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XV.—*Remarks upon the Recent and Fossil Cycadeæ.* By  
J. MORRIS, Esq.

THE Cycadeæ, originally placed by Linnæus and Jussieu among the Ferns, are an interesting family of plants, from their appearing to form an intermediate place between the Palms, Ferns and Coniferæ; resembling the first in their external habit, the second in the gyrate veneration of their leaves (a character not belonging to the whole family), and related to Coniferæ in the ovula being uncovered, or not furnished with any seed-vessel. The affinities of these families, although previously mentioned by C. Richard\*, were, in this latter respect, finally determined by Mr. R. Brown in his researches into the structure of their reproductive organs, inserted in the Appendix of Capt. King's 'Voyage to Australia.'

The stems or trunks of Cycadeæ are generally simple, although some species of *Zamia* appear capable of dividing into two or three terminal buds. In *Cycas* the internal structure consists of a central pith surrounded by two or more circles of laminated vascular and cellular tissue alternating; in *Encephalartos* the central cellular tissue is divided from the external by only one circle of woody fibre†. "The stems are enclosed in no true bark, but have a thick case composed of the persistent scales which have formed the bases of fallen leaves; these, together with other abortive scales, constitute a compact covering that supplies the place of bark."—(*Buckland* †.)

\* 'Mém. sur les Conifères et Cycadées,' 1826, p. 183. "Il n'est aucune famille de plantes qui ait plus de rapports et de ressemblance avec les Conifères que celle des Cycadées. Ces rapports nous semblent si grands, que nous pensons qu'il est impossible de distinguer ces deux familles, ni par des caractères tirés de leurs fleurs, ni par des caractères puisés dans l'organisation de leurs fruits. Les seuls signes distinctifs qui existent réellement entr'elles consistent uniquement dans leur port et la structure anatomique de leur tige, qui en effet est fort différente dans l'un et l'autre groupe."

M. Richard, however, appears to have been unaware of the internal structure of *Cycas* being stratified; but describes it as similar to that of Palms: "*C. circinalis*, Arbor . . . , ligno albicanti, molli uti in arboribus monocotyledonibus disposito."

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The female inflorescence of *Zamia* and *Encephalartos* is similar to the male cones in form, having thick scales, each bearing on the superior surface two naked ovula; while in *Cycas* the naked ovula are seated in depressions on the edges of a frond but little altered from the ordinary structure.

The foliation of this family consists of pinnate fronds, the circinnate veneration of which, in a young state, has generally been considered a character belonging to all the genera; but a series of observations on the development of the frond which I have had an opportunity of making in several species of the three existing genera, have led me to an opposite conclusion, from which it is evident that even in *Cycas* itself the rachis is constantly straight in the early state; when however twelve or more fronds rise together, the outer ones become incurved at their extremities, apparently for the purpose of affording some protection to the more delicate fronds within, which remain perfectly straight: the only parts to which the term circinnate can be strictly applied, are the young segments or pinnæ. In the evolution of the fronds the development proceeds from the base upwards, each pair of pinnæ becoming unrolled as soon as that part of the rachis has attained its full degree of extension and size.

A correct figure of the young frond of *C. circinalis* is given in Rheede's 'Hortus Malabaricus,' vol. iii. t. 15. f. 2, 3, 4; and one of *C. revoluta* is figured in plate xi. fig. 4, 5, 'Mag. Nat. Hist.' 1840, from a specimen obtained from Mr. Anderson, of the Chelsea Botanic Garden.

The prefoliation of *Zamia* and *Encephalartos* presents but little difference from each other; the young rachis is slightly recurved at the apex, the two series of pinnæ being regularly imbricated, and applied to, or in contact with, each other by

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"In *Encephalartos affinis*, Lehman, a bud is composed of young leaves foreshortened (raccourcis), the tops of which converge at the summit; and the pinnæ on each side of the rachis, in consequence of this foreshortening, are imbricated and placed in contact one with another by the anterior surface. The same curious fact is observable in *E. Altensteinii* and *horridus*, Lehm. In species of this genus the terminal bud generally develops itself at an interval of two or even more years; and in young plants or the lateral buds of large stems it is often only developed by a single frond, or by a very limited number at one time. The increase of the young fronds is produced by the extension of the rachis and pinna. *E. spiralis*, Lehm., presents exactly the same character. In the *Zamia*, Lehm., the fronds are developed in a totally different manner. In *Z. pumila* and *media*, in the bud, the young rachis is rolled into the form of a crozier; but the two series of pinnæ are imbricated on each side, and are joined one with another in such a manner that their tops are directed downwards, occasioned by the circinnate disposition of the rachis. In the young fronds of *Cycas circinalis* and *revoluta*, Thun., the rachis as well as the pinna are rolled in the form of a crozier; each having a peculiar line or axis of circinnation, the same as in Ferns\*."

