 Director of the Imperial Botanic Garden at St. Petersburg. This garden, which had formerly belonged to the Medical College, was then in a state of the utmost disorder, possessed only some few miserable houses, and required an entire reorganization, insomuch that Fischer has been justly regarded as its founder. Under his directions a large portion of the valuable plants from Gorenki were transferred to it, a library was founded, and an herbarium established, new and important buildings were erected, and rich collections of plants and seeds were obtained from England, France, Germany, and other more distant regions, to fill the space thus created for their reception. At his proposal also, various scientific journeys were undertaken both within the Russian

dominions and in other parts, partly at the expense of the crown, and partly by means of shares; such for example as the journey in Mexico of Baron Karwinsky. An "Index Plantarum anno 1824 in horto Imperiali Botanico Petropolitano vigentium," exhibits the state of the garden soon after his appointment. In 1831 he published a 'Monographia Zygophyllearum;' and from 1835 to 1845, he issued annually, in conjunction with C. A. Meyer, Von Trautvetter, and subsequently with Avé-Lallemant, an "Index Seminum, quæ hortus botanicus Imperialis Petropolitanus pro mutuâ commutatione offert," containing in addition to the lists of seeds, characters and descriptions of a multitude of new plants, and more particularly those of Siberia. In conjunction with C. A. Meyer he also published a 'Bericht über die Getraide-Arten, welche im Jahre 1836 und 1837 in Kaiserlichen Botanischen Garten zu St. Petersburg gebaut worden;' a "Lettre sur les genres *Xeranthemum* et *Chardinia*" in the 'Nouveaux Mémoires' of the Moscow Society; and an "Enumeratio (prima et altera) Plantarum novarum a Cl. Schrenck lectarum," Petropoli, 1841, 1842. In the year 1845, a reconstruction of the great Palm-house of the garden became necessary, and this was effected under the directions of the architect M. Fischer-Ouralsky; the new house (of which a full account is given in a work by Fischer and Meyer, entitled 'Sertum Petropolitanum,' issued in the following year), measuring 266 feet in length, 80 feet in breadth, and 67 feet in height, and forming one magnificent saloon. In consequence, however, of discussions to which this building gave rise, Dr. Fischer was compelled in the spring of 1850 to relinquish the post of Director which he had held for seven-and-twenty years, and to quit the garden, the library, the herbarium, and the other collections, which had been almost wholly formed by himself and which he cherished with a parent's love. Towards the end of the same year, however, he was appointed a Medical Councillor in the department of the Minister of the Interior, and again attached himself to his favourite science by the publication in the 'Bulletin' of the Moscow Society of a "Notice sur les *Anoplanthus* de l'Ancien Monde;" and a "Synopsis Astragalorum *Tragacantharum*," illustrated by twelve plates drawn by himself. Dr. Fischer was elected a Foreign Member of the Linnean Society in 1820, and was also a member of numerous other scientific societies. The Leopolding-Caroline Academy of Naturalists elected him in 1837, under the name of "Aiton." He died at St. Petersburg on the 5th (17th) of June 1854, in the 73rd year of his age, after a short but painful illness. In 1830 he married the

daughter of M. von Struve, the Russian Minister at Hamburg, who, with one son, survives him.

Carl Anton Meyer, the intimate friend and *collaborateur* of Dr. Fischer in many of his works, and his successor as Director of the Imperial Botanic Garden at St. Petersburg, was born, of German parentage, in the capital city of Witepsk. He was educated at the University of Dorpat, and accompanied Professor Ledebour, whose pupil he was, in a journey in Southern Russia, and afterwards in 1826 in his celebrated journey, undertaken at the expense of the University, to the Altai Mountains and the neighbouring Steppes, to the examination of which Dr. Meyer's attention was more especially directed. The Journal of his separate tour through the Kirghis-Steppe from Barnaul to Noor-Saisan and Altyn-Tubé, occupies the greater part of the second volume of the Narrative of Prof. Ledebour's Journey, published at Berlin in 1830. The plants collected by the three companions, during the summer of 1826, consisting of about 1600 Phanerogamæ, formed the materials of the "Flora Altaica," published by their joint labours in 4 vols. 8vo, Berlin, 1829-1833. In 1829 Dr. Meyer was named by the Academy of Sciences of St. Petersburg to accompany M. Kupfer as botanist in an Expedition to the Environs of Mount Elbruz and the Caucasus, undertaken by order of the Emperor, and on which a Report, made to the Academy, was published by M. Kupfer in 1830. Dr. Meyer's own Report, entitled "Verzeichniss der Pflanzen, welche während der, in den Jahren 1829 und 1830, unternommenen Reise im Caucasus und in den Provinzen am Westlichen Ufer des Caspischen Meeres gefunden und eingesammelt worden sind," was published at St. Petersburg in 1831. It gives a complete enumeration of the Phanogamous plants collected, in number nearly 2000, with the characters of many new genera and species, together with an itinerary of the journey, and some account of the localities in which the collections were chiefly made. These two important publications at once placed Dr. Meyer in a high rank among Russian botanists, and procured his admission into the Academy of St. Petersburg. From the year 1835 he was associated with Dr. Fischer in several works above enumerated in the notice of that botanist; and he contributed numerous papers to the 'Mémoires' of the Imperial Academy. The titles of these are as follows: "Bemerkungen über einige Hymenobrychisarten," 1837; "Das *Alyssum minutum* und die zunächst verwandten Arten monographisch bearbeitet," 1840; "Bemerkungen über die natürliche Familie der *Polygonaceæ*," 1840; "Florula Pro-

vinciæ Tambow," 1844; "Über einige Cornus-Arten aus der Abtheilung *Thelycrania*," 1845; "Monographie der Gattung *Ephedra*," 1846; "Über die Zimmtrosen," 1847. He succeeded Dr. Fischer in the Directorship of the Imperial Botanic Garden at St. Petersburg in 1850, and continued to hold that office during the brief remainder of his life. It was only in May last year that he was elected a Foreign Member of the Linnean Society, and we have already to record his name in our annual obituary. His death took place at St. Petersburg in the night between the 24th and the 25th of February of the present year.

Charles François Brisseau de Mirbel, Member of the Academy of Sciences of the Institute of France, was born at Paris in the year 1776. He applied himself early to the study of Botany under the distinguished Professors of the Museum, and in the year 1797, we find him accompanying Ramond, the celebrated investigator of the Pyrenees, as one of his pupils, in his two Journeys to Mont Perdu, one of the most remarkable summits of the Pyrenean Chain. Shortly after he became Director of the Garden at Malmaison, in which the Empress Josephine cultivated a magnificent collection of exotic plants. This connection with the Imperial Family introduced him to the notice of Louis Bonaparte, whom he accompanied to Holland, in the capacity of his private Secretary, and by whom he was nominated Director of the Dutch School of Painting at Paris and at Rome. In 1808, the Class of Sciences of the Institute (of which he was previously a correspondent) elected him a Member in the place of Ventenat; and about the same time he was named Professeur-Adjoint of Vegetable Physiology and Botany at the Faculté des Sciences. Soon after the restoration he began to take part in public affairs, and in 1817 he was called to the Council of State in the capacity of Maître des Requêtes. In the same year he succeeded Bertin de Vaux as Secretary General of the Department of Police, of which M. de Decazes was then Minister. Soon after his nomination to this office he became the subject of some bitter attacks in the Chambers, but was well defended by his chief, whom he accompanied also as Secretary General on his removal to the Department of the Interior. On the fall of M. de Decazes, he resigned both his offices, and never afterwards discharged any function connected with public affairs. He succeeded Bosc as Professor of Culture at the Muséum d'Histoire Naturelle in 1829; and in the same year he was elected a Foreign Member of the Linnean Society. In 1837 he became a Foreign Member of the Royal Society. His death took place at Neuilly on the 12th of September 1854, at the age of 78. Few

men have laboured more assiduously for the promotion of botanical science, and especially of Vegetable Physiology. During more than half a century he contributed largely to our knowledge on some of the most obscure and important points of vegetable anatomy; and although many of his theoretical views have been justly controverted, his precepts and his example have given a powerful impulse to the prosecution of microscopical researches into vegetable structure. His first publication was an Introductory Lecture to a Botanical course delivered by him in 1801, entitled "Influence de l'Histoire Naturelle sur la Civilisation." He next furnished the preliminary volumes to the Botanical division of Sonnini's Edition of Buffon, which were separately published under the title of "Traité d'Anatomie et de Physiologie Végétale," 2 vols. 8vo, Paris, 1802. This essay immediately created a great sensation in the botanical world, and led to the proposal by the Royal Society of Göttingen, in 1805, of the celebrated question on the Vessels of Plants, which brought into the field as competitors for the prize, Link, Rudolphi and Treviranus. In 1808, Mirbel published at the Hague "Exposition et Défense de ma Théorie de l'Organisation Végétale," with a German translation revised by Dr. Bilderdyk, with the view of still further explaining his theory, which he believed to have been misunderstood both by the propounders of the question and by the competitors for the prize; and in 1815, after his return to Paris, he gave a still more full and comprehensive exposition in his 'Elémens de Physiologie Végétale et de Botanique,' 3 vols. 8vo. It would extend this notice far beyond its necessary limits to attempt to give even a list of the numerous papers contributed by him to the 'Annales' and 'Mémoires du Muséum,' to the 'Annales des Sciences Naturelles,' and to other scientific publications. A brief notice of some of the more important will be sufficient to show how extensive was the field of his research. The series commences with a "Précis d'un Mémoire sur l'Organisation Végétale," in the 5th volume of the 'Annales du Muséum,' which is followed by a memoir "Sur les fluides contenus dans les Végétaux," in the 7th, and another entitled "Nouveaux Recherches sur les caractères anatomiques qui distinguent les Plantes Monocotylédonés des Plantes Dicotylédonés," in the 13th. After these come a series of observations on the germination of various plants and families of plants, in the same volume. Next we have, in the 15th volume, "Considérations sur la manière d'étudier l'Histoire Naturelle des Végétaux, servant d'Introduction à un travail Anatomique, Physiologique et Botanique sur la famille des Labiées," the anatomical and physiological portions of which follow. In the