The remains of fronds supposed to belong to this family being rather numerous in a fossil state, and as the structural characters vary in the three recent genera, I shall give a slight description of the pinnæ and their mode of attachment, illustrated by a woodcut of each type.

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\* Bulletin des Sciences Physiques de Néerlande, t. i. p. 129.

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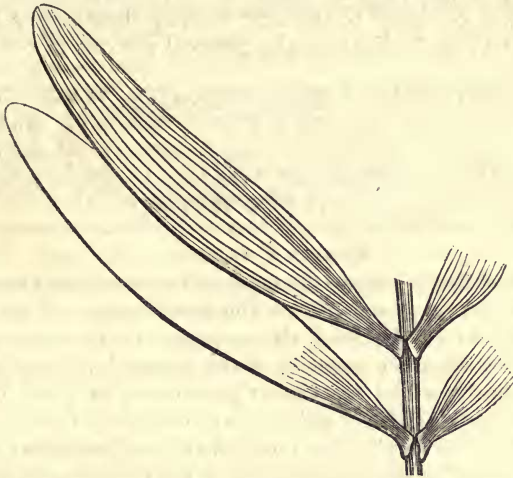
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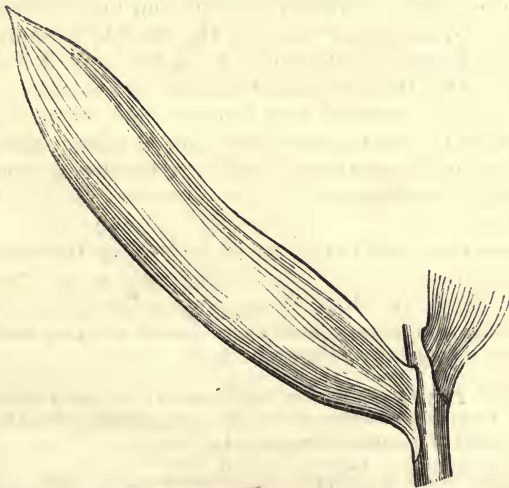
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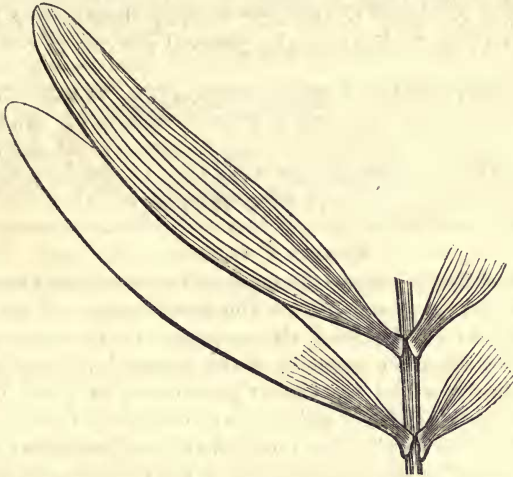


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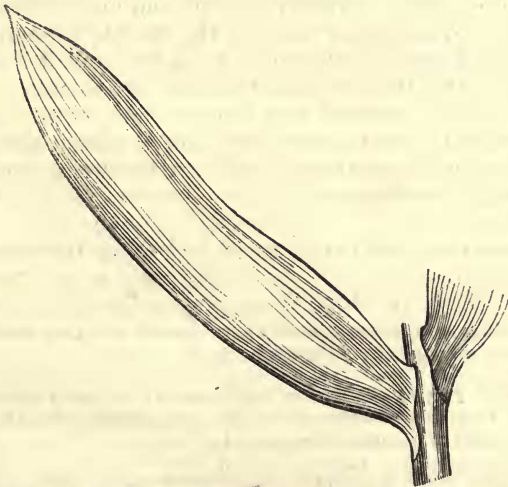


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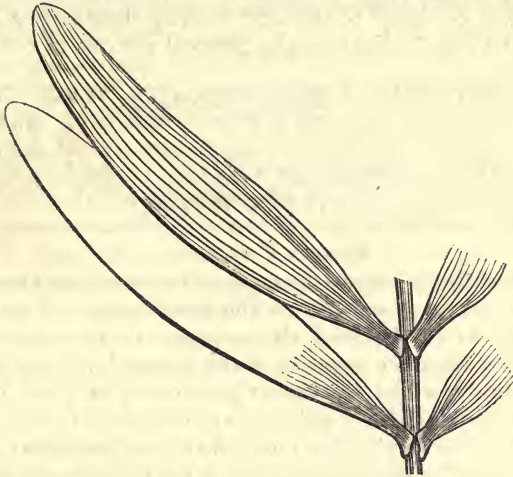