'Mémoires du Muséum' are contained his Essays on the Geographical distribution of *Conifera*, of *Chenopodea*, and of the Phanerogamous Plants of the Old World from the Equator to the North Pole; in the 'Nouvelles Annales,' his "Recherches Anatomiques et Physiologiques sur le *Marchantia polymorpha*, pour servir à l'Histoire du Tissu Cellulaire de l'Epiderme et des Stomates;" in the 'Archives du Muséum,' his "Nouvelles Notes sur le Cambium, extraites d'un travail sur l'Anatomie de la Racine du Dattier," which work appeared in the 18th volume of the 'Mémoires de l'Académie des Sciences;' in the 'Annales des Sciences Naturelles,' among other important papers, his "Nouvelles Recherches sur la Structure et les Développements de l'Ovule Végétal;" his "Remarques sur la Nature et l'Origine des Couches Corticales et du Liber des Arbres Dicotylédons;" his "Notes pour servir à l'Histoire de l'Embryogénie Végétale" (written in conjunction with M. Spach); his "Recherches Anatomiques et Physiologiques sur quelques Végétaux Monocotylés;" and his "Extrait de deux Mémoires sur la Composition et la Structure de plusieurs Organismes des Plantes" (in conjunction with M. Payen). Several of these later papers formed part of a controversy in which he was for some years engaged with M. Gaudichaud, in defence of his peculiar views of Vegetable Physiology.

Among our *Associates* we have also to record three losses during the past year.

Abel Ingpen, a zealous and active entomologist, and one of the most constant attendants at our Evening Meetings during a period of nearly thirty years, was born on the 20th of May 1796. At the age of seventeen he became clerk to Mr. P. B. Brodie, a distinguished conveyancer, in whose office, and greatly respected by him, he passed the entire remainder of his life (more than forty years), surviving that gentleman only seven days. He was elected an Associate of the Linnean Society in 1826, and published, in 1827, 'Instructions for Collecting, Rearing and Preserving British Insects; also for Collecting and Preserving British Crustacea and Shells,' Lond. 12mo, of which a second enlarged and corrected edition was published in 1839. This little work is regarded as one of the most carefully executed and practically useful works that have been written on the subject of which it treats. He was also author of a paper in the 1st volume of the 'Transactions of the Entomological Society,' entitled "Remarks on the Destruction of *Cocci*," and of numerous articles, chiefly anonymous, in the 'Gardener's Magazine' and the 'Horticultural Magazine,' on subjects connected with Horticulture, to which in

common with Entomology his leisure was entirely devoted. He died of cholera at his residence at Chelsea, on the 14th of September 1854, in the 59th year of his age. His collection of natural objects, his books, and the plants of his garden, were all carefully and skilfully collected, and arranged with a neatness and precision, which were his most striking characteristics.

The Rev. David Landsborough, D.D., Minister of the Free Church at Saltcoats, Ayrshire, first became known as a naturalist by occasional sketches of the natural history of his former Parish of Stevenston, and the shores of Ardrossan, the study of which occupied the brief intervals of leisure left by his ministerial duties. These embraced the plants both flowering and cryptogamic, and especially the Sea-weeds; the shells, land and marine; and the fossil botany of the neighbouring coal-fields. His separate publications in natural history, besides those of a more purely literary character, consist of 'Excursions in Arran, Ailsa Craig, and the two Cumbraes,' Edinb. 1847, 16mo, and a second series, Edinb. 1852, 12mo; 'A Popular History of British Sea-weeds,' Lond. 1849, 16mo; and 'A Popular History of British Zoophytes,' Lond. 1852, 8vo. His smaller contributions were chiefly communicated to the 'Annals and Magazine of Natural History,' and are as follows: "On the Phosphorescence of Zoophytes," vol. viii. p. 257; "Description of a new Pliocene Deposit at Stevenston, and of Post-Tertiary Deposits at Stevenston and Largs in the County of Ayr," vol. viii. p. 514; "On *Rissoa Harveyi*," vol. ix. p. 261; "On the History and Habits of the Rook," vol. xi. p. 275; "Account of a Dredging Excursion," vol. xv. p. 291; and "Notice of some Rarities found on the West Coast of Scotland," vol. xv. p. 327. In the 'Zoologist' he also published notices "On Mollusks, &c., observed at Whiting Bay, in the Isle of Arran, in August 1842;" and "On the Discovery of Bones near Saltcoats, Ayrshire." He carried on an extensive interchange of specimens, chiefly of *Algae*, with naturalists in all parts of the United Kingdom, and the children of the manse were trained to great neat-handedness in their preservation. Many hundred sets of elegant volumes thus prepared at Stevenston, Rockvale and Saltcoats were sold, and the proceeds contributed not a little to the support both of Church and Schools. Dr. Landsborough was elected an Associate of the Linnean Society in 1849, and died at Saltcoats, of cholera, on the 12th of September 1854.