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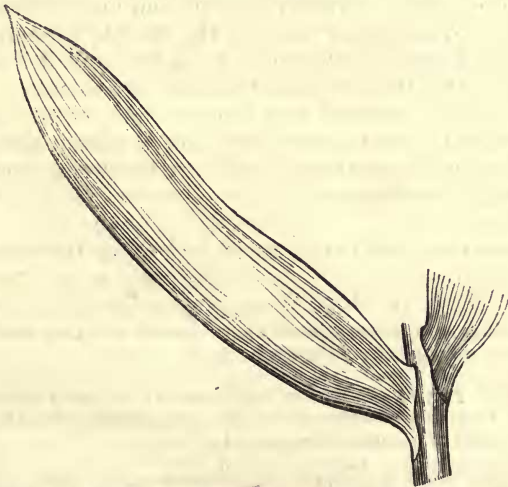


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The nine species of *Zamia*, viz. *Z. angustifolia*, *tenuis*, *media*, *debilis*, *integrifolia*, *pygmæa*, *furfuracea*, *muricata* and *pumila*, are confined to the new world; their native habitats being the West Indies and the tropical regions of continental America.

The fifteen species of *Encephalartos*, viz. *E. pungens*, *cyca-difolia*, *tridentata*, *longifolia*, *Caffra*, *lanuginosa*, *Lehmannis*, *Cycadis*, *horrida*, *latifolia*, *spiralis*, *prunifera*, *repanda*, *Frederici Gulielmi* and *Altensteinii*, belong to Southern Africa, only one species being found in New Holland\*.

#### FOSSIL CYCADEÆ.

Dr. Buckland, in the 'Geological Transactions,' first called the attention of geologists to the fossil stems of this family from the Isle of Portland, the analogy of which was pointed out by Mr. Brown; remains of the fronds had however been previously described by Count Sternberg in his 'Flora der Vorwelt,' and Ad. Brongniart also noticed them as occurring at Höer in Sweden†; the most abundant locality at the present time are the shales belonging to the oolitic series of Yorkshire: whether all the remains usually associated with this family really belong to it, may be difficult to decide, as many of them present characters very different from the existing species, which do not at the same time assimilate them to any other living genera. Ad. Brongniart, an authority on these subjects, has considered most of the simple pinnate fronds with parallel venation to belong to Cycadeæ; but it is much to be regretted, that the portion of his work ('Hist. des Vég. Foss.') which would comprehend this family is not yet published, so that we might have the full benefit of a continuation of the same masterly observations which have thrown so much light on the fossil Cryptogamia.

The classification in the following catalogue will be nearly the same as that adopted by most authors on this subject.

\* The following observations are extracted from Lindley and Hutton ('Fossil Flora,' ii. p. 122), respecting the geographical position of *Encephalartos*. "They are not met with at Cape Town, where they would be exposed to the cold winds from the southern polar regions, but first appear far in the interior of the country, in the land of the Caffers, where the common Cape Flora of Proteas and Heaths is replaced by strikingly different races of plants. They prefer mountainous and wooded or bushy country, following the ranges of hills, but not straggling into the plains. They are generally met with in rocky places, almost 2000 feet above the level of the sea, higher than the region of Mimosas, and surrounded by bushes, arborescent succulent plants, Rhamnææ, Celastrinææ, and shrubby Leguminous species."

† Ann. des Sc. Nat. tom. iv.

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The nine species of *Zamia*, viz. *Z. angustifolia*, *tenuis*, *media*, *debilis*, *integrifolia*, *pygmæa*, *furfuracea*, *muricata* and *pumila*, are confined to the new world; their native habitats being the West Indies and the tropical regions of continental America.

The fifteen species of *Encephalartos*, viz. *E. pungens*, *cyca-difolia*, *tridentata*, *longifolia*, *Caffra*, *lanuginosa*, *Lehmannis*, *Cycadis*, *horrida*, *latifolia*, *spiralis*, *prunifera*, *repanda*, *Frederici Gulielmi* and *Altensteinii*, belong to Southern Africa, only one species being found in New Holland\*.

#### FOSSIL CYCADEÆ.

Dr. Buckland, in the 'Geological Transactions,' first called the attention of geologists to the fossil stems of this family from the Isle of Portland, the analogy of which was pointed out by Mr. Brown; remains of the fronds had however been previously described by Count Sternberg in his 'Flora der Vorwelt,' and Ad. Brongniart also noticed them as occurring at Höer in Sweden†; the most abundant locality at the present time are the shales belonging to the oolitic series of Yorkshire: whether all the remains usually associated with this family really belong to it, may be difficult to decide, as many of them present characters very different from the existing species, which do not at the same time assimilate them to any other living genera. Ad. Brongniart, an authority on these subjects, has considered most of the simple pinnate fronds with parallel venation to belong to Cycadeæ; but it is much to be regretted, that the portion of his work ('Hist. des Vég. Foss.') which would comprehend this family is not yet published, so that we might have the full benefit of a continuation of the same masterly observations which have thrown so much light on the fossil Cryptogamia.