George Luxford was born on the 7th of April 1807, at Sutton in Surrey, from whence he was early removed to the neighbouring town of Reigate. At the age of eleven, he was placed under the charge

of Mr. Allingham, a printer and stationer, with whom he remained for sixteen years, acquiring not only a knowledge of the printing business, but also an acquaintance with the Greek, Latin and French languages, and much general and scientific information. Botany was his favourite study, and the picturesque neighbourhood in which he resided supplied him with the means of improving his knowledge of our native plants. In 1834 he removed to Birmingham, but returned to Reigate in 1837, and in the same year commenced business as a printer, in London. In the course of that and the following year he wrote and printed 'A Flora of the Neighbourhood of Reigate,' in a small 12mo volume, consisting chiefly of an enumeration of the species, but containing also new localities for some of the rarer among them, and occasional observations on their distinguishing characters. In 1841 he undertook to edit for Mr. Newman a botanical periodical, which, under the title of the 'Phytologist,' was continued monthly, for some years under his sole editorship, but always more or less under his superintendence, until the month of June last year. He was also at one time connected with the 'Globe' newspaper, and for some years sub-editor of the 'Westminster Review.' In 1846 he was appointed Lecturer on Botany at St. Thomas's Hospital; but in 1851 he relinquished this and his other engagements, and became compositor and reader in Mr. Newman's printing establishment, in which he continued up to the time of his death, which took place at his residence in Hill Street, Walworth, on the 12th of June 1854, in the 48th year of his age. He was elected an Associate of the Linnean Society in 1836.

The Secretary also announced that nine Fellows and three Foreign Members had been elected since the last Anniversary.

At the Election which subsequently took place, Thomas Bell, Esq., was re-elected President; William Yarrell, Esq., Treasurer; John Joseph Bennett, Esq., Secretary; and Richard Taylor, Esq., Under-Secretary. The following five Fellows were elected into the Council in the room of others going out:—George Bentham, Esq.; George Busk, Esq.; Arthur Henfrey, Esq.; William Wilson Saunders, Esq.; and Berthold Seemann, Esq., Ph.D.

The President nominated Francis Boott, Esq., M.D.; Robert Brown, Esq.; William Spence, Esq., and William Yarrell, Esq., Vice-Presidents for the ensuing year.

June 5.

Thomas Bell, Esq., President, in the Chair.

Mr. Ward, F.L.S., exhibited specimens in flower of *Gentiana verna* from Galway, and *Cerastium latifolium* and *Draba frigida*, from the Dovra Range of mountains in Norway, all of which have flourished freely on some peaty banks in his garden at Clapham for the last three years. Mr. Ward also exhibited collections of dried specimens of Alpine plants from Switzerland and Norway.

Mr. Stevens, F.L.S., exhibited a splendid new Butterfly (*Ornithoptera Brookeana*, Wallace), collected by Mr. Wallace in Borneo.

Read the first of a Series of Memoirs, entitled "Horæ Carcinologicae, or Notices of *Crustacea*. I. A Monograph of the *Leucosiadae*, with observations on the relations, structure, habits and distribution of the family, a revision of the generic characters, and descriptions of new genera and species." By Thomas Bell, Esq., V.P.R.S., Pres. L.S.

The author commences this paper with remarks on the distinct limitation of the *Leucosiadae*, and the absence of any obvious osculant forms by which to associate them closely with neighbouring groups of the *Oxystomata*, and the no less striking want of any distinct representation of this family within the limits of other members of the same great group. He refers, however, to a probable affinity in the structure of the type of the *Pinnotheridae*, which has hitherto been overlooked. The apparent approximation of the genus *Oreophorus* to the *Calappadae* is also suggested, and a corresponding tendency to a lateral expansion of the carapace pointed out in the genera *Lithadia*, *Nursia*, *Phlyxia* and *Ebalia*.

The history of the progressive knowledge of the family from its first detection by Fabricius as a distinct group is then given. The author enters at some length into the consideration of the nature of specific characters in general, and the necessity of adopting such as are tangible and certain; and after deprecating the use of such as are merely comparative between different species, he urges the importance of giving, in all cases when a new species is described, such a definition as shall point out as briefly as may consist with clearness

and certainty the points of distinction from all those which are already known, and a description so full as to enable the future observer to ascertain whether any individual afterwards examined is new, or identical with the one so described. Specific characters, the author says, should always be either absolute, or derived from points of comparison within the individual itself.

After a general view of the structure, it is shown that from a low degree of development of the organs subserving the functions of relation, these animals are necessarily slow and circumscribed in their locomotion, and dependent for their safety from injury upon external means of protection.

In referring to the distribution of the family, it is shown that every genus, without exception, is restricted to its own geographical limit; and this is true to such an extent, that there is no instance of one species of any genus inhabiting the old world, and another of the same genus being found in the new.