The classification in the following catalogue will be nearly the same as that adopted by most authors on this subject.

\* The following observations are extracted from Lindley and Hutton ('Fossil Flora,' ii. p. 122), respecting the geographical position of *Encephalartos*. "They are not met with at Cape Town, where they would be exposed to the cold winds from the southern polar regions, but first appear far in the interior of the country, in the land of the Caffers, where the common Cape Flora of Proteas and Heaths is replaced by strikingly different races of plants. They prefer mountainous and wooded or bushy country, following the ranges of hills, but not straggling into the plains. They are generally met with in rocky places, almost 2000 feet above the level of the sea, higher than the region of Mimosas, and surrounded by bushes, arborescent succulent plants, Rhamnææ, Celastrinææ, and shrubby Leguminous species."

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CYCADEACITES, Presl.

CYCADITES, Brown.

Trunks exhibiting the usual structure of *Cycadeæ*.

Fronds pinnate; pinnæ linear, entire, adnate at the base, traversed by a single thick midrib.

Stems.

- C. columnaris*, Presl, Sternberg, Flora der Vorwelt, part 7, 8. t. 47. f. 1—6. Near Radnitz, Bohemia.  
*C. involutus*, Presl, l. c. t. 51.  
*C. Bucklandi*, Presl, l. c. p. 194. *Conites Buckl.*, Sternb., part 3, p. 39. t. 30. Oolite, Stonesfield.  
*C. cylindricas Mantellia*, Brong. Prod., pp. 93 and 96. Lias, Lunéville, Strasburg.  
*C. cyprinophilis*, Mém. Agric. Soc. Lyons, ii. p. 129. t. 3. f. 1—5. C. M. Mines de Rive-de-Gier.

Fronds.

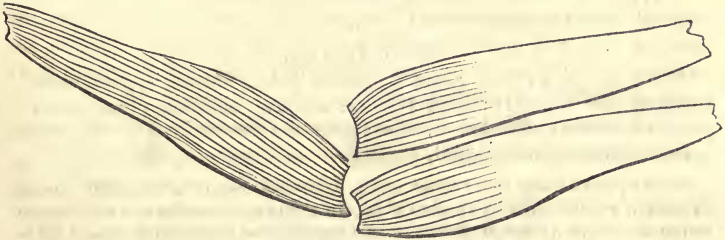
- C. salicifolius*, Presl, l. c. t. 40. f. 1, 2. Lignite, Altsattel, Bohemia.  
*C. angustifolius*, Presl, l. c. t. 44. Lignite, Altsattel, Bohemia.  
*C. ? Nilssonii\**, *Spadix* of, Hisinger, Let. Suec., t. 33. f. 4.  
*C. ? Nilssonii*, Phillips, Geol. of Yorkshire, t. 7. f. 24. Oolite, Yorkshire.

ZAMITES, Brong., Presl, &c.

Fruit strobiliform, oval, pedunculate, with large imbricated scales spirally arranged. (Presl.)

Stems cylindrical or nearly spheroidal, without a distinct axis, covered by rhomboidal cicatrices. (Brong.)

Fronds pinnate; pinnæ sessile, distichous, entire or dentate, pointed; sometimes contracted, sometimes enlarged at the base.



Stems.—*Cycadeoidea*, Buckland, *Mantellia*, Brong.

*Z. Cordæi*, Presl, Sternb. Flor., part 7, 8. p. 196. t. 55. C. M. Radnitz, Bohemia.

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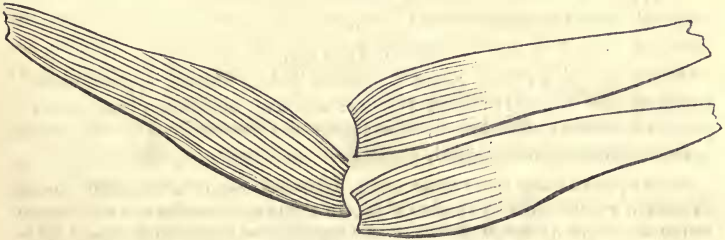
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Fronds.

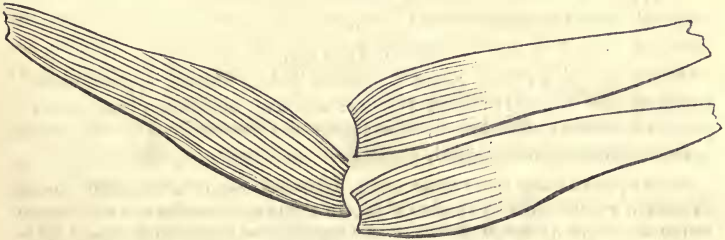
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*Strobiles.*

- Z. crassa*, Lindl. and Hutt., 2. t. 136. Wealden, Isle of Wight.
- Z. macrocephala*, L. and H., 2. t. 125. Greensand, near Deal.
- Z. ovata*, L. and H., 3. t. 226 a. Greensand? Feversham.