The systematic portion of the paper consists of the characters of, and observations on, all the genera whether new or previously known, and characters and descriptions of every known species. Five new genera and no less than thirty-six new species are described. The following are the generic and specific characters as given in the paper:—

Genus *LEUCOSIA*. *Testa* ovato-orbicularis, subglobosa, lævis, polita; fronte subproducto, fossulas antennarias tegente. *Orbita* fissuris tribus. *Fossæ antennariæ* obliquæ, apertæ. *Pedipalpi externi* caule exteriori lateribus parallelis, recto vel subcurvo, apice obtuso; caule interiore acutè triangulari. *Pedes antici* crassiores, longitudine mediocres, brachiis ad basin et ad latera tuberculatis. *Abdomen maris*, in nonnullis speciebus, segmentis omnibus primo et ultimo exceptis—in aliis tertio cum quarto et quinto cum sexto; *fœminæ* a tertio ad sextum coalitis.

1. *Leucosia Urania*, Herbst. Testâ subglobosâ, anticè productâ, fronte rotundato; brachiis triedris, suprâ ad basin tuberculis paucis; sinu thoracico usque ad latera regionis hepaticæ anticè attingente, granis marginato.
2. *Leucosia craniolaris*, Linn. Testâ ovato-rhomboidêâ, fronte tridentato; brachiis serie tuberculorum ad latera et tuberculis duobus tantùm ad basin.
3. *Leucosia obtusifrons*, De Haan. Fronte rotundato, sinu thoracico anticè circulari, tuberculis circumscripto; brachiis ad latera et ad basin tuberculatis, manibus longioribus quam latioribus, serie granorum ad marginem interiorem.

4. *Leucosia unidentata*, De Haan. Fronte unidentato; sinu thoracico anticè circulari, tuberculis perlatis circumscripto; brachiis facie superiore seriebus binis tuberculorum.
5. *Leucosia rhomboidalis*, De Haan. Testâ rhomboidali, anticè productâ, multò longiore quam latiore; brachiis basi utrinque densè tomentosis, lateribus tuberculatis, suprâ plerumque lævibus.
6. *Leucosia longifrons*, De Haan. Testâ subglobosâ, fronte producto, integerrimo; sinu thoracico anticè elliptico, granis non cincto; brachiis ad latera tuberculatis, et granulis paucis ad basin.
7. *Leucosia orbicularis*, Bell. Testâ orbiculari, fronte lato, brevissimo, bidentato; sinu thoracico nullo; sterno anticè granulato.
8. *Leucosia pallida*, Bell. Fronte tridentato, ultra orbitâ producto; sinu thoracico in sulco brevi profundo anticè terminato; granulis paucis supra insertionem pedum anteriorum; manibus utrinque carinatis lævibus; digitis inermibus.
9. *Leucosia obscura*, Bell. Testâ suborbiculari; rostro minutè tridentato; sinu thoracico angustissimo; manibus longioribus quam latioribus utrinque carinatis, lævibus; digitis inermibus.
10. *Leucosia marmorea*, Bell. Fronte minutè tridentato, dente medio longiore; sinu thoracico anticè brevi, lineâ semicirculari granulata terminato; brachiis ad basin et ad latera tuberculatis; manibus margine interno granulato.
11. *Leucosia punctata*, Bell. Testâ impresso-punctatâ; fronte subemarginato; brachiis suprâ omninò granulatis.
12. *Leucosia affinis*, Bell. Testâ anticè angustatâ, fronte producto, subemarginato; manibus utrinque carinatis; brachiis anticè tumidis, lævissimis, politis.
13. *Leucosia brevimana*, Bell. Testâ subrhomboidali; fronte emarginato; margine laterali haud granulato; manibus æquè longis ac latis.
14. *Leucosia margaritacea*, Bell. Testâ multò longiore quam latiore, lævissimâ, margaritaceâ; sinu thoracico margine lævi; brachiis suprâ tuberculis albis, rubro-cinctis.
15. *Leucosia ocellata*, Bell. Testâ rhomboidali; fronte bidentato; regione gastricâ maculis quatuor parvis rubris signatâ, quarum binæ anteriores ocellatæ.
16. *Leucosia Whitei*, Bell. Testâ rhomboideâ; fronte producto, minutè tridentato; regionibus hepaticâ et branchiali granulis tribus vel quatuor; brachiis tomentosis, tuberculis magnis omninò instructis.
17. *Leucosia hæmatosticta*, Adams & White. "Thorace trapezoidali suprâ valdè convexo, post angulum latero-anteriozem incisurâ profundâ, maculis multis sanguineis obsito."

18. *Leucosia Cumingii*, Bell. Testâ suborbiculari, margine lævi; sinu thoracico incisurâ inter regiones hepaticam et branchialem terminato; regionibus branchialibus valdè tumidis.
19. *Leucosia pulchella*, Bell. Testâ æquè longâ ac latâ, margine lævi, tenui, subreflexo; brachiis suprâ et infrâ omninò tuberculatis; pedipalpis externis anticè paulo angustatis.
20. *Leucosia phyllocheira*, Bell. Manibus latioribus quam longioribus, utrinque lamellatis; pedibus omnibus posterioribus articulo penultimo lato, compresso.

Genus *ILIA*, Leach. *Testa* subglobosa, postice dentibus quatuor armata, quarum utrinque una compressa ad regionem intestinalem, et una conica ad brachialem; fronte bifido. *Orbita* suprâ bifissa. *Pedipalpi externi* caule exteriori recto, apice obtuso. *Pedes antici* longissimi, manibus contortis, antrorsùm angustatis.