*Fronds.*

Pinnæ contracted at the base.

- Z. distans*, Presl, *l. c.* p. 196. t. 41. f. 1. Keuper, Bamberg.
- Z. lanceolatus*, L. and H., 3. t. 194. Low. Ool. Shale, Haiburn Wyke, Yorkshire.
- Z. undulatus*, Presl, *l. c.* p. 197. *Odontop. undulatus*, Sternb., pt. 5. and 6. p. 78. t. 28. f. 1.

Pinnæ broad at the base.

- Z. gigas*, Lindl. and Hutt., 3. t. 165. Ool. Shale, Scarborough.
- Z.?* *giganteus*, Hist. Let. Suec., t. 33. f. 5.
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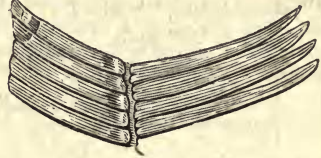
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No specimens of this section have yet been found with the vernation of the young fronds, although, I believe, Ad. Brongniart considers he has discovered unequivocal evidence of the gyrate vernation of *Nilssonia*. This section is readily distinguished from *Pterophyllum* by the pinnæ being narrow and of nearly equal breadth throughout, a character in which they agree somewhat with the young state of *Encephalartos spiralis* and *E. cycadis*, and the broader ones resemble other forms of that genus; but it would be preferable to retain them here, although their affinity to *Zamites* is very evident, if the concave basal attachment of *Z. gigas* may be considered an intermediate form.

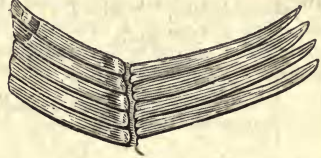
Pinnæ narrow.

- P. acutifolium*, Geol. Trans., 2nd series, vol. v. t. 21. f. 1, 2, 3. Ool., Cutch.
- P. Cutchense*, Geol. Trans., 2nd series, vol. v. t. 21. f. 4. Ool., Cutch.
- P. Bucklandi*, *Z. Buckl.*, Presl, *l. c.* pt. 7, 8. p. 198.
- P. æquale*, *Pterophyllum dubium*, Ad. Brong. Prod. p. 95; Hist. Let. Suec., t. 33. f. 8. *Nilssonia æqualis*, Brong., Ann. des Sc. Nat. 4. t. 12. f. 6. Lias? Höer, Sweden.
- P. pecten*, *Pterophyllum pecten*, Lindl. and Hutt., 2. t. 102. *Cycadites pecten*, Phillips, Geol. Yorks., t. 7. f. 22. Gr. Ool., Gristhorpe Bay.
- P. Jægeri*, *Pterophyllum Jægeri*, Brong. Prod. p. 95. *Osmundites pectinatus*, Jæger. Keuper?
- P. dubium*, *Cycadites plumula*, Presl, *l. c.* pt. 7, 8. p. 195. *Filicites dubius*, Sternb., pt. 1—4. t. 33. f. 1. Oolite, Yorkshire.
- This may only be a variety of the next species.
- P. pectinatum*, *Zamia*, Brong. Prod., p. 94. Lindl. and Hutt., 3. t. 172. *Filicites scolopendrioides*, Lindl. and Hutt., 3. t. 229. (excl. synonym.) Stonesfield slate. Ool. shale\*, Saltwick, Yorkshire.

which these characters are well exhibited; they are figured in the 2nd part of vol. v. of the 'Geol. Trans.'

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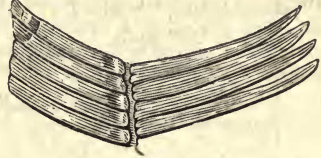
Pinnæ narrow.

- P. acutifolium*, Geol. Trans., 2nd series, vol. v. t. 21. f. 1, 2, 3. Ool., Cutch.
- P. Cutchense*, Geol. Trans., 2nd series, vol. v. t. 21. f. 4. Ool., Cutch.
- P. Bucklandi*, *Z. Buckl.*, Presl, *l. c.* pt. 7, 8. p. 198.
- P. æquale*, *Pterophyllum dubium*, Ad. Brong. Prod. p. 95; Hist. Let. Suec., t. 33. f. 8. *Nilssonia æqualis*, Brong., Ann. des Sc. Nat. 4. t. 12. f. 6. Lias? Höer, Sweden.
- P. pecten*, *Pterophyllum pecten*, Lindl. and Hutt., 2. t. 102. *Cycadites pecten*, Phillips, Geol. Yorks., t. 7. f. 22. Gr. Ool., Gristhorpe Bay.
- P. Jægeri*, *Pterophyllum Jægeri*, Brong. Prod. p. 95. *Osmundites pectinatus*, Jæger. Keuper?
- P. dubium*, *Cycadites plumula*, Presl, *l. c.* pt. 7, 8. p. 195. *Filicites dubius*, Sternb., pt. 1—4. t. 33. f. 1. Oolite, Yorkshire.
- This may only be a variety of the next species.
- P. pectinatum*, *Zamia*, Brong. Prod., p. 94. Lindl. and Hutt., 3. t. 172. *Filicites scolopendrioides*, Lindl. and Hutt., 3. t. 229. (excl. synonym.) Stonesfield slate. Ool. shale\*, Saltwick, Yorkshire.

which these characters are well exhibited; they are figured in the 2nd part of vol. v. of the 'Geol. Trans.'