1. *Ilia nucleus*, Linn. Testâ minutè et confertè granulosâ, granulis majoribus distantibus instructâ.
2. *Ilia rugulosa*, Roux. Testâ glabrâ, sparsim granulosâ, anticè lævi.

Genus *PERSEPHONA*, Leach. *Testa* ovalis seu orbicularis, depressa, dentibus tribus ad partem posteriorem armata, regionibus pterygostomianis angulatis. *Orbita* trifissa. *Fossæ antennariæ* transversæ. *Pedipalpi externi* caule exteriori paulo dilatato sensim angustato, ad apicem internè truncato. *Pedes antici* robusti, testâ haud bis longiores; *reliqui* articulis ultimo et penultimo compressis. *Abdomen maris* segmentis a tertio ad quintum,—*fœminæ* a quarto ad sextum, coalitis.

1. *Persephona Guaia*, Bell. Testâ ovatâ, sparsim tuberculatâ, angulo pterygostomiano obtusissimo, spinâ mediâ posticâ lateralibus paulo superiore.
2. *Persephona Lichtensteini*, Leach. Testâ orbiculari, angulo pterygostomiano dentiformi, margine laterali unidentato, spinis posticis æqualibus, medio cum lateralibus triangulum æquilateralem designante.
3. *Persephona orbicularis*, Bell. Testâ orbiculari, angulo pterygostomiano in tuberculo abruptè producto; spinis posticis æqualibus, angulum ferè rectum designantibus.
4. *Persephona Edwardsii*, Bell. Testâ orbiculari, anticè subproductâ, angulo pterygostomiano obsoleto; spinâ posticâ mediâ lateralibus multò altiore.

Genus *LEUCOSILIA*, Bell. *Testa* globosa, fronte dentibus binis divergentibus terminata; regione intestinali unidentatâ. *Orbita* trifissa. *Fossæ antennariæ* obliquæ in dentibus frontis excavatæ. *Pedipalpi externi* caule exteriori subcurvo, obtuso. *Pedes antici* robusti, longitudine mediocres. *Abdomen maris* segmentis 3^{to} 4^{to} 5^{to} coalitis, penultimo unidentato; *fœminæ* latè ovatum, valdè convexum.

Sp. unica, *Leucosilia Jurinii*, Saussure.

Genus MYRA, Leach. *Testa* ovato-globosa, posticè tridentata. *Orbita* profundè trifissa. *Fossæ antennariæ* obliquæ. *Pedipalpi externi* caule exteriori dilatato. *Pedes antici* longissimi, graciles, manibus rectis.

1. *Myra fugax*, Fabr. Testâ subglobosâ, medio elevatâ, non carinatâ; spinâ posticâ mediâ lateralibus bis longiore; spinis lateralibus compressis.
2. *Myra affinis*, Bell. Testâ ovato-globosâ, spinis posticis brevibus, subæqualibus; pedibus anticis testâ vix bis longioribus; manu digitis tertiâ parte longiore.
3. *Myra carinata*, Bell. Testâ ovatâ, minutè granulatâ, medio carinatâ, spinâ posticâ mediâ lateralibus ter quaterve longiore, spinis lateralibus acutè conicis.
4. *Myra elegans*, Bell. Testâ bis longiore quam latiore (spinâ posticâ non inclusâ), margine anteriore setoso.
5. *Myra mammillaris*, Bell. Testâ ovatâ, glabrâ, tuberculis parvis elevatis sparsim instructâ; dentibus posticis brevissimis, rotundatis.

Genus MYRODES, Bell. *Testa* ovata, rostro emarginato terminata, posticè dentibus tribus, quarum media longior, armata. *Orbita* trifissa. *Fossæ antennariæ* ferè longitudinales. *Pedipalpi externi* caule exteriori subcurvo, haud dilatato. *Pedes antici* testâ vix longiores; manibus pyriformibus haud longioribus quam latioribus; digitis tenuibus, valdè elongatis, curvis, apice aduncis.

Sp. unica, *Myrodes eudactylus*, Bell.

Genus PHILYRA, Leach. *Testa* orbicularis, depressa, inermis, fronte epistomate brevior. *Orbita* suprâ aperta, trifissa. *Fossæ antennariæ* ferè transversæ. *Pedipalpi externi* caule exteriori dilatato. *Pedes antici* mediocres; *octo posteriores* tarso compresso lamelloso. *Abdomen maris* hastato-lanceolatum; *fæminæ* articulo ultimo angusto, producto.

1. *Philyra scabriuscula*, Fabr. Testâ depressâ, granuloso-scabrâ, fronte epistomate multo brevior; brachiis tuberculatis; manibus ad marginem interiorem lineis duabus granulatis.
2. *Philyra globulosa*, Fabr. Testâ globosâ, lævi, margine laterali granulato; fronte vix epistomate brevior; brachiis granulatis.
3. *Philyra porcellana*, Fabr. "Testâ globosâ, minutè punctatâ; fronte epistomate parùm brevior, margine granulato; brachiis cylindricis tuberculatis; manibus lævibus inflatis."