\* Mr. Williamson, in a memoir published in the Geol. Trans. vol. v., considers most of the Yorkshire plants as belonging to the great oolite.

This section has been proposed to include those species of fronds hitherto classed with *Zamites*, but from which they differ in the variable form of the base of the pinnæ and their imbricated character. Ad. Brongniart appears to have been aware of this structure (Prod. p. 91) and has referred them to *Zamites*, but this name ought to be restricted to those fossils agreeing more closely



with the recent genus. The oblique attachment and auricled base are characters not well marked in any recent species; and whether attached by the whole or only a portion of the base, may be difficult to decide from the compressed state of the specimens,—an opinion that might be formed from inspecting casts obtained from pressed leaves of some of the Coniferæ (*Cunninghamia lanceolata*), in which the broad basal attachment (in the cast) would be very deceptive.

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Pinnæ narrow.

- P. acutifolium*, Geol. Trans., 2nd series, vol. v. t. 21. f. 1, 2, 3. Ool., Cutch.
- P. Cutchense*, Geol. Trans., 2nd series, vol. v. t. 21. f. 4. Ool., Cutch.
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- P. Jægeri*, *Pterophyllum Jægeri*, Brong. Prod. p. 95. *Osmundites pectinatus*, Jæger. Keuper?
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The *Filicites scolopendrioides* of Lindley (not of Brongniart, from which it is very distinct, Brongniart's figure representing merely the fructification of an entire leaf, Lindley's figure that of true pinnæ) has been placed as a synonym of *Z. pectinata*, although it differs in having the pinnæ wider apart and more obtuse at the apex, not important specific characters.

*P. taxinum*, *Zamiu taxina*, Lindl. and Hutt., 3. t. 175. Stonesfield slate.

I am informed, from a recent communication of Prof. Phillips, that the fossils figured in his 'Geology of Yorkshire,' under the names of *Cycadites lanceolatus* (*Zamia Mantelli*, Br.), *C. gramineus* (*Z. elegans*, Br.), and *C. latifolius* (*Z. Youngii*, Br.), ought to be placed in the Otopteroid division of Ferns, the veins losing themselves in the upper margin. Seven or eight other species are named in Ad. Brong. 'Prodromus,' the characters of which are not given, viz. *Z. Feneonis*, *acuta*, *patens*, *lavis*, *Goldiæi*, *Buchanani*, *pennæformis*.

Pinnæ broad.

*P. falcatum*, *Zamites*, Presl, *l. c.* pt. 7, 8. p. 197. *Odontopteris falcatus*, Sternb., pt. 5. and 6. p. 78. t. 23. f. 1. Inf. Ool., Whitby.

*P. Schmeidelii*, Presl, *l. c.* p. 197. *Odon. Schmeidelii*, Sternb., pt. 5. and 6. p. 78. t. 25. f. 2. Hornstone, Baruth.

*P. lanceolatum*, Geol. Yorksh., Young and Bird, t. 3. f. 2. "The leaf with long lanceolate striated leaflets." Oolite, Yorkshire.

The peculiar character which distinguishes this section from *Zamites* may be easily remarked by comparing the attachment of the pinnæ in any of the above species with that of *Z. lanceolatus*, 'Foss. Flor.' 3. t. 194.

PTEROPHYLLUM, Brong.

Fronds pinnate; pinnæ sublinear, inserted by their whole base; apex truncate, sometimes acute; veins fine, equal, slender, parallel, but little marked.

Apex truncate.

*P. majus*, Brong., Ann. des Sc. Nat., 4. p. 219. t. 12. f. 7; Hist. Let. Suec., t. 33. f. 6.

*P. minus*, Brong., Ann. des Sc. Nat., 4. p. 219. t. 12. f. 8; Hist. Let. Suec., t. 33. f. 7; Lindl. and Hutt., t. 67. f. 2. Oolite, near Scarborough.

*P. comptum*, Lindl. and Hutt., t. 66. *Cycadites comptus*, Phillips, t. 7. f. 20. Oolite, near Scarborough.

*P. Munsteri*, Presl, *l. c.* p. 198. t. 43. f. 1. Keuper, Bamberg.

*P. truncatum*, Presl, *l. c.* p. 198. *Aspleniopteris Nilssoni*, Sternb. pt. 4. t. 43. f. 3—5. Höer, Sweden.