Hanc speciem non vidi—a præcedente ane distincta?

4. *Philyra Pisum*, De Haan. "Fronte epistomate parùm brevior; regionibus pterygostomianis medio angulatis; thorace granulato; chelis in maribus thoracem dimidio superantibus; digitis in longitudinem 5-sulcatis margine interno denticulatis."

5. *Philyra platycheira*, De Haan. "Parva, regionibus pterygostomianis medio angulatis; fronte epistomate parùm breviorè; chelis in maribus thorace bis longioribus; digitis valdè depressis, lævibus, margine interno integerrimis."
6. *Philyra lævis*, Bell. Testâ, corpore, pedibus omninò lævibus.
7. *Philyra Adamsii*, Bell. Testâ glabrâ, regionibus partim et lineâ longitudinali granulatis; margine posteriore utrinque bituberculato.
8. *Philyra punctata*, Bell. Testâ orbiculari, lævi, punctatâ; angulo pterygostomiano obsoleto; brachiis triquetris.
9. *Philyra carinata*, Bell. Testâ partim granulosa, inter regiones cardiacam et branchialem lævi, medio carinatâ; manibus lineis duabus granulosis.
10. *Philyra macrophtalma*, Bell. Testâ ovatâ, minutissimè granulatâ; pedunculis oculorum elongatis; abdomine maris angusto, lineari.

Genus EBALIA, Leach. Testa rhomboidalis vel subhexagona; fronte producto, emarginato. Orbita bifissa. Fossæ antennariæ tectæ, obliquæ. Pedipalpi externi ad marginem epistomatis extendentes, caule exteriori margine externo recto, caule interiore acuminato. Pedes antici breves, crassi; posteriores ungue forti styliformi terminati.

1. *Ebalia Pennantii*, Leach. Testâ granulatâ, eminentiâ cruciformi; margine latero-anteriore bilobato; abdomine maris segmentis a tertio ad sextum confluentibus.
2. *Ebalia Bryeri*, Leach. Testâ minutè granulatâ, margine laterali integro, subrevoluto, posteriore bilobato; regione cardiacâ bituberculatâ, branchiali utrinque tuberculo uno; brachio haud bis longiore quam latiore.
3. *Ebalia Cranchii*, Leach. Testâ granulatâ, carinatâ, tuberculis quinque; margine latero-anteriore fere integro; brachio ter longiore quam latiore.
4. *Ebalia granulosa*, Edw. Testâ granulosa, tuberculis sex; margine latero-anteriore bilobo.

Genus PHLIXIA, Bell. Testa rhomboidea, tuberculis tribus posticè instructis. Orbita suprâ emarginata, bifissa. Fossæ antennariæ cum orbitis communicantes. Antennulæ elongatæ, porrectæ. Pedipalpi externi caule exteriori lato, margine externo curvo, anticè angustato; caule interno segmento penultimo lateribus parallelis, ultimo triangulari. Abdomen in utroque sexu segmentis a tertio ad sextum coalitis.

1. *Phylxia crassipes*, Bell. Testâ subcarinatâ; rostro quadrato, quadridentato; pedibus anticis testâ plus quam duplò longioribus; brachiis rotundis, medio tumescentibus.

2. *Phlyxia lambriformis*, Bell. Testâ carinatâ; rostro triangulari, emarginato; margine latero-anteriore incisivo, latero-posteriore acutè carinato.
3. *Phlyxia lævis*, Bell. Brachiis triedris; testâ lævi, margine laterali unidentato.

Genus LITHADIA, Bell. Testa rhomboidea, rudis; regionibus gibbosis; rostro bifido, resupinato. Orbita suprâ et extrorsum aperta. Fossæ antennariæ obliquæ. Pedipalpi externi caule exteriori ensiformi obtuso; interiore lanceolato, exteriori longiore. Pedes antici robusti, rudes, tuberculati. Abdomen maris segmentis tertio, quarto et quinto coalitis.

Species unica, *Lithadia Cumingii*, Bell.

Genus OREOPHORUS, Rüppell. Testa tuberosa, posticè supra pedes dilatata. Fossæ antennariæ obliquæ. Pedipalpi externi caule exteriori arcuato, apicem versus sensim angustiore. Pedes anteriores longi, robusti; octo posteriores subæquales, scuto dorsali reconditi.

1. *Oreophorus horridus*, Rüpp. Testâ subtriangulatâ, regionibus branchialibus fortitè et obliquè carinatis; chelis mediocribus; manu digitis longiore.
2. *Oreophorus reticulatus*, Adams & White. Testâ subpentagonâ, reticulatâ; digitis maximis, manu bis longioribus.
3. *Oreophorus nodosus*, Bell. Testâ nodosâ, margine undato; manu tumidâ, ad margines carinatâ, bisulcatâ, digitis longiore.

Genus NURSIA, Leach. Testa polyedra, fronte producto. Orbita extrorsum aperta. Fossæ antennariæ transversæ. Pedipalpi externi caule exteriori curvo, dilatato, anticè et posticè obtuso; caule interiore margine interno recto, articulo penultimo quadrato, ultimo triangulari. Pedes antici digitis deflexis. Abdomen maris articulo penultimo apice processu dentiformi instructum.

1. *Nursia plicata*, Herbst. Testâ utrinque 4-dentatâ, medio tuberculis tribus triangulûm delineantibus, posticè lineâ elevatâ transversâ tuberculum gerente; fronte 4-dentato.
2. *Nursia abbreviata*, Bell. Testâ orbiculari, margine undato, lineâ elevatâ longitudinali, alterâ transversali decussatâ; fronte integro.

Genus NURSILIA, Bell. Testa latior quam longior, margine polygono, fronte producto. Orbita bifissa, extrorsum aperta. Fossæ antennariæ obliquæ. Pedipalpi externi epistoma superantes, caule exteriori curvo, medio dilatato; interiore elongato, margine interno arcuato. Abdomen fœminæ valdè convexum, articulo ultimo inter bases pedipalporum externorum producto.

Species unica, *Nursiliu dentata*, Bell.

Genus *ARCANIA*, Leach. *Testa* subglobosa, spinis seu tuberculis elevatis plurimis armata. *Orbita* suprâ et extrorsum aperta. *Fossæ antennariæ* longitudinales. *Pedipalpi externi* caule exteriori recto, lineari, apice interiore emarginato-truncato; caule interiore gradatim acuminato. *Pedes antici* gracillimi. *Abdomen maris* lanceolatum, segmentis a tertio ad sextum coalitis.

1. *Arcania Erinaceus*, Herbst. Corpore atque membris densè spinosis, spinis spinulosis.
2. *Arcania 11-spinosa*, De Haan. "Thorace spinuloso, spinulis obtusis, ambitu 11-spinoso, spinis acutis simplicibus; brachiis granulatis, digitis manibus longioribus."
3. *Arcania novem-spinosa*, Adams & White. "Thorace lævi, granuloso, marginibus latero-anterioribus spinis duabus, latero-posterioribus spinis duabus, posteriore spinâ longâ rectâ."
4. *Arcania septem-spinosa*, Bell. Testâ paulò latiore quam longiore, tuberculatâ, margine spinis septem tuberculatis armato, laterali utrinque reliquis longiore.
5. *Arcania tuberculata*, Bell. Testâ paulò longiore quam latiore, omnino tuberculatâ, margine spinis novem tuberculatis instructo; brachiis granulatis, manibus lævibus.
6. *Arcania gracilipes*, Bell. Testâ granulosâ, tuberculis quindecim suprâ, et tribus ad marginem posteriorem instructâ; pedibus anticis tenuissimis.
7. *Arcania lævimana*, Bell. Testâ granulatâ, tuberculis numerosis distinctis, ad marginem spinis novem simplicibus armatâ; manibus glabris.

Genus *IPHIS*, Leach. *Testa* rhomboidalis, transversa, angulis rotundatis, utrinque spinâ longissimâ horizontali armata; fronte emarginato.

Species unica, *Iphis septemspinosa*, Fabr.

Genus *IXA*, Leach. *Testa* elliptico-rhomboidalis, processu utrinque subcylindrico à regione branchiali producto; regionibus sulco profundo separatis. *Orbita* suprâ bifissa. *Pedipalpi externi* caule exteriori lato, interiore longiore. *Pedes* filiformes.

Species unica, *Ixa cylindrus*, Fabr.

Read also, a "Notice of a species of Carabideous Insect, *Helluo (Acanthogenys) myrmecophilus*, Westw., found together with its larva, in Ants' nests in Ceylon, by G. H. K. Thwaites, Esq., F.L.S." By J. O. Westwood, Esq., F.L.S. This paper was accompanied by figures of the larva and imago states of the insect.

June 19.

William Yarrell, Esq., V.P., in the Chair.

Mr. Bentley, F.L.S., exhibited a large number of different fibres used for the manufacture of Paper, together with samples of the paper made from them; and gave some account of the peculiarities of the several materials exhibited, and of the papers manufactured from them.

Dr. Seemann, F.L.S., exhibited crystals and cakes, constituting an organic new acid, extracted from the root of the Pipitzahuac (*Dumerilia Alamani*, DeCand., *Perezia fruticosa*, La Ll. et Lexarza) by Mr. William Schaffner and Professor Leopoldo Rio de la Loza, in Mexico, which has received among the Mexican naturalists, on account of its resemblance to gold, the name of "Oro Vegetal," or Vegetable Gold. The acid possesses medicinal properties similar to those of jalap, and is soluble in æther. Dr. Seemann had received the specimens and detailed accounts (not written in English) only two days previous, and was therefore unable to prepare a full description of the plant, its synonyms and properties, for this meeting, but he proposes to do so in time for the next.

Read, a continuation of Dr. J. D. Hooker's Memoir on "*Balanophorea*."

Read also, a Memoir "On the Larvæ of Coleopterous Insects," by J. O. Westwood, Esq., F.L.S. &c. In this paper descriptions and figures were given of the larvæ of numerous species of *Coleoptera* of various families.

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