*P. Nilssoni*, Lindl. and Hutt., 2. t. 67. f. 1. *Aspleniopteris Nilssoni*, Phillips, Geol. Yorksh., t. 8. f. 4. Oolite, Scarborough.



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Pinnæ broad.

*P. falcatum*, *Zamites*, Presl, *l. c.* pt. 7, 8. p. 197. *Odontopteris falcatus*, Sternb., pt. 5. and 6. p. 78. t. 23. f. 1. Inf. Ool., Whitby.

*P. Schmeidelii*, Presl, *l. c.* p. 197. *Odon. Schmeidelii*, Sternb., pt. 5. and 6. p. 78. t. 25. f. 2. Hornstone, Baruth.

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*P. minus*, Brong., Ann. des Sc. Nat., 4. p. 219. t. 12. f. 8; Hist. Let. Suec., t. 33. f. 7; Lindl. and Hutt., t. 67. f. 2. Oolite, near Scarborough.

*P. comptum*, Lindl. and Hutt., t. 66. *Cycadites comptus*, Phillips, t. 7. f. 20. Oolite, near Scarborough.

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Pinnæ broad.

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*P. minus*, Brong., Ann. des Sc. Nat., 4. p. 219. t. 12. f. 8; Hist. Let. Suec., t. 33. f. 7; Lindl. and Hutt., t. 67. f. 2. Oolite, near Scarborough.

*P. comptum*, Lindl. and Hutt., t. 66. *Cycadites comptus*, Phillips, t. 7. f. 20. Oolite, near Scarborough.

*P. Munsteri*, Presl, *l. c.* p. 198. t. 43. f. 1. Keuper, Bamberg.

*P. truncatum*, Presl, *l. c.* p. 198. *Aspleniopteris Nilssoni*, Sternb. pt. 4. t. 43. f. 3—5. Höer, Sweden.

*P. Nilssoni*, Lindl. and Hutt., 2. t. 67. f. 1. *Aspleniopteris Nilssoni*, Phillips, Geol. Yorksh., t. 8. f. 4. Oolite, Scarborough.



- P. filiciformis*, *Zamites filiciformis*, Presl, *l. c.* pt. 7. and 8. p. 198.  
*Filicites dubius*, Sternb., pt. 4. p. 23. t. 47. f. 1.
- P. obtusum*, *Odontopteris obtusa*, Brong. Hist. Vég. Foss., t. 78. f. 4.
- P. latifolius*, *O. latifolius*, Sternb., pt. 5. and 6. p. 79. *Tæniopteris latifolius*, Brong., t. 82. f. 6.

Apex acute.

- P. acuminatum*, *Zamites*, Presl, *l. c.* p. 198. t. 43. f. 2. Keuper, Bamberg.
- P. Brongniarti*, *Cycadites*, Mantell, Geol. S.E. England, p. 238. Wealden, Sussex.
- P. heterophyllus*, *Zamites*, Presl, p. 199. t. 43. f. 4, 5. Keuper, Bamberg.
- P. tenuicaulis*, *Cycadites*, Phillips, pt. 1. t. 7. f. 19. Gr. Ool., Gristhorpe Bay.
- P. difformis*, *Zamites*, Presl, *l. c.* pt. 7, 8, p. 198. *Aspleniopteris difformis*, Sternb., pt. 4. p. 21; pt. 2. t. 24. f. 1. Bohemia.

The following species I have not seen :—

- P. longifolium*, Brong. Prod., p. 95. *Algacites filicoides*, Schloth. Nachtr., p. 46. t. 4. f. 2. Lias.
- P. Meriani*, Brong. Prod., p. 95. Lias.
- P. Williamsonis*, Brong. Prod., p. 95. Inf. Ool., Whitby.
- P. enerve*, Brong. Prod., p. 95. Variegated marl.

#### NILSSONIA, Brong.

Fronds pinnate; pinnæ approximate, oblong, more or less elongate, apex rotundate, adhering by their whole base; veins unequal, parallel.

- N. brevis*, Brong., Ann. des Sc. Nat. 4. p. 218. t. 12. f. 4; Hist. Let. Suec. Höer, Sweden.
- N. elongata*, Brong., *l. c.* t. 12. f. 3. *Zamites*, Presl, *l. c.* p. 198. Höer, Sweden.
- N. proxima*, *Cycadites Nilssonii*, Sternb., pt. 1—4. t. 47. f. 1.

The above is an outline of some of the characters in the recent and fossil Cycadeæ, the geological position of which is equally interesting with their recent affinities. A few species are found in the carboniferous beds of Bohemia and in the new red sandstone of Germany, and some have also been met with in the cretaceous series of Denmark and Sweden; but their great development appears to have been during the Jurassic period, thirty species occurring in the oolitic formation of England, and three in that of India. Thus they seem to have formed the characteristic vegetation of that age, intermediate between the abundant Cryptogamic tribes of the carboniferous æra and the dicotyledonous flora of the tertiary series.

The great number of fossil species supposed to belong to this fa-

- P. filiciformis*, *Zamites filiciformis*, Presl, *l. c.* pt. 7. and 8. p. 198.  
*Filicites dubius*, Sternb., pt. 4. p. 23. t. 47. f. 1.
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mily has probably suggested the remark by Prof. Don, that the recent species "constitute the remains of a class of plants which belonged to a former vegetation."

The interesting specimens of fossil fructification, apparently furnished with a stem, belonging to this family, which exist in the collections of the British Museum, Mr. Bean of Scarborough and Mr. Saull of London, etc., have not been alluded to in this paper; they probably constitute a new genus from being generally associated with fronds having a peculiar character, first pointed out to me by M. König; and I shall reserve any remarks on this subject until I have completed some observations on the internal structure of the stem and its affinity to *Zamites*.

XVI.—*Carabideous Insects collected by Charles Darwin, Esq., during the Voyage of Her Majesty's Ship Beagle*. By G. R. WATERHOUSE, Esq.

[Continued from vol. vi. p. 355.]

GENUS FERONIA.

Sp. 1. *Feronia Corinthia*, Dejean, *Spécies général des Coléoptères*, tom. iii. p. 304.

*Molops Corinthia*, Germ. Col. sp. nov. p. 21.

Of this species Mr. Darwin obtained many specimens at Maldonado, La Plata, and two specimens are labelled 'Monte Video.' It is the *Carabus striatulus* of Fabricius, the original specimen of which is contained in the Banksian collection. I speak without hesitation, having compared Mr. Darwin's specimens with the original, with Dejean's description, and also with three specimens sent from the continent by different parties, all bearing the same specific name.

The *Feronia Corinthia* is readily distinguished from all the *Feroniæ* of the southern portions of South America hitherto discovered, by its large size, and the elytra being deeply striated towards the suture and almost smooth externally. The *Feronia chalcea* of Dejean is closely allied to the present species, having very nearly the same general form and similar sculpturing to the elytra; but in size it is much inferior, *F. Corinthia* being 8 lines in length, whilst *F. chalcea* is only  $5\frac{3}{4}$  to 6 lines in length; the former is brassy black, and the latter is of a brassy colour inclining to æneous.

Sp. 2. *Feronia chalcea*, Dejean, *Sp. général des Coléop.* tom. iii. p. 308.

Four specimens of this species were brought from Maldonado, La Plata, by Mr. Darwin.

Sp. 3. *Feronia cordicollis*, Dejean, *Spécies général des Coléop.* tom. iii. p. 306.

Seven specimens of this species occur in Mr. Darwin's collection, five of which are from Monte Video, and two from Maldonado, La

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The *Feronia Corinthia* is readily distinguished from all the *Feroniæ* of the southern portions of South America hitherto discovered, by its large size, and the elytra being deeply striated towards the suture and almost smooth externally. The *Feronia chalcea* of Dejean is closely allied to the present species, having very nearly the same general form and similar sculpturing to the elytra; but in size it is much inferior, *F. Corinthia* being 8 lines in length, whilst *F. chalcea* is only  $5\frac{3}{4}$  to 6 lines in length; the former is brassy black, and the latter is of a brassy colour inclining to æneous.

Sp. 2. *Feronia chalcea*, Dejean, *Sp. général des Coléop.* tom. iii. p. 308.

Four specimens of this species were brought from Maldonado, La Plata, by Mr. Darwin.

Sp. 3. *Feronia cordicollis*, Dejean, *Spécies général des Coléop.* tom. iii. p. 306.

Seven specimens of this species occur in Mr. Darwin's collection, five of which are from Monte Video, and two from Maldonado, La



mily has probably suggested the remark by Prof. Don, that the recent species "constitute the remains of a class of plants which belonged to a former vegetation."

The interesting specimens of fossil fructification, apparently furnished with a stem, belonging to this family, which exist in the collections of the British Museum, Mr. Bean of Scarborough and Mr. Saull of London, etc., have not been alluded to in this paper; they probably constitute a new genus from being generally associated with fronds having a peculiar character, first pointed out to me by M. König; and I shall reserve any remarks on this subject until I have completed some observations on the internal structure of the stem and its affinity to *Zamites*.

XVI.—*Carabideous Insects collected by Charles Darwin, Esq., during the Voyage of Her Majesty's Ship Beagle*. By G. R. WATERHOUSE, Esq.

[Continued from vol. vi. p. 355.]

GENUS FERONIA.

Sp. 1. *Feronia Corinthia*, Dejean, *Spécies général des Coléoptères*, tom. iii. p. 304.

*Molops Corinthia*, Germ. Col. sp. nov. p. 21.

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